Mental Health Outcomes of First Generation College Students: Is Generational Status Associated with Increased Risk for Depression and Anxiety?

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MENTAL HEALTH OUTCOMES OF FIRST GENERATION COLLEGE STUDENTS: IS GENERATIONAL STATUS ASSOCIATED WITH INCREASED RISK FOR DEPRESSION AND ANXIETY?

A Dissertation

Presented to
the Faculty of the Graduate School of Social Work
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of the Requirements for the Degree
Doctor of Philosophy

by
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Chair: Stacey Freedenthal, Ph.D.
Abstract

The purpose of this study was to investigate whether there were differences in mental health outcomes between first generation college students and non-first generation college students. The sample ($n = 6,449$) consisted of undergraduate students, aged 18–22, in bachelor’s degree programs, and was drawn from 15 colleges and universities throughout the United States. Acculturative stress was used as a theoretical framework for why first generation college students (pioneers) may screen higher in prevalence and severity of mental health outcomes. The particular mental health outcomes examined in this study were the prevalence and severity of depression and anxiety. The results revealed that pioneers did not screen higher in prevalence or severity of depression or anxiety than non-first generation students (legacy students). However, students who had at least one parent who attended college, but did not graduate (partial legacy students), screened higher for prevalence of anxiety, severity of anxiety, and prevalence of minor depression than legacy students. These results were also significant when partial legacy students were combined with pioneers. The findings suggest that there may be risk factors for depression and anxiety that are unique to partial legacy students. Implications of these findings are that colleges and universities should be aware that partial legacy students may be at risk for mental health problems—a group that has not been previously identified as at risk. Further implications point to the possibility that pioneers who attend
college may represent a more resilient group of students. Limitations include the lack of stratification of generational status by year in school, the limitations of the outcome measures, the subjective measure of financial situation, and restricting the sample age range from 18–22. Future research could include measures of resiliency and acculturative stress when examining mental health outcomes by generational status.
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Chapter One: Introduction

Evidence suggests the prevalence of depression and other mental health problems among college students in the U.S. is on the rise (Benton, Robertson, Tseng, Newton, & Benton, 2003; Collins & Mowbray, 2005; Gallagher, 2005; Kadison & DiGeronimo, 2004; Soet & Sevig, 2007). Kadison and DiGeronimo (2004) reported that in the past 25 years, depression rates on college campuses have doubled. In a survey of mental health center directors, Gallagher (2005) found that the rate of students reporting ever being diagnosed with depression has increased 56% in the last six years, from 10% in the spring of 2000 to 16% in the spring of 2005. More than one observer has noted that the nature and severity of problems over the last fifty years have slowly shifted from benign adjustment issues to more severe psychological distress (Benton et al., 2003; Kadison et al., 2004; Kitzrow, 2003).

Explanations for this increase are varied, and include moving away from home for the first time, increased academic demands, skyrocketing costs of tuition, and social isolation (e.g., Kadison et al., 2004; Kitzrow, 2003). Particular groups of college students, such as students with financial troubles, older students, sexual minorities, and women, have been shown to be at increased risk for mental health problems (e.g., Eisenberg, Gollust, Golberstein, & Hefner, 2007; Suicide Prevention Resource Center, 2004). One group of students who could potentially be at risk, but whose mental health outcomes have not been examined, is first generation college students.
This dissertation hypothesized that first generation college students, hereafter referred to as pioneers, may be at greater risk for mental health problems than non-first generation students. Pioneers are defined as students where neither parent attended college or university. The theoretical rationale for this hypothesis was that the acculturative stress experienced by pioneers could potentially lead to greater psychological distress than in those students who are not first generation college students. Acculturative stress has been identified in the research as being particularly relevant to pioneers in terms of their transition to the college environment, experiences in college, student retention, and graduation (e.g., Deffendall, Knutson, & Sacks, 2011; Pascarella, Pierson, Wolniak, & Terenzini, 2004; Pike & Kuh, 2005). Research suggests that pioneers are having difficulties in these areas (e.g., Hirudayaraj, 2011, National Center for Education Statistics, 2005; Pascarella et al., 2004; Richardson & Skinner, 1992). One possible theoretical explanation that has not been explored is whether acculturative stress could trigger difficulties with mental health outcomes.

**Operational Definitions of Generational Status**

**Pioneers.**

The definition of what constitutes a pioneer has varied in the literature. The majority of researchers have defined first generation college students as the U.S. Department of Education (1997) defines them; students whose parents did not attend or never enrolled in post-secondary education (e.g., Terenzini, Spring, Yaeger, Pascarella, & Nora, 1996). Others (Choy, 2001) have defined pioneers more loosely as students where at least one of the parents attended some college, but neither had a college degree.
Pioneers were defined in this dissertation as undergraduate students between 18–22 where neither parent attended college or university. A cut-off age of 22 was decided for a couple of reasons. The first is because 18–22 is considered the traditional age of undergraduate students, and the second reason is due to the way in which the age variable was constructed. This will be discussed at length in the Methods chapter and limitations section of the dissertation.

**Legacy students.**

Legacy students were defined as undergraduates between the ages of 18–22 with at least one parent who earned a bachelor’s degree or higher from a college or university.

**Partial legacy students.**

Partial legacy students include those in which the parent with the most formal education attended some college, but did not earn a college degree. After an initial review of the data, it became apparent that a large subset of the sample (n = 1,157) did not fit neatly into legacy or pioneer status. For this reason, a third group was created upon which to run analyses to see if they were distinct from both pioneers and legacy students on mental health outcomes. In order to perform a more fine-grained analysis, this third group will be retained and a series of statistical analyses were run to determine if the third group is more closely aligned with pioneers or legacy students. If the third group was unique then it was retained as a separate group throughout the multiple regression and logistic regression analyses. While most researchers distinguish between only two groups (first generation and non-first generation students), Pascarella et al., (2004) identified and retained a third group of students, making the observation that it
may be unwise to compare first generation students to all others. As Pascarella (2004) and colleagues state, “a student whose mother had completed a year of college and whose father had a high-school diploma would be grouped in the ‘other college student’ category with a student whose parents both had graduate degrees” (p. 256).

**Background of the Problem: College Student Mental Health**

Directors and administrators at college mental health centers are almost unanimous in their belief that students are coming to campus with more mental health problems—both in prevalence and severity—than at any time in recent history (Benton et al., 2003; Collins & Mowbray, 2005; Gallagher, 2005; Kadison & DiGeronimo, 2004; Kitzrow, 2003). The severity of mental health problems in college populations has been recognized at the national level, as evidenced by the creation of a SAMHSA task force that has awarded over $4.5 million in grant funding to colleges across the U.S. for the development of suicide prevention programs (SAMHSA, 2008). The National Institute of Mental Health’s (NIMH) inclusion of college populations as well as the priority-appointment in the 2009 Challenge Grant Program provide further evidence of the national concern over college student mental health (Hunt & Eisenberg, 2010).

Research has identified subpopulations of college students who may be at greater risk for mental health problems, such as students from lower socioeconomic backgrounds and ethnic and sexual minorities (e.g., Eisenberg et al. 2007), but no research has examined the possibility of pioneers as an at-risk group specifically for mental health problems. Yet, given the numerous stressors that pioneers often face (e.g., Orbe, 2004; Somers, Woodhouse, & Cofer, 2004; Terenzini et al., 1996), a closer examination of
mental health outcomes seems warranted to determine if being a pioneer constitutes a unique risk.

**Increasing prevalence of pioneers on college campuses.**

Research has shown that the proportion of pioneers on college campuses increased steadily from the 1920’s to the early 1970’s (Billson & Terry, 1982; Orbe, 2003). Using data from the National Center of Education Statistics, Choy (2001) reported that in 1994, 59% of high school students had enrolled in some form of post-secondary education. The National Education Longitudinal Study of 1988, which classified pioneers as students whose parents had a high school diploma or less, estimated the proportion of pioneers enrolled in post-secondary education was 22%. Estimates of the proportion of incoming pioneers at four-year institutions were 29.5% at public universities and 25% at private universities (National Center for Education Statistics, 1998). Indeed, the most recent data on pioneers shows the continued growth of this population. The National Center for Education Statistics (2010) reported that pioneers approach 50% of students enrolled in 2007–2008 in higher education. Pioneers who identified as White made up 28% of the sample, 45% of Black or African Americans students were pioneers, 49% of Hispanic or Latino students were pioneers, 36% of Native American identified as pioneers, and 32.2% of Asian students identified as pioneers. Between fall 2010 and fall 2019, overall college enrollment is expected to increase by 14% (National Center for Educations Statistics, 2010), and pioneers are certain to make up a large proportion of that group. As the overall number of pioneers on college campuses continues to grow, awareness among university personnel of the unique
challenges that they face could help inform policy changes that increase the likelihood of a successful transition.

**A challenging transition for pioneers.**

Pioneers differ from legacy students in a number of important ways that can make the transition to college difficult (Deffendall, Knutson, & Sacks, 2011; Dennis, Phinney, & Chuateco, 2005; Terenzini et al., 1996). One of the most challenging aspects of this transition is the limited knowledge many pioneers have about life on college campuses. The families of pioneers are not able to prepare them psychologically and logistically for what to expect when attending college (York-Anderson & Bowman, 1991; Horn & Nunez, 2000). Other obstacles are related to the capacity to fully engage or immerse themselves in the university environment, since pioneers are far more likely to attend part-time, to work more hours, and to live off-campus (Hottinger & Rose, 2006; Pascarella, Pierson, Wolniak, & Terenzini, 2004). They are also more likely to be racial or ethnic minorities, to be older, to attend college closer to home, and to need financial aid for tuition (Hottinger & Rose, 2006; National Center for Education Statistics, 1998; Terenzini et al., 1996). Other characteristics include having lower socioeconomic status and deciding later in their high school careers to enter college (Fallon, 1997; Hottinger & Rose, 2006).

**Bridging two cultures.**

It has been argued that pioneers are in a situation in which acculturation to a college environment increases the likelihood of success (Orbe, 2004). The process of acculturation is inherently stressful and can manifest as mental health problems when
demands exceed personal resources (Williams & Berry, 1991). The experience of going to college for pioneers has been described as entering an alien world with vastly different ways of communicating, and with an entirely different set of rules (Bartholomae, 1985; Terenzini, Rendon, Upcraft, Millar, Allison, Gregg, & Jalomo, 1994). Indeed, Hsiao (1992) recognized that, “one of the greatest challenges facing first generation college students in pursuit of college education is their position on the margin of two cultures—that of their friends and family and that of the college community” (p. 2). This sentiment has been echoed by other researchers (e.g., Lara, 1992; London, 1992) who found that pioneers feel alienated in both the university culture and their culture of origin. Orbe (2004) saw pioneers as presenting a unique opportunity for research into how students successfully negotiate multiple identities on college campuses.

The number of responsibilities that pioneers have is one of the main ways in which they differ from legacy students. Pioneers often have more financial, family, and cultural obligations than legacy students (Inman & Mayes, 1999; Priebe, Ross, & Low, 2008). Despite these obstacles, they continue to attend college at high rates, and one of the main reasons they attend is the promise of a brighter economic outlook with a college degree (Higher Education Research Institute, 2007).

**Complicated family relations.**

In addition to the career advantages of having a college education, college attendance is also regarded by some people as a rite of passage into early adulthood (Arnett, 1998), or as a time of breaking from the family of origin (London, 1989). For pioneers, this developmental period can be difficult and they can often find themselves
grappling with redefining relationships with family members and their culture of origin (London, 1992; Stierlin, 1974). While many seem to have a certain willingness to break with their familial and/or cultural background, many others simultaneously tend to stay more connected to their family and culture of origin (Orbe, 2004; Priebe et al, 2008).

The tension between the desire to expand and grow and the loyalty to one’s familial background is a common crossroads for many young adults’ development, but it is particularly salient in pioneers (Hsiao, 1992), because, as London (1992) has noted, it ultimately brings into question where one’s allegiance lies. On the one hand, seeking a college degree almost certainly provides them with more opportunity than their parents or other previous generations could have known. On the other hand, being first generation opens them to criticism from individuals in their culture of origin who have not attended college and who may question where their allegiance and loyalties lie. London (1989) reports that in his in-depth interviews with 15 pioneers for a qualitative research project, without exception they reported feelings of loss and a renegotiation of relationships.

One might assume that parents of pioneers would support their children’s decision to pursue a college degree, but the evidence is equivocal (Terenzini et al., 1994). In qualitative interviews with pioneers, they often report that the decision to pursue college is not always supported, which can complicate the decision to attend, or causes people to question whether staying in school is the right decision if obstacles arise (Orbe, 2004). Whereas legacy students are continuing a family tradition, pioneers can be seen as breaking one (Terenzini et al., 1994). The familial perspective is often that family should be prioritized over career and getting a college education (Orbe, 2004). In addition,
consciously or not, parents of pioneers may feel uncomfortable with the possibility that pursuing a college education would put their child into a higher social class than themselves (London, 1989; Priebe et al., 2008). Indeed, some families of pioneers actively discouraged or even undermined attempts to pursue post-secondary education (Priebe et al., 2008). In addition to navigating the college environment, pioneers experience the added stress of navigating multiple identities at a stage of development when they are supposed to be forging their own identity (Arnett, 1998; Erikson, 1950).

While much has been learned about pioneers’ demographic characteristics, college preparation, transitioning to college, and post-secondary educational outcomes (e.g., Ayala & Striplen, 2002; Choy, 2001; Horn & Nunez, 2000; Lara, 1992), very little is known about the mental health outcomes (e.g., depression, anxiety) of pioneers, who are more often than not navigating multiple identities (Mejia & McCarthy, 2010). Based on a review of the extant literature on first generation college students, to the best of this writer’s knowledge, this is the first study to examine the mental health outcomes of students by generational status.

**Study Purpose**

The purpose of this study was to determine if pioneers are at greater risk – both in prevalence and severity – for depression and anxiety than legacy students. Partial legacy students were also included as a distinct group if they differed significantly along demographic variables. Otherwise, they were collapsed into the group with which they were most closely aligned. To date, no study has examined levels of anxiety and depression in students of different generational status, and this study provides data that
either suggests or denies a relationship between the two. Knowing if the mental health problems of pioneers differ from legacy students is important because it can help inform how to identify at-risk students. In addition, pioneers who are struggling to stay in school may have the added stressor of suffering with mental health problems. Learning more about whether pioneers may be vulnerable can increase knowledge of risk factors for mental health problems and how to address them.

**Chapter Summary**

This dissertation examined whether generational status represented a unique risk factor for college students. Although research has illuminated the social and familial tensions that pioneers encounter, very little is known about the mental health outcomes of pioneers. In addition, very little is known about how different levels of generational status may relate to the well-being of college students. For instance, are pioneers more susceptible to mental health problems than partial legacy students, or is the risk similar? This study explored the relationship between generational status and mental health, as well as established a more fine grained analysis with respect to generational status than has been done in past research.
Chapter Two: Review of the Literature

Acculturative Stress

Acculturative stress theory (Berry, 2006) was used in this dissertation as the theoretical framework that provides a rationale for why pioneers may be at additional risk for mental health problems. Although usually reserved to describe immigrants acculturating to a new culture, acculturation can also be used to describe the experiences of many pioneers upon attending college or university (Mena, Padilla, & Maldonado, 1987; Padilla, Alvarez, & Lindholm, 1986). Acculturation is a psychosocial phenomenon in which a minority group member adapts to the dominant culture (Berry, 2003; Berry, 2006). Acculturative stress is defined as the stress that is associated with the adaptation to a new culture, as well as the psychological consequences, such as depression, anxiety, and occasionally suicidal ideation, that have been linked to that adaptation (Constantine, Okazaki, & Utsey, 2004; Williams and Berry, 1991).

Acculturative stress in international students and pioneers.

Acculturative stress has been linked to depression in ethnic minority and international college student populations (Hovey, 2000a, 200b; Perez, Voelz, Pettit, & Joiner, 2002). For many first generation college students, navigating the college environment is not unlike entering a new culture (London, 1989; Orbe, 2004), and therefore can be particularly stressful and overwhelming. Although it could be argued that all college students experience this culture shift, pioneers often lack many of the
resources of legacy students. For instance, pioneers lack the knowledge of family members in terms of familiarizing a student with what to expect of campus life, including; socialization, increasing academic demands, living away from home, and navigating financial aid and academic advising (Horn & Nunez, 2000; York-Anderson & Bowman, 1991). In addition to the normal stressors of attending college, pioneers have the additional experience of acculturating to an environment they may know little about.

Scholars have argued that stress is a fundamental component of the acculturation process, and it has been identified as a significant problem for people entering a different culture (Berry, 1980; Berry, Kim, Minde, & Mok, 1983). A transactional perspective on stress, which accounts for culture, provides a more realistic view of the effects of stress (Lazarus & Folkman, 1984). This perspective weighs stressful events against one's own resources for coping with them (Sapolsky, 1998). While a transactional perspective on stress is distinct from acculturative stress, it helps to explain why different individuals react to the same situations in different ways, with different levels of coping ability. When demands exceed personal resources, psychological adaptation in the form of anxiety and depression can ensue (Mejía & McCarthy, 2010).

Not only do pioneers tend to have significant resource deficits in the college environment, the details of which will be discussed later in this chapter, but they are also put into situations where they must navigate multiple cultures at once (Hertel, 2002; Orbe, 2004; Pascarella & Terenzini, 2005; Zwerling & London, 1992). Acculturative stress is distinct from other types of stress in that its source is the process of acculturation, and the outcomes are often negative adaptive psychological responses.
including depression, anxiety, confused identity, and feelings of alienation (Williams & Berry, 1991). Although no research has explored the relationship between mental health conditions and acculturative stress among pioneers, the phenomena of acculturation and its attendant stressors would appear to apply to this population of students.

**Existing research on acculturation and pioneers.**

Scholars have written about the problems of acculturation for pioneers, but primarily in the context of explaining problems associated with low graduation rates and high percentages of attrition at colleges and universities since pioneers are among the least likely to attain college degrees (e.g., Terenzini, Springer, Yaeger, Pascarella, & Nora, 1996; Thayer, 2000). (These characteristics will also be explained in more detail later in this dissertation chapter). Pike and Kuh (2005) and Terenzini et al. (1994) have both identified acculturation as an issue for pioneers to address in order to make a successful transition to university life. The experiences of pioneers entering college have also been captured in a number of qualitative reports (London, 1989; Orbe, 2004; Priebe et al., 2008) as well as essays by pioneers who have gone on to become scholars (e.g., Lara, 1992; Rendon, 1992; Rodriguez, 1982). London (1989), who described the experience of entering college for pioneer students as synonymous with entering a new culture, interviewed pioneers and found that, regardless of race or ethnicity, the common thread was a sense of marginality, of living on the edge of two cultures, but never quite at home in either.
Acculturative stress and mental health of pioneers.

Given the stress inherent in attending college for pioneers, as well as the link between acculturative stress and mental health conditions in other populations (e.g., immigrants, and international students) (e.g., Constantine, Okazaki, & Utsey, 2004; Hovey & Magana, 2002; Revollo, Qureshi, Collazos, Valero, & Casas, 2011; ), it would follow that there may be significant mental health problems in pioneers. The lack of investigation in this area—that pioneers are an at-risk group for mental health problems—represents a gap in the research literature. And again, it is important because the association between mental health problems and other problematic behaviors can put students at risk of not only dropping out of school, but a host of other serious problems. This study was an attempt to address that gap. Specifically, this study examined whether there are differences in the prevalence and severity of mental health conditions between pioneers, partial legacy, and legacy students, while controlling for a number of variables correlated with depression and anxiety in previous studies. This study provided a more nuanced understanding of how generational status is associated with mental health problems by defining generational status by three distinct groups.

History of acculturation

The psychological impact of adapting to different cultures has been discussed since the time of Plato (Rudmin, 2003). Indeed, in modern times it barely seems possible to imagine living in a world without the intermingling of cultures, and this has only seemed to increase today. The process today is referred to as acculturation. Redfield, Linton, and Herskovits (1936, p.49) provide the classic definition, stating that,
“acculturation comprehends those phenomena which result when groups of individuals having different cultures come into continuous first hand contact with subsequent changes in the original culture patterns of either or both groups”. Later definitions made the distinction that acculturation could be not only a process of assimilation, but also of creative, reactive, or delayed processes (Social Science Research Council, 1954). Further differentiation includes the differences between collective or group acculturation and psychological acculturation (Graves, 1967). Collective or group acculturation refers to the change that occurs within the group, whereas psychological acculturation is defined as the change that occurs within an individual who could be involved in varying degrees with the collective change experienced by the group (Berry, 1970).

As the concept of acculturation became more familiar and popular among scholars, particularly cross-cultural psychologists, it also came under scrutiny as the term soon began to be discussed as synonymous with assimilation (Vasquez, 1984). However, assimilation is differentiated from acculturation in that assimilation refers to one of four paths acculturation can take. Specifically, assimilation refers to a strategy whereby the individual in the non-dominant group makes a conscious decision to seek daily interaction with the dominant culture, and at the same time to lose contact with their culture of origin (Berry, 1997).

Another term that is similar to acculturation and developed in parallel is interculturation (Berry, 1997). Employed largely in French-speaking academic circles, interculturation refers to the process of interaction between groups or individuals that are culturally distinct. Although the terms are similar, interculturation is more concerned
with the formation of new cultures from the interaction of the two than acculturation (Berry, 1997).

Today, acculturation is an increasingly important topic because the isolation of distinct cultural groups has become increasingly difficult to maintain. There are a number of reasons for this phenomena, including; a) the rapid increase in technological communications has made isolation more difficult, b) war, political oppression, overthrown governments, and famine produce millions of immigrants each year, c) political ideologies that represent more liberal leanings have allowed minorities to express their civil rights, and d) free trade and international recruitment of skilled professionals have increased dramatically in recent years (Rickard, 1994). The inertia of these phenomena has created a situation where acculturation is highly probable if individuals are going to participate in the world in which we now live.

**Current Definition: The Four-fold Acculturation Theory**

There have been varying views of how acculturation is defined and measured (Horenczyk, 1997; Lazarus, 1997; Peck, 1997; Triandis, 1997). Despite these varying views, acculturation was defined in this dissertation as a psychosocial phenomenon in which a minority group member adapts to the dominant culture (Berry, 2003). If acculturation is highly probable for pioneers, the next question is; how does this process unfold, and what are the particular outcomes from this process? The two major questions of the groups are; cultural maintenance, or, how much should the group or individual maintain their separate identity, and, contact or participation, or how much to interact with the other culture or group (Berry, 1997)? Examining these two issues
simultaneously provides us with a conceptual framework that lays out a theory of acculturation called the four-fold theory.

From a meta-level viewpoint, Berry (2003) and others would argue that one can only discuss acculturation within its cultural context. In other words, acculturation at the cultural level would require a nuanced understanding of both the dominant and non-dominant cultures, which in turn, would allow for a more complete understanding of the acculturation experiences at the individual level. Acculturation at the individual level, or psychological acculturation, is what is generally being referred to when discussing the four-fold theory. Conceptually, this is relevant because there is enormous variability in the ways in which individuals from the same culture change when interacting with foreign cultures. In this study, psychological acculturation, and in particular the stress associated with the acculturation process (termed acculturative stress), is the theoretical framework for why pioneers may be more susceptible to mental health problems than legacy or partial legacy students. While this dissertation is not measuring levels of acculturative stress, it is using the concept as a theoretical rationale for why pioneers may be at increased risk for mental health problems because of the acculturative stress associated with the college environment. In addition, if pioneers are more prone to mental health problems, then acculturative stress should be considered as a possible indicator in future studies, where a measure of acculturative stress is included. This could inform institutional policies on ways to help integrate pioneers into colleges and universities. Previous research on the association between acculturative stress and mental health problems are discussed later in this chapter.
The question of whether acculturation takes place on a single continuum or is multidimensional has been up for debate by cross-cultural psychologists for over forty years (e.g., Berry, 1970; Garcia & Lega, 1979; Somerlad & Berry, 1970), and owes its original conceptualization to anthropology. Redfield, Linton, and Herskovitz (1936) noted that assimilation was not the only means by which people acculturate. Berry (1970) and others since (e.g., Ryder, Alden, & Paulhus, 2000; Sanchez & Fernandez, 1993; Zak, 1973) have elaborated on the idea that acculturation can, in fact, be multidimensional. They have developed elaborate models to reflect this idea, perhaps the most famous of which is the four-fold theory of acculturation.

**Four-fold theory.**

There is a general consensus among scholars of acculturation that Berry and his associates first conceptualized and defined the four-fold theory of acculturation (e.g., Berry, 1970; Berry & Annis, 1974; Somerland & Berry, 1970), which moved into common language and was adopted by other scholars as the leading theory of the acculturation process (Rudmin, 2003). The four-fold theory states that a person can identify with or practice two distinct cultures independently (Rudmin, 2003). These cultures would be the dominant and the minority culture—and interaction with these two can be either positive or negative—based on the individuals’ thoughts and experiences, leaving four possible types of interaction as seen in Figure 1 below. The experience could be positive for the dominant and minority culture, positive for the dominant but negative for the minority culture, negative for the dominant culture but positive for the minority culture, or negative for both. These four quadrants are now commonly referred
to as (a) assimilation, (b) separation, (c) integration, and (d) marginalization (Berry, 1997). See figure 1 below, developed by Berry (2003), for a visual display of the possible outcomes of acculturation for the minority and dominant group.

Figure 1: Varieties of acculturation for minority and dominant groups

Reprinted with permission from J. W. Berry (2003).

From the point of view of the minority group, which in this case would be the vantage point of pioneers, the assimilation strategy would be one in which an individual did not wish to maintain relationships with their culture of origin, but instead to interact exclusively with the dominant culture (Berry, 1997). In contrast, a strategy in which an individual from the minority group was to avoid contact with the dominant group and at the same time seek to maintain a strong connection with their culture of origin is indicative of separation (Berry, 1997). When one has an interest in both maintaining
contact with their culture of origin, while at the same time reaching out to begin new relationships with the dominant culture, then integration is indicated. Lastly, when there is little interest in maintaining a relationship with the culture of origin and a lack of relationship with the dominant culture as well, marginalization is the default categorization. Marginalization is seldom a condition that is chosen, but comes about because of the unfortunate combination of enforced cultural loss and discrimination by the dominant culture (Berry, 2003).

With the exception of marginalization, and to some degree integration, each of the other three psychological acculturation strategies are freely chosen by the individual, and assume relatively high levels of openness to diversity from the dominant culture (Berry, 1991). The dominant culture, for instance, must have a multicultural ideology, low levels of prejudice and racism, and some level of attachment and aspiration towards the dominant culture’s ideology (Kalin & Berry, 1996). Pre-conditions are also required of the culture of origin when integration and separation are desired.

The culture of origin’s group must have an interest in maintaining and preserving a cultural heritage. For pioneers, the attitudes towards assimilation could be paramount in determining the types of stress associated with attending college and interacting with the dominant culture. For instance, integration and assimilation would seem to be indicative of much better academic and mental health outcomes than separation or marginalization. But as was mentioned earlier, integrating and assimilating are not always in control of the individual.
Acculturation Outcomes

Scholars have long assumed that there were negative psychological outcomes associated with acculturation (Malzberg & Lee, 1965). However, there is mounting evidence that acculturation has a variety of outcomes, both positive and negative, and that a generalization of acculturation being inherently negative seems misguided (Berry & Kim, 1988; Jayasuriya, Sang, & Fielding, 1992; Murphy, 1965). Psychological difficulties associated with acculturation can be broken down into two broad categories in the research literature according to level of difficulty or severity: behavioral shifts, and acculturative stress. Behavioral shifts, also referred to as culture learning (Brislin, Landis, & Brandt, 1983), social skills learning (Furnam & Bochner, 1986), or adjustment (Ward & Kennedy, 1993a) refers to the process of acculturation bringing about changes in behavior that are consistent with the new culture, as well as some letting go of behaviors from the culture of origin. Acculturative stress (Berry, 1970; Berry, Kim, Minde, & Mok, 1987) is associated with more severe conflict in the process of acculturation and has been closely tied to models of psychological distress (Lazarus & Folkman, 1984). In the most severe forms of difficulty, acculturative stress could lead to psychopathology (Revollo, Qureshi, Collazo, Valero, & Casas, 2011). In this case, the psychological distress resulting from the acculturation process would prove to be beyond the coping capacities of the individual. These two concepts, behavioral change as normal adjustment, and in particular acculturative stress as potentially maladaptive adjustment, are used in this dissertation as the theoretical explanation for why pioneers may have more mental health problems.
**Variability of successful outcomes to acculturative stress.**

The success of acculturation is highly variable, as has been discussed by Berry and Sam (1997), and Ward (1996). When the stress of a new environment cannot be adjusted to or assimilated to quickly and easily, and the stress is due to intercultural contact, then the conflict can create significant psychological distress. Adaptive stress paradigms (e.g. Lazarus & Folkman, 1984) are useful here in terms of conceptualizing how an individual reacts, initially and over time, to the stress associated with acculturation. In this sense, stress reactions, be they psychological or behavioral, are a result of acculturative stress, or stress that stems from contact with another culture (Berry, 2003).

The question arises as to what factors are associated with successful acculturation, and what factors are associated with unsuccessful transitions? Berry (1992) created a framework in which key variables in the study of psychological adaptation to acculturation should be included. These factors include conditions before entering the new culture such as; gender, education, economic situation, push/pull motivations, expectations of acculturation, cultural dissonance, and personality factors such as introversion and extroversion (Berry, 1997). The various possible outcomes are discussed below.

Returning to the four-fold acculturation theory, which outcomes are most closely associated with varying degrees of behavioral change and acculturative stress? Research literature supports the idea that the most significant behavioral changes are associated with the assimilation strategy and the least behavioral changes are associated with
separation (Berry & Sam, 1997). Integration requires a selective adaptation of the
dominant cultures’ behaviors, as well as retention of behaviors from the culture of origin.
Marginalization is often marked by problematic behaviors such as illegal activities and
substance abuse (Berry, 2003). In terms of acculturative stress, the least resistant or
taxing strategy would be integration, given that the dominant culture accepts the
minority’s integration. The most taxing strategy is marginalization, where there is
essentially no acculturation to the dominant culture, as well as a rift in the connection to
the culture of origin. Research has produced findings on mental health that support the
four-fold acculturation theory and the various pathways that can be taken (Berry & Kim,

Diaz-Guerrero (1979) illuminated that it is important to keep in mind that
individuals are actors in the acculturation process, and can choose to either play an active
or passive role in their contact with the dominant culture. Thus, active problem-solving
can be helpful if the dominant culture is open to the interests of acculturating individuals.
On the other hand, passive problem-solving could be more indicative of assimilation if
the dominant culture is accommodating, or marginalization or oppression if the dominant
culture is perceived as more sinister.

**Research on Acculturative Stress and Pioneers**

Research suggests that acculturative stress has been associated with increased
psychological problems, especially in the initial months of contact between the individual
and the new culture or society (Yeung & Schwartz, 1986; Zheng & Berry, 1991). As
discussed earlier, acculturative stress is a situation in which individuals experience
problems that stem from the acculturative process. In addition, it is often exacerbated when the two cultures have disparate cultural values and discrimination (Gil, Vega, & Dimas, 1994).

Although the process is usually discussed in terms of immigrant populations, it can also apply to individuals who are experiencing a new culture, such as pioneers (Mena, Padilla, & Maldonado, 1987; Padilla, Alvarez, & Lindholm, 1986). The process for pioneers is different than for immigrants because pioneers often have the added burden of cultural conflict with their families (e.g., Miranda, Bilot, Peluso, Berman, & Van Meek, 2006). This is not to imply that the process for pioneers is more difficult than for recent immigrants – just different – with the commonality being interfacing with a new culture. The parents of a pioneer may hold quite different values than those that the student aspires to, which can obviously create family tension (Szapocznik, Scopetta, Kurtines, & Aranalda, 1978). For pioneers, this familial tension and cultural self-consciousness, along with the stressors associated with navigating the college environment, can potentially place significant stress on an individual’s psyche (Mena et al., 1987).

**Acculturative Stress and Mental Health Outcomes**

There is evidence that suggests mental health problems are associated with acculturative stress. Although most of the research involving acculturative stress in pioneers is centered around educational outcomes, a parallel literature search on recent immigrants, as well as ethnic minority and international students – populations that are in a similar predicament of managing two disparate cultures – yielded quite a few results
related to mental health outcomes. A meta-analysis of 49 studies on psychological adjustment and acculturation found that psychological problems were positively correlated with acculturative stress (Moyerman & Forman, 1992). Evidence also suggests an association between depression and acculturative stress as well as anxiety and acculturative stress (Hovey & King, 1996; Hovey & Magana, 2002; Salgado de Snyder, 1987). Acculturative stress has also been linked to feelings of marginalization, alienation, identity confusion, and heightened psychosomatic symptoms (Berry & Annis, 1974; Smart & Smart, 1995).

Acculturative stress has been positively correlated to psychological problems in other groups as well. The literature on recent immigrants reports numerous studies in which high levels of acculturative stress predict significant problems with depression and other mental health conditions (e.g., Gil, Vega, & Dimas, 1994; Hovey, 2000a; Hovey, 200b; Hovey & Magana, 2002; Revollo, Qureshi, Collazos, Valero, & Casas, 2011; Santiago-Rivera, Kanter, Busch, Rusch, Reyes, West, & Runge, 2010). Acculturative stress has also been offered as an explanation for the high rates of depression in international and ethnic minority students, who in many instances, are navigating a new culture in the same way as pioneers (Revollo, Qureshi, Collazos, Valero, & Casas, 2011; Walker, Wingate, Obasi, & Joiner, 2008; Wei, Heppner, Mallen, Ku, Liao, & Wu, 2007). There is also evidence that links acculturative stress and increased psychological distress in a sample of Hispanic college students, many of whom were first generation (Crockett, Iturbide, Stone, McGinley, Raffaelli, & Carlo, 2007).
Existing Research on Pioneers and Acculturative Stress: Educational Outcomes

Despite the abundance of literature documenting the cultural and academic hardships of first generation college students, surprisingly little has been published in terms of mental health outcomes. A review of the literature reveals no studies examining acculturation as it relates specifically to mental health outcomes in first generation college students. Examining the mental health outcomes of pioneers is important because it has been well documented that mental health problems among students are highly associated with other problems such as decreased retention rates (where retention is defined as a student continuing to enroll in college or university until they have completed their degree), substance abuse, and suicide (e.g., Eisenberg et al., 2008; Kitzrow, 2003). It would follow logically that if pioneers have lower retention rates, then they could also be having mental health problems as well. Although it is assumed that acculturative stress negatively affects mental health, what is actually known about this relationship, specifically among pioneers? In addition, what is known about acculturative stress and mental health symptoms as they relate to pioneers?

Williams and Berry (1991) hypothesized that acculturative stress would lead to increased anxiety and depression, especially in situations where the circumstances feel beyond the individual’s control and threaten a person’s coping resources (Barlow, 2002; Cohen & Willis, 1985; Lazarus & Folkman, 1984). This situation could occur when stressors specific to pioneers, such as pressure to assimilate, or a lack of institutional knowledge at the university, are beyond one’s ability to cope. The next section looks
more specifically at research on pioneers, their characteristics, and the influence of acculturative stress on their college experiences.

The research on pioneers and education can be organized into three areas that follow the process of college from pre-admission through attendance; (a) pre-college planning, (b) the transition to college from high school or work, and (c) the effects of their experiences in college on persistence (Terenzini, Springer, Yaeger, Pascarella, & Nora, 1996).

**Educational background and college experience of pioneers.**

Academically, pioneers appear to lag behind their legacy counterparts. Pioneers were less likely to take advanced mathematics courses in high school, with 60% of pioneers taking advanced mathematics courses and over 80% of legacy students taking those same courses (Choy, Horn, Nunez, & Chen, 2000). Specifically for calculus, only 20% of pioneers took this course in high school compared to 34% of legacy students (U.S. Department of Education, 2001). There is also evidence that pioneers’ parents were less involved in SAT or ACT preparation (16% versus 27%), discussed post-secondary plans less often (42% versus 61%), and were less likely to visit their child at college (61% versus 82%) relative to legacy students (Horn & Nunez, 2000). Only about 50% of pioneers took the SAT or ACT, compared to upwards of 75% of legacy students (National Center for Education Statistics, 2005). In addition, pioneers’ average overall GPA was 2.6 compared to 2.9 for legacy students (National Center for Education Statistics, 2005). Therefore, pioneers tend to enter college with lower rates of taking the
SAT, lower scores, and lower GPA’s (Brooks-Terry, 1988; Horn & Nunez, 2000; National Center for Education and Statistics, 2005; Riehl, 1994).

In addition, there is evidence that pioneers spend less time studying and have less involvement in campus activities (Billson & Terry, 1982; Hottinger & Rose, 2006; Orozco, 1999). For many pioneers there is a tendency to have less familial and social support to attend college (Bartels, 1995; Rendon, 1992; Thayer, 2000; York-Andersen & Bowman, 1991), as well as a lack of satisfaction and advantages within the institution of college (Orozoco, 1999; Thayer, 2000; Vargas, 2004). In addition, this transition often represents a significant break from the culture of origin (Hsiao, 1992). It is not surprising then to see that at four-year colleges, both pioneers and partial legacy students are more likely to drop out of school. In one study, pioneers were 8.5 time more likely to leave during their second year of college when compared to legacy students, and partial legacy students were 4.5 times more likely to leave than legacy students (Ishitani, 2006). This is not meant to imply that all pioneers are from disadvantaged backgrounds. Many come from families with significant social and cultural capital. Rather, this is meant to highlight the fact that, in general, pioneers often enter college with significant obstacles, ones that are over and above the stressors typically associated with attending college, such as leaving home and living on their own, navigating a new environment, and adjusting to increased academic demands. Nevertheless, there is some evidence to support the assertion that pioneers more often experience lower socioeconomic status (Hertel, 2002), and lower financial and emotional support (York-Anderson & Bowman, 1991). The additional responsibilities and stressors that are outside of the college
environment can make a single-minded commitment to college education a challenge for pioneers (Brooks-Terry, 1988; Orbe, 2003).

**Pre-college planning and transition.**

Research on the pre-college planning stage found a number of differences between pioneers and legacy students. For instance, there were significant differences between pioneers and legacy students in levels of family support, knowledge of college, and personal commitment (York-Anderson, & Bowman, 1991). Stage and Hossler (1989) found differences in generational status when comparing parents’ educational aspirations for their children while they were still in high school, which in turn, influenced the expectations of the students.

The transition to college among pioneers has also been the focus of research. London (1989) and Weis (1985; 1992) found that in addition to the regular anxieties that students encounter upon entering college, pioneers were also acculturating to foreign social environments to a greater degree than legacy students. For instance, in a review of the literature, Brooks-Terry (1988) found that pioneers experienced conflicting loyalties between on-campus friends and home, and often viewed their developmental stage differently (i.e., obtaining a college degree vs. starting a family). In addition, research has supported the idea that pioneers experience more conflicting roles in terms of managing educational and familial demands. Reconciling these demands has been shown to be painful, and can involve periods of anguish and internal conflict, because upward mobility often entails the loss or transformation of the relationship with one’s culture of origin (London, 1989; Terenezini, Rendon, Upcraft, Miller, Allison, Gregg, & Jalamo, 1999).
1994; Weis, 1985; 1992). Current scholars who had been pioneer students have given similar accounts of their experiences transitioning to college (e.g., Lara, 1992; Rendon, 1992, Rodriguez, 1982).

**Retention rates of pioneers.**

A third area of research examines how individual and family characteristics relate to retention rates of pioneers. Choy (2001) found that pioneers were more than twice as likely to leave after the first year of college (23%) compared to legacy students (10%), even after taking financial aid, work hours and race/ethnicity into account. Degree attainment has also been shown to rise as parental education rises. The likelihood of completing a bachelor’s degree rose from 55% for pioneers, to 65% for partial legacy students, to 76% for legacy students (National Center for Education Statics, 1998).

Billson and Terry (1982) as well as others (Attinasi, 1989; Richardson & Skinner, 1992; Warburton, Bugarin, & Nunez, 2001) found that pioneers are at greater risk of dropping out of school due to lower levels of social and academic integration. More recent data by Ishitani (2006) found that pioneers and partial legacy students were at the highest risk for leaving college during their second year, and the risk dropped gradually following the second year.

**Research with pioneers on psychological well-being and functioning.**

Although much is known about pioneers’ preparation for college, transition to post-secondary education and educational outcomes, surprisingly little is known about their psychosocial well-being. Only three studies were located that go beyond educational outcomes and examine the experiences, cognitive development, and
personality characteristics of pioneers (McGregor, Mayleben, Buzzanga, Davis, & Becker, 1991; Pascarella, Pierson, Wolniak, & Terenzini, 2004; Terenzini, Springer, Yaeger, Pascarella, & Nora, 1996). Measuring well-being in populations has become increasingly common in policy studies and general health services as such measures tend to give a more comprehensive view of well-being and functional status (Duberstein, Sörensen, Lyness, King, Conwell, Seidlitz, & Caine, 2003; Wells, Stewart, Hays, Burnam, Rogers, Daniels, Berry, Greenfield, & Ware, 1989). In addition, a focus on comprehensive well-being outcomes, such as psychosocial and cognitive development, is particularly important for students with mental health problems such as depression, since they have shown to be even worse off in these areas than even patients with chronic medical problems (Klerman & Weisman, 1992).

The three studies that examined well-being and integration into college of first generation college students were by McGregor et al. (1991), Terenzini et al. (1996) and Pascarella et al. (2004). All three of these studies measured first generation status (what is called “pioneers” in this study) the same way as it was measured in this dissertation, namely, as any student where neither parent had attended college or university. The study by McGregor et al. (1991) was a brief, observational study designed to measure the personality characteristics of college students by generational status. The findings were that pioneers scored much lower on self esteem and self-acceptance measures than non-first generation students. They were also more likely to perceive themselves as creative.

The study by Terenzini and colleagues sought to examine differences in characteristics between pioneers and legacy students, the experiences during college of
each group, and the consequences (if any) of these differences. The results indicated that pioneers had remarkably different background characteristics than legacy students. Pioneers were much more likely to be of Hispanic origin, to be from lower socioeconomic backgrounds, to have lower levels of incoming academic skills, to have weaker academic demands, and lastly, to be less integrated socially and academically. The results of this study are highly consistent with those reported by other qualitative studies (e.g., Lara, 1989; Rendon, 1992) that documented pioneers feeling out of place, as if they were placed in another culture. Additional findings were that pioneers were far less likely to report experiences of persistence and success associated with college. Notably, pioneers reported less integration into the college community, as evidenced by their feeling less supported by faculty. In addition, they were shown to work more hours than legacy students, thereby making it harder to find time to study.

Pascarella and colleagues (2004) study on educational outcomes and psychosocial development in college sought to expand on the previous findings on pioneers college experiences by following students into the second and third years of college. The study had three primary goals: (a) to estimate the differences between pioneers and legacy students on dimensions of their academic and non-academic experiences in college, (b) to estimate the differences between pioneers and legacy students along various status attainment, psychosocial and cognitive outcomes, and (c) to determine if there was a difference in magnitude in terms of how the academic and non-academic experiences influenced cognitive and psychosocial outcomes.
Interestingly, this study was one of four studies – the other three being the study by McGregor et al. (1991), a report from National Center for Education Statistics (1998), and the study by Ishitani (2006) – that classified first generation and non-first generation students more precisely than only two groups. The Pascarella study classified first generation students as those whose parent with the most formal education was a high school diploma or less, and then created two levels of “other college students”. A student where both parents attained a bachelor’s degree was considered a high level of education, and a student whose parent with the highest level of education was some college, but did not graduate, was classified a moderate level of education. (Pascarella et al., 2004). (The National Center for Education Statistics classified the three groups in the same fashion).

Findings from the Pascarella study showed quite a few discrepancies between first generation and other students. In staying with the nomenclature used in their study, the differences were most notable between first generation students and students whose parents had a high level of education. For instance, school selectivity was significantly different between first generation and high level of education students, but not between moderate and first generation students. Other significant differences of note in academic and non-academic experiences, while controlling for a number of precollege characteristics and demographics, were that first generation students completed fewer credit hours, worked more hours per week, were less likely to live on campus, had lower levels of extracurricular or athletic involvement on campus, and less contact with college peers than non-first generation students. In terms of academic outcomes, first generation college students showed no difference at the end of the second and third year, except for
a small but significant difference in science reasoning when compared to the moderate college experience group, but not the high education group. The one consistently negative effect for first generation college students across second and third year outcomes was their educational degree plans. This could indicate that first generation students had less external guidance and/or internal understanding of the importance of creating an educational plan for the future.

In terms of the magnitude of effects of how the academic and non-academic experiences influenced cognitive and psychosocial outcomes, first generation students were more likely to benefit from extracurricular activities despite the fact that they were less likely to participate in them. As mentioned earlier, first generation students worked more hours and this tended to have a larger negative academic impact than for other students. On the positive side, increased involvement in academic and classroom activities had a greater magnitude of impact on academic outcomes for first generation students with two notable exceptions; impact of cumulative credits on critical thinking, and course-related peer interaction on science reasoning. Also of note, although first generation students were less likely to attend selective institutions, when they did so, the magnitude of their growth in the areas of openness to diversity and self-understanding exceeded that of both other types of college students. Lastly, the types of courses taken had a greater magnitude of positive impact on first generation students than other students in second and third year outcomes on writing skills, internal locus of control on academic success, and educational plans.
McGregor et al. (1991), Terenzini et al. (1996) and Pascarella and colleagues (2004) provided an important step towards moving beyond a discussion of retention and dropout rates by increasing understanding of the psychosocial development of pioneers. In summary, these studies provide evidence that first generation students felt less support from the college environment, had remarkably different background characteristics, experienced less integration into the college community, and in one case, experienced lower self-esteem and self-acceptance (McGregor et al., 1991). Concurrent with an increased understanding of psychosocial development would be the mental health outcomes of these students. The current study seeks to address this area.

**The Current Study**

This dissertation examines the relationship between generational status and mental health outcomes in a multi-site sample of undergraduate college students. The following research questions addressed these aims.

**Research Questions**

1. While controlling for age, gender, sexual orientation, financial situation, and race/ethnicity, is generational status correlated with the prevalence of depression?

2. While controlling for age, gender, sexual orientation, financial situation, and race/ethnicity, is generational status correlated with the prevalence of anxiety?

3. While controlling for age, gender, sexual orientation, financial situation, and race/ethnicity, is generational status correlated with the severity of depression?
4. While controlling for age, gender, sexual orientation, financial situation, and race/ethnicity, is generational status correlated with the severity of anxiety?

**Chapter Summary**

As stated above, the difficult acculturative experiences of pioneers have been well-documented, but in most cases, this information was used to explain the high attrition and low degree completion rates among pioneers (National Center for Education Statistics, 2005). Although national data on the discrepancies are not available, studies have pointed out the gaps in retention and attainment. In two seminal studies on pioneers, Terenzini et al. (1996) and Pascarella et al. (2004) explored the demographic characteristics, educational outcomes, and psychosocial development of pioneers as well as how they differed from legacy students. Mental health outcomes are another area of research by generational status that could be explored and potentially provide evidence for a correlation between psychosocial development, retention rates, and mental health outcomes. Acculturative stress provides a theoretical framework for how pioneers may be at higher risk for mental health problems. This is the first study to this writer’s knowledge that specifically examined mental health outcomes by generational status.
Chapter Three: Methods

Background of the Healthy Minds Survey

This study analyzed data from the 2011 Healthy Minds Study, a biennial research survey of college students created as a collaborative effort between the University of Michigan School of Public Health, Survey Sciences Group, L.L.C., and the University of Michigan Depression Center (Survey Sciences Group, 2011). The survey was first piloted in 2005 at the University of Michigan. In 2007, the first multi-campus, web-based survey was conducted in which 13 colleges and universities participated. The 2011 version of the survey included 15 schools and over 9,000 student participants. The survey collects personal and mental health information from undergraduate and graduate students in a web-based questionnaire. Other data that are collected include information on medication and mental health service usage, stigma and other barriers to care, and how well-being and academic performance relate to mental health. The incentives for participating universities include a customized report for individual schools on the prevalence of mental health problems, utilization of mental health services, barriers to service usage, and positive mental health outcomes (Survey Sciences Group, 2011).

The Principal Investigator of the study, Daniel Eisenberg, Ph.D., provided written consent to use the dataset for this dissertation. The study was designed to measure and compare the prevalence and severity of depression and anxiety among undergraduate
students by generational status (i.e., pioneers, partial legacy, and legacy students), while controlling for covariates of these mental health conditions.

**Sample recruitment.**

Undergraduate and graduate students were recruited from 15 colleges and universities within the United States to take part in an online study. Using a random sample recruitment design, students were contacted via email and personally invited to take part in the online survey. The emails that were sent to students explained the nature of the survey, described issues of consent and confidentiality, and provided a link to the survey instrument. In order to encourage participation, follow-up emails were sent to students and they were informed that participation in the survey automatically enrolled them in a chance to win a sweepstakes for cash prizes totaling $2,000 (ten $100 prizes and two $500 prizes). Response rates were 25% in the 2011 version, down from close to 45% from 2007 and 2009 due to a less intensive recruiting strategy which allowed for cutting costs (D. Eisenberg, personal communication, January, 2012).

Individual universities collaborated with Survey Sciences Group to randomly contact students and invite them to take part in the survey. Besides the letters, students were contacted up to four times by email and encouraged to participate. Participation was confidential and no personal identifiable health information has been stored in the data set. The email addresses and any other personal identifiers that were collected are stored in separate, password protected files on Survey Sciences Group servers per the Healthy Minds Study protocol, which is overseen by the University of Michigan institutional review board (eResearch). Only members of the research team listed on the
protocol have access to these files. The team has also been trained in maintaining the confidentiality of participants.

**Participant data.**

The 2011 version of the survey collected data from 9,596 students at 15 colleges and universities throughout the United States. The pilot study of this survey had shown differences among responders and nonresponders on mental health measures and demographics (Survey Sciences Group, 2011). Therefore, nonresponse bias was accounted for by comparing the demographic characteristics of respondents and nonrespondents, and subsequently generating nonresponse bias weights accordingly (Survey Sciences Group, 2011).

Data analysis for this dissertation was limited to undergraduate students aged 18–22. The rationale for this was two-fold. First, the traditional age for undergraduate students is 18–22. In addition, younger students are at a different stage developmentally, and have different life demands than older, nontraditional undergraduate students (Hermon & Davis, 2004). For example, most traditional-aged students are becoming independent for the first time and experimenting with various career roles, while older nontraditional students tend to seek higher education for the purpose of recommitting to a concrete investment in career goals in order to gain improved work and home satisfaction (Gianakos, 1996). Terenzini and colleagues (1994) found other important differences, namely, that the biggest developmental challenge for traditional students was the transition from home to college, whereas for non-traditional students, the biggest challenge was the transition from work to school.
Secondly, the age variable was set up in such a way that students could select individual years from 18–22 (i.e., 18, 19, 20, etc.), but after 22, the response options went to a range (i.e., 23–25, 26–30, etc.). In order to treat the variable as continuous, students older than 22 were dropped. To determine that first generation students were not over represented in the older students, frequencies of the three groups were run to see what portion of the sample fell into each generational status. There were 565 undergraduate students ages 23 and up who completed the survey, which made up 8% of the total sample.

Within this remaining data set, 7,139 students identified as undergraduates between the ages of 18–22 in bachelor’s degree programs. Further cleaning of the data eliminated 647 cases that did not complete the survey and were coded as such in the data collection. Of the remaining 6,492 students, 43 participants did not answer the question about parental level of education. The final sample consisted of 6,449 undergraduate students between the ages of 18–22. From the final sample of students, 474 or 7.3% were pioneer students. An additional 1,157 students, or 17.8%, had parents who attended some college, but had not completed a bachelor’s degree (partial legacy students). Legacy students comprised of 74.2% of the sample, at 4,818 students. Descriptions of the sample, including race/ethnicity, gender, and age are displayed in Table 4 in Chapter 4.

**Key Concepts Operationalized**

**Pioneers.**

Pioneers are defined as undergraduate college students, aged 18–22, whose parents did not attend college or university. These data are captured on the questionnaire by two items, which ask, “What is the highest level of education completed by your
mother, father?”. Pioneers are identified as students who selected for both parents one of the following responses: “High school degree”, “Between 9th and 12th grade”, or “Eighth grade or lower”.

**Partial legacy students.**

Participants who selected “some college but no college degree” or “associates degree” for either parent on item A12a/b are defined as partial legacy students. These participants may be collapsed into the pioneer group or the legacy student group after the results of the chi-square and t-tests. Chi square and/or t-tests will be run on age, gender, sexual orientation, ethnicity, and financial situation to determine if there are significant differences between the partial legacy students and the other two groups. If it is determined that they are a distinct group, they will be kept as a third group throughout the analyses.

**Legacy students.**

Participants with at least one parent who graduated college or university are defined as legacy students. Participants who selected, “Bachelor’s degree”, or any higher level of education for either parent on questions A12a/b were identified as legacy students per the definition given at the beginning of this dissertation.

**The Patient Health Questionnaire (PHQ).**

The prevalence and severity of depression and anxiety screening instruments used in this study were measures that were originally developed as part of the Patient Health Questionnaire (PHQ) (Spitzer, Kroenke, & Williams, 1999). The PHQ originated from the Primary Care Evaluation of Mental Disorders (PRIME-MD) instrument, which was used to screen for depression, anxiety, somatoform, eating disorder, and alcohol use
disorders in primary care settings (Spitzer et al., 1994). The PRIME-MD took a clinician
5 to 6 minutes to complete in patients without a disorder, and 11 to 12 minutes in patients
who screened positive for a disorder (Pfizer, Inc., n.d.). This proved to be a hindrance to
its use in busy clinical settings. Therefore, the PHQ was designed as a self-administered
alternative screening tool (Spitzer et al., 1999). Specifically, the survey screens for
depression, anxiety, somatoform disorders and eating disorders using DSM-IV validated
screening measures of the PHQ (Spitzer et al., 1999). Specific subscales, or modules, of
the PHQ were used to assess these disorders. For the purposes of this study, the
depression and anxiety modules will be used to assess the prevalence and severity of
these disorders. Details about these modules, including number of items, scoring, and the
psychometric properties are described below.

**Depression.**

Depression is measured using module two of the Patient Health Questionnaire
(PHQ). Module two of the PHQ, now commonly administered on its own and referred to
as the PHQ-9, is a nine-item validated screening instrument that can be used to establish a
provisional DSM-IV diagnosis of major depressive disorder and has been highly
correlated with diagnoses by mental health clinicians in a range of populations (Diez-
Quevedo, Rangil, Sanchez-Planell, Kroenke, & Spitzer, 2001; Spitzer, Kroenke, &
Williams, 1999; Kroenke, Spitzer, & Williams, 2001). Each of the nine items
corresponds to the nine DSM-IV criteria for Major Depressive Disorder (American
Psychiatric Association, 2000). There are four response options, including “not at all”,
“several days”, “more than half the days”, and nearly every day”. Each item has a range
of 0–3, with the total score on the scale ranging from 0–27. There are two ways in which
this module is scored to screen for depression. One way in which the module is scored is to treat the variable as continuous and add up the total raw score (0–27). This method has been used in numerous research studies and has been indicative of depression severity (Kroenke, Spitzer, Williams, 2001; Löwe, Spitzer, Grafe, Kroenke, & Quenter, 2004; Löwe, Unutzer, Callahan, Perkins, & Kroenke, 2004; Muller-Tasch et al., 2007; Pyne, Kuc, Schroeder, Fortney, Edlund, & Sullivan, 2004). Analyzing raw scores maintains the variance in the dependent variable, and has been conducted in prior research (e.g., Pyne, Kuc, Schroeder, Fortney, Edlund, & Sullivan, 2004). In addition, the inclusion of dimensional assessments of severity has been recognized as an important complement to categorical diagnoses as evidenced by their proposed inclusion in the most current draft of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2012).

Prevalence of depression is measured categorically by creating an ordinal variable in SPSS with the categories of no depression, minor depression, and major depression. Cut-off scores for none, mild and major depression are given in Table 1 below along with the treatment recommendations that accompany the instrument. The scale has been used in this fashion in the research literature to create an ordinal variable of no depression, minor depression (less severe) and major depression (Katon et al., 2004; Eisenberg et al., 2007). In a meta-analysis conducted by Gilbody, Richards, Brealey, and Hewitt (2007) on the PHQ-9 to detect Major Depressive Disorder, the combined psychometric attributes of 14 studies revealed a pooled sensitivity of 80% and specificity of 92%.
**Anxiety.**

The prevalence and severity of anxiety is measured using module five of the PHQ, which is a screening instrument for anxiety. See Appendix B for a copy of the anxiety module. The anxiety screen can be scored using either the diagnostic algorithm for the module to determine prevalence or the raw scores to determine the severity of Generalized Anxiety Disorder. Module five consists of seven items, scored 1–3, with each response endorsing the following; 1 = “not at all”, 2 = several days”, and 3 = “more than half the days”. The total score on the scale ranges from 8–21, with scores of 14 and above classifying as a positive screen for anxiety. According to the diagnostic algorithm, to reach a score of 14, one would endorse a minimum of some anxiety symptoms for every item, or a combination of no symptoms and “more than half the days” on all the items to reach a score of 14, which is the lower threshold to screen positive for anxiety. Prevalence of anxiety is measured categorically as a dichotomous variable. In SPSS, a new categorical anxiety variable was created where 1 = no anxiety, and 2 = anxiety.

Severity can only be measured for those who meet the first symptom of the DSM-IV TR criteria for Generalized Anxiety Disorder. The items mirror the diagnostic questions in the DSM-IV TR, where if one answers “none” to the first question, the rest of the questions become irrelevant because the diagnostic criteria has already been eliminated. The scale was set up in a similar pattern, where if “none” is selected for the first item, the rest of the items are skipped. Only when “some days” is selected on item 1, which would be scored as a 2, are the rest of the items answered. This explains why the scale is scored 8–21. In order to maintain the variance of those who did not endorse any anxiety symptoms, a minimum score of 7 was possible for those participants who
screened out after the first item. See table 1 below for more detail on the cut-off scores for anxiety versus no anxiety. At a cut-point of greater than 10, sensitivity was 81% and specificity was 99% (Spitzer et al., 1999).

Table 1

*Measurement of Depression and Anxiety Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type of Measurement</th>
<th>Response Range</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression Severity</td>
<td>Continuous</td>
<td>0–3</td>
<td>0–27</td>
</tr>
<tr>
<td>Depression Prevalence</td>
<td>Categorical</td>
<td>0–3</td>
<td>None (0–9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Minor (10–14)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Major (15–27)</td>
</tr>
<tr>
<td>Anxiety Severity</td>
<td>Continuous</td>
<td>1–3</td>
<td>8–21</td>
</tr>
<tr>
<td>Anxiety Prevalence</td>
<td>Categorical</td>
<td>1–3</td>
<td>No Anxiety (8–13)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Anxiety (14–21)</td>
</tr>
</tbody>
</table>

**Gender.**

Gender is measured on a 3-item question, with response options of male, female, or transgender. Although the gender item had 3 response options, no one identified as transgender, so the data were coded into two categories of male and female.

**Sexual orientation.**

Sexual orientation was measured using a 4-item response set with the options; heterosexual, bisexual, gay/lesbian/queer, and questioning/other. All of the response sets were maintained for the analysis.

**Race/ethnicity.**

Race/ethnicity was measured using an 8-item response set with the options; White or Caucasian, African American/Black, Hispanic/Latino, Asian/Asian American,
Arab/Middle Eastern or Arab American, American Indian/Alaskan Native, and Pacific Islander, and other. Due to the low frequency of responses for the last 4 categories, they were collapsed into one group defined as “other”.

**Financial situation.**

Financial situation was measured by asking; “How would you characterize your current financial situation?” The choices were a 3-item response set with the following options; “it’s a financial struggle”, “it’s tight but I’m doing fine”, and “finances aren’t really a problem”.

**Age.**

Age was captured by asking; “How old are you?”. The 10 item response set includes; 18, 19, 20, 21, 22, 23-25, 26-30, 31-35, 36-40, and 40+. As discussed earlier, only 18-22 year olds were captured.

**Data Analysis Plan**

**Categorizing generational status.**

The statistical analysis was done using the Statistical Package for the Social Sciences (SPSS), version 16.0. The initial step was to run descriptive statistics on each of the three groups of students. Bivariate analyses comparing the three groups across demographic variables resolved how students with at least one parent who had some college will be classified. This decision was due in part to the conflicting ways in which pioneers have been operationalized in the literature. From the early 1970’s until now, there are conflicting reports on the percentages of pioneers (Higher Education Research Institute, 2007), due to the way in which parent’s level of education was defined. For instance, some studies classify pioneers as any student where neither parent earned a
Bachelor’s degree (Pike & Kuh, 2005; Prospero & Vohra-Gupta, 2007); whereas others have defined pioneers as any student with at least one parent who did not attend college or university (Hahs-Vaughn, 2004; McCarron & Inkelas, 2006; Majer, 2009).

Comparing the groups statistically makes the decision of how to determine generational status more informed.

The initial data analysis determined whether the partial legacy group was more similar to legacy students or pioneers by comparing them across demographic variables. This was done by running a t-test on the continuous age variable and chi-square tests on the categorical variables. Generational status was categorical in each of the analyses. The other categorical variables will include: gender, race/ethnicity, citizenship, military service, relationship status, living arrangement, and sexual orientation. Pearson’s chi-square was used to determine significance when variables have two categories. When more than two categories exist, standardized residuals, which were provided as part of the SPSS output, were used to determine where the difference(s) lie (Field, 2010; Haberman, 1973). Standardized residuals greater than ±1.96 are significant at the .05 level, greater than ±2.58 are significant at the .01 level, and greater than ±3.29 are significant at the .001 level. Independent samples t-tests were used to explore the differences when one variable is categorical and one is continuous. This method was employed when analyzing age across generational status.

In all subsequent logistic regression and multiple regression models, generational status, gender, sexual orientation, and financial situation are all interpreted as categorical, independent variables included in the research questions. Age was interpreted as a continuous variable. Due to the potentially co-varying association between sexual
orientation, gender, and financial outlook with depression and anxiety (e.g., Eisenberg et al., 2007; Meyer, 2003; Meyer, Dietrich, & Schwartz, 2008; Nolen-Hoeksema, 2001), these variables were held constant to determine if student generational status represents a unique risk factor for mental health problems.

**Logistic regression.**

Before the analyses were run, the data were checked to verify that the assumptions of logistic regression were met. Many of the assumptions of multiple regression, such as linearity, normality, and homogeneity of variance, and homoscedasticity, are not required for logistic regression. However, a lack of multicollinearity is an assumption of logistic regression (Hosmer & Lemeshow, 2000).

**Prevalence of anxiety.**

In order to examine generational status as a predictor of the prevalence of depression and anxiety, while controlling for demographic variables, a series of logistic regression statistical analyses were used. This method was used with prevalence of anxiety (yes/no) as the outcome variable. The categories with anxiety as the outcome variable include; anxiety or no anxiety. Logistic regression is an appropriate statistical technique when there are multiple independent variables, and the dependent variable is categorical. For the logistic regression analyses, the dependent variables (depression and anxiety) were coded as dummy variables and interpreted categorically. Prevalence of anxiety was scored as yes/no using a binomial logistic regression. See table 2 for the descriptive statistics of anxiety measured categorically by generational status.
Prevalence of depression.

The prevalence of depression was scored using a multinomial logistic regression with the three groups of classifications. The specific categories for the analysis with depression as the outcome variable include; major depression, minor depression and no depression. See table 2 below for the descriptive statistics of depression measured categorically by generational status.

Table 2

<table>
<thead>
<tr>
<th></th>
<th>Anxiety</th>
<th></th>
<th>Depression</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
<td>Total</td>
<td>None</td>
</tr>
<tr>
<td>Generational Status</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Pioneers</td>
<td>374</td>
<td>78.9</td>
<td>100</td>
<td>21.1</td>
</tr>
<tr>
<td>Partial legacy</td>
<td>904</td>
<td>78.1</td>
<td>253</td>
<td>21.9</td>
</tr>
<tr>
<td>Legacy Students</td>
<td>4,036</td>
<td>83.8</td>
<td>782</td>
<td>16.2</td>
</tr>
<tr>
<td>Total</td>
<td>5,314</td>
<td>.</td>
<td>1,135</td>
<td>.</td>
</tr>
</tbody>
</table>

Multiple regression.

Standard multiple regression was used to determine the severity of anxiety and depression. Before running the regression models, the assumptions for multiple regression were checked. These assumptions include linearity between the predictor and outcome variables, normality of the residuals, homoscedasticity, independence of the errors, and model specification (Chen, Ender, Mitchell, & Wells, 2003).

Severity of anxiety.

The severity of anxiety was measured by calculating the raw score of anxiety. This method maintains the variance in the dependent variable scores and has been
employed in a number of other research reports (e.g., Muller-Tasch et al., 2007; Pyne, Kuc, Schroeder, Fortney, Edlund, & Sullivan, 2004).

**Severity of depression.**

A standard multiple linear regression was also run to determine the severity of depression. Severity will be measured by calculating the raw score of depression. In the multiple regression analyses, the dependent variables (anxiety and depression) were measured as continuous variables.

**Statistical power.**

One of the advantages of this data set is the large sample size, which increases the likelihood of finding statistical significance. Nevertheless, a power analysis was conducted to confirm that the sample was big enough to find significant findings. Statistical power refers to the ability of a test to determine whether there is a relationship between variables. It refers to the probability of rejecting the null hypothesis when it is false (Netwon & Rudestam, 1999). An a-priori power analysis was conducted to determine if this study had sufficient power. Some researchers have encouraged post-hoc analyses to be reported as well (Wooley & Dawson, 1983), while others have advocated that they should be reported only when results are not significant (Cohen, 1965; Onwuegbuzie & Leech, 2004). G*Power 3.1.2 was used to calculate power for this study. Specifying the model as linear multiple regression, setting a $p$ value to .05, estimating a medium effect size ($f^2 = 0.15$) as defined by Cohen (1988), and entering a sample size of $n = 6,449$, the calculated the power for this study is 1.0. This can be interpreted to mean that that our sample has 100% power to detect a difference between variables, if indeed there is one.
**Risk to subjects.**

Since this was a secondary data analysis of an existing data set, there is no identifiable personal information included in the data. All protected health information was collected and stored in password protected files behind the secure firewall of the Survey Sciences Group per the original IRB protocol. The 2011 Healthy Minds data set to be analyzed in this study contains only de-identified data. The dissertation author does not have access to the personally identifiable data. This study was approved by the DU IRB with exempt status because it used de-identified secondary data.

**Chapter summary**

This chapter describes the methodology used to conduct this study. This was a secondary analysis of data collected in 2011 on a web-based survey from 15 colleges and universities in the U.S. Over 9,000 students answered questions on a web-based survey about mental health outcomes, treatment options, stigma, and beliefs about services. After identifying only undergraduate students in bachelor’s degree programs between the ages of 18–22, the final sample size was 6,449. The variables used for this dissertation include: generational status, depression and anxiety screening variables, race/ethnicity, age, gender, sexual orientation, and financial situation. Key concepts were operationalized and a description of how each variable was measured is described in this chapter. Data were screened for outliers, missing data, and other assumptions. *T*-tests and chi-square analyses were run across demographic variables to determine if there were significant differences between generational status groups. This determined whether the three groups were maintained throughout the analysis, or if generational status was collapsed into two groups. Collapsing would occur if there were no significant
differences on the demographic variables. If the three groups were statistically different, then they were maintained and analyzed separately throughout the multiple and logistic regression analyses. The three groups of students are: pioneers, partial legacy students, and legacy students. Multinomial logistic regression was run to determine the prevalence of depression. Binomial logistic regression was run to determine the prevalence of anxiety. Standard multiple regression was run to determine if the severity of anxiety differs by generational status. Lastly, a multiple regression was also run to determine if depression differs by generational status. There was no risk to subjects in this dissertation project since the data had been previously collected.
Chapter Four: Results

Preliminary Analysis

Missing data and assumptions.

Descriptive statistics provided information on missing data, outliers, and normality. Assumptions such as skewness and kurtosis were also checked through descriptives. Tables 3 and 4 provide important initial information on all of the variables involved in the series of analyses for continuous and categorical variables respectively. For the variables sexual orientation, race, and financial situation, less than 1% of the data were missing. The PHQ-9 had less than 2% of missing data.

The PHQ-Anxiety Module has a skip pattern in which the participant goes to the next section if there are no anxiety symptoms endorsed on the first item (see Appendix 2 for a copy of the module). The PHQ Anxiety module algorithm follows the DSM-IV TR diagnostic criteria for Generalized Anxiety Disorder, where, if the first item is answered “not at all”, then Generalized Anxiety Disorder is ruled out. The decision was made to replace the lowest possible score for the scale since the participants did not endorse any anxiety symptoms on the first item. This was done by changing the score from 1 to 7 for people who endorsed no symptoms of anxiety. It was agreed that this would be a better way of handling the missing data than to delete the cases listwise, which would limit the variance of the scores. Deleting cases listwise would have limited the variability of the sample since all cases that did not endorse anxiety would be eliminated.
In terms of distribution for the continuous variables (age, severity of anxiety, and severity of depression), the skewness and kurtosis, which describe the symmetry and peakedness of the distributions of all the dependent variables, is less than two, which is considered acceptable for psychometric uses (Field, 2010). The Kolmogorov-Smirnov test, which assesses the normality of score distribution (Pallant, 2010), indicates when the result is not significant. The results for age, depression raw score, and anxiety raw score were significant (p < .05), and therefore the assumption of normality was violated. However, with large samples it is relatively common to have small deviations from normality and get significant results (Field, 2010).

The data were also examined visually to determine the extent of the normality assumption violation. Histograms and Normal Q-Q Plots were also examined to assess if the data were normally distributed. Histograms provide a visual description of the distribution of scores. Normal Q-Q Plots, or normal probability plots, show the observed scores against a plot of the expected scores for a normal distribution (Pallant, 2010). Examining the variables visually confirmed that the age variable was reasonably normally distributed. As mentioned above large samples are sensitive to violating the assumption of normality test, and so visual examination of the scores is necessary before proceeding. A visual examination of the depression raw score revealed a slightly positively skewed distribution, with skewness as 1.20 (SE = .04), and anxiety skewness as .48 (SE = .04). This was to be expected given the nature of the variables. According to Field (2010), with samples larger than 200, a normal distribution is easily violated, and significance tests for skewness and kurtosis should not be used. Instead, as mentioned above, a visual examination of the shape of the distribution should be relied upon.
Table 3  
*Descriptive Statistics for Continuous Variables (N = 6449)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>6449</td>
<td>18</td>
<td>22</td>
<td>19.95</td>
<td>1.26</td>
<td>.01</td>
<td>-1.07</td>
</tr>
<tr>
<td>PHQ-ANXIETY</td>
<td>6444</td>
<td>7</td>
<td>21</td>
<td>11.22</td>
<td>3.52</td>
<td>.48</td>
<td>-.52</td>
</tr>
<tr>
<td>PHQ-9</td>
<td>6333</td>
<td>0.00</td>
<td>27</td>
<td>6.37</td>
<td>5.06</td>
<td>1.20</td>
<td>1.40</td>
</tr>
</tbody>
</table>

Lastly, the data were checked for outliers. Examining the boxplots, SPSS defines outliers as data points that extend beyond 1.5 box lengths of the end of the box (Pallant, 2010). Extreme outliers are defined by SPSS as data that extend more than three box lengths (Pallant, 2010). According to the Boxplot graph, the age variable had no outliers, the depression raw score had 15 outliers, and the anxiety raw score had 4, none of which were extreme. All scores were checked to confirm that they were not errors in the data. The decision was made to keep the outliers since they were not extreme, represented a gradual decline of scores on the histograms, and represented legitimate scores on the corresponding scales. Each variable had between 99.9 and 100% of the data.

**Sample Characteristics**

Table 4 provides descriptive statistics for pioneers, partial legacy students, and legacy students. The demographics in the table also include all of the variables that were controlled for in the regression analyses, as well as other descriptives. As was mentioned earlier in a discussion of missing data, the original sample consisted of 7,139 students identified as undergraduates between the ages of 18–22 in bachelor’s degree programs. After eliminating participants who were missing data on the generational status variable (43), as well as participants who did not complete the survey (647), the sample size was
reduced to 6,449, with 474 pioneers, 1,157 partial legacy students, and 4,818 legacy students. Specific schools were not identified in the data set. The average age of participants was 19.95, $SD = 1.26$.

**Comparing Students by Generational Status**

In order to examine the similarities and differences between pioneers, partial legacy and legacy students, a series of chi square and $t$-tests were run on a number of demographic variables, specifically, age, gender, race/ethnicity, financial situation, sexual orientation, that were collected as part of the data. Chi square tests will be used when a categorical variable is being compared based on generational status. $T$-tests were used when comparing pioneers to partial legacy students, and partial legacy to legacy students on the age variable since there was one continuous and one categorical variable.

**Assumptions of $t$-tests and chi-square.**

An assumption that is specific to $t$-tests that has not already been examined is the equality of variances between the two groups. Levene’s statistic confirms that the variance in the scores of the two groups in both $t$-tests were not significant (comparing pioneers to partial legacy students and partial legacy to legacy students, $p > .05$). There are two assumptions that must not be violated when conducting a chi-square test. The first is that only one frequency can occur in each cell of the contingency table (Field, 2010). For instance, a repeated measures test could not be conducted using chi-square. This assumption is not violated since the data used from the *Healthy Minds Study* are cross-sectional data. The second assumption is that each cell should have expected frequencies of at least five (Field, 2010). In all of the chi-square analyses the frequencies exceeded five in each cell. Therefore, this assumption was not violated.
Differences by Generational Status

Of significance were the disparities between pioneers, partial legacy, and legacy students on a number of demographic variables. In particular, legacy students were more likely to be white (82%), than either partial legacy students (73.4%) or pioneers (67.3%). Pioneers were more likely (32.5%) to classify their financial situation as a struggle when compared to partial legacy students (22.6%) and legacy students (11.1%). They were also three times more likely than legacy students to live off campus with a parent or guardian if they were a pioneer (17.6%) and 5% more likely to do so than partial legacy students. Also of note is the low overall proportion of students with any military service. Less than 1% of students in any generational category reported any history of military service. In addition, there was no statistical difference in the number of students with a history of military service across the three groups; therefore, controlling for military service was excluded from the analysis.

The analyses for each of the demographic variables was run two ways in order to compare the three student groups. First, pioneers will be compared to partial legacy students. Secondly, partial legacy students will be compared to legacy students. Residuals represent the difference between the expected and observed scores. When converted to a z-score (SPSS does not do this automatically), the standardized residuals were compared to the critical value to determine significance (e.g., critical values = ±1.96, ±2.58, ±3.29). Please see Table 4 below for significant differences between groups on demographic variables. The superscript numbers in the table note where the differences lie, and are explained at the bottom of the table. The table also provides the number and percentages of students in each group for those demographic variables.
An interesting trend was discovered when examining the results of the differences between generational statuses. There was a hierarchical trend on many of the key variables, including; race, current financial situation, relationship status, and living arrangements. In particular, pioneers were less likely to be white than partial legacy students, who, in turn were less likely to be white than pioneers. This tendency was also apparent in relationship status, with both pioneers and partial legacy students more likely to be married (supporting the literature, at least in terms of pioneers). Importantly, this trend continues with approximately 32% of pioneers identifying their finances as a struggle, 23% of partial legacy students identifying them as such, and 11% of legacy students stating finances are a problem. Also supported by the literature, pioneers were the most likely to live with their parent or guardian, followed by partial legacy, and then legacy students. These findings support previous findings discussed in the literature review that pioneers as well as partial legacy students differ on certain key variables in terms of integration with the university (less likely to live in campus residence halls), relationship status, economic hardship, and privileged status in terms of race/ethnicity. Due to these differences, the research questions will be examined in two ways; by combining the partial legacy and pioneer students, as well as examining the three groups distinctly. Refer to Table 4 for the specific relationships among these variables. Since three groups of students were analyzed, mean scores for the outcome variables by generational status are also reported (Table 6).
Table 4

Demographics of students by generational status

<table>
<thead>
<tr>
<th></th>
<th>Pioneers (n = 474)</th>
<th>Partial legacy students (n = 1,157)</th>
<th>Legacy students (n = 4,818)</th>
<th>Total Sample (n = 6,449)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>20.17b</td>
<td>20.0</td>
<td>19.92</td>
<td>19.95</td>
</tr>
<tr>
<td>SD</td>
<td>1.3</td>
<td>1.27</td>
<td>1.26</td>
<td>1.26</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>72.4</td>
<td>73.1</td>
<td>67.8f</td>
<td>69.1</td>
</tr>
<tr>
<td>Male</td>
<td>27.6</td>
<td>26.9e</td>
<td>32.2</td>
<td>30.9</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>67.3</td>
<td>73.4c</td>
<td>82.0</td>
<td>79.3</td>
</tr>
<tr>
<td>Black</td>
<td>6.8</td>
<td>9.4d</td>
<td>3.6</td>
<td>4.4</td>
</tr>
<tr>
<td>Hispanic</td>
<td>7.0b</td>
<td>3.5f</td>
<td>1.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Asian</td>
<td>9.5e</td>
<td>3.5f</td>
<td>4.4</td>
<td>4.6</td>
</tr>
<tr>
<td>Other</td>
<td>9.3</td>
<td>10.2d</td>
<td>8.3</td>
<td>8.7</td>
</tr>
<tr>
<td>Citizenship</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American</td>
<td>95.8</td>
<td>98.3</td>
<td>97.2</td>
<td>97.2</td>
</tr>
<tr>
<td>International</td>
<td>3.8a</td>
<td>1.7</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>Military Service</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.8</td>
<td>0.5</td>
<td>0.9</td>
<td>0.8</td>
</tr>
<tr>
<td>No</td>
<td>99.2</td>
<td>99.5</td>
<td>99.1</td>
<td>99.2</td>
</tr>
<tr>
<td>Current Financial Situation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A financial struggle</td>
<td>32.5</td>
<td>22.6a,f</td>
<td>11.1</td>
<td>14.1</td>
</tr>
<tr>
<td>Tight but doing fine</td>
<td>56.5a</td>
<td>66.6</td>
<td>54.9d</td>
<td>56.5</td>
</tr>
<tr>
<td>Not really a problem</td>
<td>11.0</td>
<td>10.9d</td>
<td>33.9</td>
<td>29.4</td>
</tr>
<tr>
<td>Relationship Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>54.2</td>
<td>54.2d</td>
<td>61.4</td>
<td>59.5</td>
</tr>
<tr>
<td>In a relationship</td>
<td>43.9</td>
<td>43.8e</td>
<td>37.4</td>
<td>39.0</td>
</tr>
<tr>
<td>Married/Divorced</td>
<td>1.9</td>
<td>1.9</td>
<td>1.2</td>
<td>1.5</td>
</tr>
<tr>
<td>Living arrangements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campus residence hall</td>
<td>51.1b</td>
<td>57.5</td>
<td>62.0d</td>
<td>60.4</td>
</tr>
<tr>
<td>Sorority/Fraternity</td>
<td>1.4</td>
<td>1.7d</td>
<td>2.7</td>
<td>2.4</td>
</tr>
<tr>
<td>Other University</td>
<td>6.3</td>
<td>5.3</td>
<td>6.1</td>
<td>5.9</td>
</tr>
<tr>
<td>Housing</td>
<td>22.8</td>
<td>23.0</td>
<td>23.4</td>
<td>23.3</td>
</tr>
<tr>
<td>Off campus</td>
<td>17.6c</td>
<td>11.9d</td>
<td>5.4</td>
<td>7.5</td>
</tr>
<tr>
<td>Parent/Guardian</td>
<td>0.8</td>
<td>0.6</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Other</td>
<td>1.9</td>
<td>1.7</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>Sexual Orientation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterosexual</td>
<td>91.6</td>
<td>92.6</td>
<td>93.8</td>
<td>93.4</td>
</tr>
<tr>
<td>Bisexual</td>
<td>3.6</td>
<td>2.9</td>
<td>2.4</td>
<td>2.6</td>
</tr>
<tr>
<td>Gay/lesbian/queer</td>
<td>3.0</td>
<td>2.9d</td>
<td>1.9</td>
<td>2.2</td>
</tr>
<tr>
<td>Questioning/other</td>
<td>1.9</td>
<td>1.7</td>
<td>1.8</td>
<td>1.8</td>
</tr>
</tbody>
</table>

*aSignificant differences between observed and expected frequencies when comparing pioneers and partial legacy students are indicated by the following: a= p < .05, b= p < .01, c= p < .001. Significant difference between observed and expected frequencies when comparing partial legacy and legacy students is indicated by the following: d= p < .05, e= p < .01, f= p < .001
Relationships between variables.

The relationship among the continuous variables in this analysis was explored by constructing a correlation matrix. This allows for a detailed look at the association between continuous variables at the bivariate level to determine the strength of the relationships. Values in the correlation matrix are between 1 and -1, and are termed the Pearson correlation coefficient, which is a measure of the strength of the linear relationship between two variables. While there are a number of different interpretations of correlations, Cohen (1988) suggested using a scale where the strength of the relationship was measured as: small (.10 to .29), medium (.30 to .49), and large (.50 to 1.0). Examining Table 5 below reveals that there is a strong relationship between anxiety and depression ($r = 0.68$). These two dependent variables are used in separate analyses, so multicollinearity is not a concern. Other significant correlations between variables include anxiety and age ($r = .03$), financial situation and depression ($r = -.16$), financial situation and anxiety ($r = -.15$), and financial situation and age ($r = -.04$). Although these correlations were significant, the effect sizes were small. These last three negatively correlated items are a product of the way the items were written. For instance, the financial situation and mental health outcome correlations can be interpreted as, as financial situation gets worse (scores on the item decrease), anxiety and depression levels rise (scores increase).
Table 5

*Correlation Matrix for Continuous and Ordinal Variables in Study*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. PHQ-9</td>
<td>-.002</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. PHQ-Anxiety</td>
<td>.03*</td>
<td>.68**</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>4. Financial situation</td>
<td>-.04**</td>
<td>-.16**</td>
<td>-.15**</td>
<td>--</td>
</tr>
</tbody>
</table>

* Correlation is significant at the .05 level (2-tailed)  
** Correlation is significant at the .01 level (2-tailed)

Table 6

*Mean Scores of Outcome Variables by Generational Status (with Standard Deviations in Parentheses)*

<table>
<thead>
<tr>
<th></th>
<th>Pioneers</th>
<th>Partial Legacy</th>
<th>Legacy</th>
<th>Total Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression*</td>
<td>6.92 (5.20)</td>
<td>6.83 (5.24)f</td>
<td>6.20 (5.0)</td>
<td>6.37 (5.06)</td>
</tr>
<tr>
<td>Anxiety**</td>
<td>11.47 (3.56)</td>
<td>11.66 (3.68)f</td>
<td>11.08 (3.50)</td>
<td>11.21 (3.52)</td>
</tr>
</tbody>
</table>

*The range of scores for depression is 0–27. **The range of scores for anxiety is 7–21. Significant differences between partial legacy vs. legacy students is indicated by the following: f= p < .001

Table 7

*Bivariate Analysis of Categorical Outcome Variables by Generational Status*

<table>
<thead>
<tr>
<th></th>
<th>Pioneers</th>
<th>Partial Legacy</th>
<th>Legacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Depression</td>
<td>346 (74.4%)</td>
<td>837 (74.1%)f</td>
<td>3748 (79.1%)</td>
</tr>
<tr>
<td>Minor Depression</td>
<td>73 (15.7%)</td>
<td>193 (17.1%)f</td>
<td>612 (12.9%)</td>
</tr>
<tr>
<td>Major Depression</td>
<td>46 (9.9%)</td>
<td>100 (8.8%)</td>
<td>378 (8.0%)</td>
</tr>
<tr>
<td>No Anxiety</td>
<td>374 (78.9%)</td>
<td>904 (78.1%)f</td>
<td>4036 (83.8%)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>100 (21.1%)</td>
<td>253 (21.9%)f</td>
<td>782 (16.2%)</td>
</tr>
</tbody>
</table>

Significant differences between partial legacy vs. legacy students is indicated by the following: f= p < .001
Research Questions Examining Prevalence of Depression and Anxiety

Logistic Regression was used to answer the following research questions:

1. While controlling for age, gender, sexual orientation, financial situation, and race/ethnicity, is generational status associated with the prevalence of depression?

2. While controlling for age, gender, sexual orientation, financial situation, and race/ethnicity, is generational status associated with the prevalence of anxiety?

Assumptions of logistic regression for research question 1.

Many of the assumptions that need to be checked such as sample size, multicollinearity and outliers, have already been examined in the previous sections of this dissertation. The only assumption specific to logistic regression is to test the linearity of the logit. There is one continuous predictor variable (age) in this analysis, so it needs to be determined if the log of age is linearly related to the log of the outcome variable (depression) (Field, 2010; Hosmer & Lemeshow, 1989) versus forming an interaction. The interaction term was created by computing the log of age as the new variable, then running the logistic regression exactly the same except adding the interaction term between log of age and the log of the outcome variable. The interaction was not significant, \( p > .05 \), meaning that the null hypothesis is true (that the log of age is not linearly related to the log of the outcome variable), and therefore the linearity of the logit assumption is not violated.
Additional assumptions for research question 2.

The assumptions for running the logistic regression with anxiety as the outcome variable are the same as for research question number 1 except that the interaction term between log of age and log of the outcome variable is entered into the logistic regression equation with depression as the outcome variable. The interaction term was not significant, \( p > .05 \), therefore the assumption of the linearity of the logit was not violated.

Research Question 1

Model summary for research question 1.

While controlling for age, gender, sexual orientation, financial situation, and race/ethnicity, is generational status associated with the prevalence of depression?

\[
Y = \frac{e^{A + B_1 (age) + B_2 (gender) + B_3 (sex. or.) + B_4 (fin. sit.) + B_5 (race) + B_6 (gen. status)}}{1 + e^{A + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + B_5 X_5 + B_6 X_6}}
\]

A logistic regression was performed to determine if generational status was associated with the prevalence of depression while controlling for a number of other variables. Multinomial logistic regression using SPSS uses the last category as the reference for the independent variable and this cannot be changed. Therefore, race was recoded so that White could be the reference category, and sexual orientation was recoded to make heterosexual the reference category. The control variables include age, race/ethnicity, financial situation, sexual orientation, and gender. There was a good fit of
the model to the data, tested using the deviance criterion (Tabachnick & Fidell, 2007), since it is not significant, $\chi^2 (1, 114, N = 6,428) = 1096.18$, $p = .64$, as well as by the Pearson goodness of fit test, $\chi^2 (1, 1238, N = 6,428) = 1242.4$, $p = .46$. In addition, the overall model explained between 3.2% (Cox & Snell $R^2$) and 4.3% (Nagelkerke $R^2$) of the variance in depression scores. Table 8 below provides data for the overall model fit.

Table 8

<table>
<thead>
<tr>
<th>Test</th>
<th>$\chi^2$</th>
<th>$df$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goodness of fit test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson</td>
<td>1242.4</td>
<td>1238</td>
<td>.46</td>
</tr>
<tr>
<td>Deviance</td>
<td>1096.18</td>
<td>1114</td>
<td>.64</td>
</tr>
</tbody>
</table>

### Generational Status as a Predictor of Depression.

Table 10 provides a detailed look at individual predictors, including odds ratios and confidence intervals. Individual variables were first examined by comparing no depression against minor depression. A partial legacy student was more likely to screen positive for minor depression than none when compared to legacy students ($OR$, 1.27, $CI$, 1.06–1.53). When comparing major depression to no depression, generational status was not a significant predictor of differences in rates for either pioneers compared to legacy students ($OR$, 0.97, $CI$, 0.69–1.37) or partial legacy compared to legacy students ($OR$, 0.99, $CI$, 0.78–1.27). The pioneer and partial legacy students were then combined and compared to legacy students. The combined group was also more likely to screen positive for minor depression than no depression, $p < .05$, ($OR$, 1.20, CI, 0.95 –1.56). There was not a statistically significant difference in the odds of screening positive for
major depression versus no depression when comparing the combined group to legacy students, \( p = .93, (OR, 0.99, CI, .80–1.23) \).

**Screening positive for minor depression versus no depression.**

There were a number of control variables that were also significant predictors of differences in rates of positive screens for minor depression. Sexual orientation, financial situation and race/ethnicity were all significant predictors of minor depression when compared to none. In particular, students self-identifying as bisexual were more likely to screen positive for minor depression versus none than heterosexual students \((OR, 3.46, CI, 2.25–5.31)\). The odds of a student who identified as questioning/other screening positive for minor depression were over twice as much as it was for heterosexuals \((OR, 2.17, CI, 1.47–3.22)\). Considering financial situation a struggle was also a significant predictor of minor depression compared to students with no financial concerns \((OR, 2.01, CI, 1.60–2.53)\). The race/ethnicity variable also contributed to the model. Students identifying as black/African American \((OR, 1.27, CI, 1.00–1.62)\) as well as Hispanic students had greater odds of screening positive for minor depression compared to no depression \((OR, 1.51, CI, 1.10–2.08)\) when compared to White students.

**Screening positive for major depression versus no depression.**

Control variables that were significant predictors of major depression when compared to no depression included financial situation and sexual orientation. For instance, with students claiming that their finances were “not a problem” as the reference group, students who identified their financial situation as “a struggle” were over three times as likely to screen positive for major depression when compared to no depression \((OR, 3.16, CI, 2.38–4.19)\). Students who reported that finances were “tight but fine”
were more likely to screen positive for major depression when compared to none (\(OR, 1.38, CI, 1.09–1.75\)). In terms of sexual orientation, students self-identifying as bisexual were over twice as likely to screen positive for major depression when compared to no depression (\(OR, 2.54, CI, 1.42–4.55\)). Students identifying as gay/lesbian/queer were more likely to screen positive for major depression compared to none (\(OR, 1.89, CI, 1.12–3.19\)). Lastly, students who identified as questioning/other were over three times as likely to screen positive for major depression versus no depression when compared to heterosexuals (\(OR, 3.17, CI, 2.07–4.83\)). Refer to Table 9 for the \(n\) and odds ratio of the results, and Table 10 for a more detailed description of the findings, including; the coefficient, standard error, \(p\) value, and confidence intervals.
Table 9

Multinomial Logistic Regression Model Predicting Prevalence of Depression by Generational Status and Demographic Variables (N = 6,312)

<table>
<thead>
<tr>
<th>Variable</th>
<th>No Depression</th>
<th>Minor Depression</th>
<th>Major Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>OR</td>
</tr>
<tr>
<td>Generational Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pioneers</td>
<td>345</td>
<td>73</td>
<td>1.05</td>
</tr>
<tr>
<td>Partial legacy</td>
<td>834</td>
<td>193</td>
<td>1.27**</td>
</tr>
<tr>
<td>Legacy students (ref.)</td>
<td>3,734</td>
<td>610</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>4,913</td>
<td>876</td>
<td>1.00</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>1,543</td>
<td>247</td>
<td>0.89</td>
</tr>
<tr>
<td>female (ref.)</td>
<td>3,370</td>
<td>629</td>
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</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>225</td>
<td>42</td>
<td>1.27</td>
</tr>
<tr>
<td>Hispanic</td>
<td>107</td>
<td>28</td>
<td>1.51**</td>
</tr>
<tr>
<td>Asian</td>
<td>204</td>
<td>53</td>
<td>1.35</td>
</tr>
<tr>
<td>Other</td>
<td>414</td>
<td>95</td>
<td>0.92</td>
</tr>
<tr>
<td>Caucasian (ref.)</td>
<td>3,693</td>
<td>658</td>
<td></td>
</tr>
<tr>
<td>Financial Situation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>struggle</td>
<td>607</td>
<td>185</td>
<td>2.01***</td>
</tr>
<tr>
<td>tight but fine</td>
<td>2,839</td>
<td>487</td>
<td>1.18</td>
</tr>
<tr>
<td>no problem (ref.)</td>
<td>1,467</td>
<td>204</td>
<td></td>
</tr>
<tr>
<td>Sexual orientation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>heterosexual (ref.)</td>
<td>4,662</td>
<td>782</td>
<td></td>
</tr>
<tr>
<td>bisexual</td>
<td>95</td>
<td>37</td>
<td>3.46***</td>
</tr>
<tr>
<td>gay/lesbian/queer</td>
<td>96</td>
<td>22</td>
<td>1.43</td>
</tr>
<tr>
<td>questioning/other</td>
<td>60</td>
<td>35</td>
<td>2.17**</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, ***p<.001
Table 10

**Multinomial Logistic Regression Analysis Reporting Likelihood of a Positive Screen by Prevalence of Depression (N=6,312)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>No Depression vs. Minor Depression</th>
<th>No Depression vs. Major Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff.</td>
<td>SE</td>
</tr>
<tr>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>Generational Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pioneers</td>
<td>0.04</td>
<td>0.14</td>
</tr>
<tr>
<td>Partial legacy</td>
<td>0.24</td>
<td>0.09</td>
</tr>
<tr>
<td>Legacy students (ref.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.003</td>
<td>0.03</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>-0.12</td>
<td>0.08</td>
</tr>
<tr>
<td>female (ref.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>0.24</td>
<td>0.12</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.41</td>
<td>0.16</td>
</tr>
<tr>
<td>Asian</td>
<td>0.30</td>
<td>0.22</td>
</tr>
<tr>
<td>Other</td>
<td>-0.08</td>
<td>0.18</td>
</tr>
<tr>
<td>Caucasian (ref.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial Situation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>struggle</td>
<td>0.70</td>
<td>0.12</td>
</tr>
<tr>
<td>tight but fine</td>
<td>0.17</td>
<td>0.09</td>
</tr>
<tr>
<td>no problem (ref.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual orientation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bisexual</td>
<td>1.24</td>
<td>0.22</td>
</tr>
<tr>
<td>gay/lesbian/queer</td>
<td>0.36</td>
<td>0.24</td>
</tr>
<tr>
<td>questioning/other</td>
<td>0.78</td>
<td>0.20</td>
</tr>
<tr>
<td>heterosexual (ref.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, ***p<.001; n for this analysis is lower than reported for individual variables due to the combination of variables with missing data, resulting in a lower n.
Research Question 2

Model Summary for Research Question 2

While controlling for age, gender, sexual orientation, financial situation, and race/ethnicity, is generational status associated with the prevalence of anxiety?

\[ Y = \frac{e^{A + B_1(age) + B_2(gender) + B_3(sex. or.) + B_4(fin. sit.) + B_5(race) + B_6(gen. status)}}{1 + e^{A + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6}} \]

A binomial logistic regression was performed to determine if generational status was associated with the prevalence of anxiety, while controlling for a number of demographic variables (Tables 12 and 13). The control variables include age, race/ethnicity, financial situation, sexual orientation, and gender. The overall model, which contained all of the predictors and was compared to the model with no predictors, was statistically significant, \( \chi^2 (13, N = 6,428) = 195.68, p < .01 \), which indicates the model could discern a difference in the prevalence of anxiety (Pallant, 2010). The Hosmer Lemeshow Goodness of Fit Test indicates that the model was a good fit, \( \chi^2 (8) = 1.74, p > .05 \). The overall model explained between 3% (Cox & Snell R\(^2\)) and 4.9% (Nagelkerke R\(^2\)) of the variance and correctly classified 82.3% of the cases. Refer to Table 11 for the overall model fit.
Table 11

*Overall Model Fit for Logistic Regression Anxiety Analyses*

<table>
<thead>
<tr>
<th>Test</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall model evaluation</td>
<td>195.68</td>
<td>13</td>
<td>.000</td>
</tr>
<tr>
<td>Omnibus Test of Model Coefficient</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goodness of fit test</td>
<td>1.74</td>
<td>8</td>
<td>.76</td>
</tr>
<tr>
<td>Hosmer &amp; Lemeshow</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Generational Status as a Predictor of Anxiety**

This research question is designed to discern the impact of generational status on a positive screen for anxiety while controlling for demographic variables. Partial legacy students were more likely to screen positive for anxiety ($OR$, 1.25, $CI$, 1.06–1.47) when compared to legacy students, but pioneers were not more likely to screen positive for anxiety than legacy students. Also examined was whether pioneers and partial legacy students combined would screen higher for anxiety, so the analysis was then run using the combined pioneer and partial legacy group. There was a statistically significant difference ($p < .05$) between the combined pioneers and partial legacy students when compared to legacy students. The combined group was also more likely to screen positive for anxiety when compared to legacy students ($OR$, 1.21, $CI$, 1.04–1.40).

**Screening for anxiety versus no anxiety.**

As Tables 12 and 13 indicate, there were a number of individual predictors that predict a greater likelihood of screening positive for anxiety. Control variables that were predictors of screening positive for anxiety in this analysis include; being female, self-reporting as bisexual, or questioning/other when compared to being heterosexual, and having financial struggles or tight finances compared to no financial problems. For
example, if a student self-identified as male, they were less likely to screen positive for anxiety ($OR$, 0.65, $CI$, 0.56–0.76). Persons who identified as Asian were less likely to screen positive for anxiety when compared to Whites, ($OR$, 0.66, $CI$, 0.46–0.94). A student who self-identified as bisexual was over twice as likely to screen positive for anxiety than a self-identified heterosexual, ($OR$, 2.24, $CI$, 1.60–3.15), and students identifying as “questioning/other” were also more likely ($OR$, 2.88, $CI$, 1.93–2.48). In addition, students who stated their financial situation was “tight but fine” as well as students who identified their situation as “a struggle” were more likely respectively to screen positive for anxiety when compared to students who labeled their finances as “not a problem”, ($OR$, 1.28, $CI$, 1.09–1.51; $OR$, 2.50, $CI$, 2.03–3.07). See Tables 12 and 13 for all of the significant and non-significant individual predictors.
Binomial Logistic Regression Model Predicting Prevalence of Anxiety by Generational Status and Demographic Variables (N = 6,428)

<table>
<thead>
<tr>
<th>Variable</th>
<th>No Anxiety</th>
<th>Anxiety</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>Generational Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pioneers</td>
<td>373</td>
<td>100</td>
<td>1.12</td>
</tr>
<tr>
<td>Partial legacy</td>
<td>901</td>
<td>253</td>
<td>1.25**</td>
</tr>
<tr>
<td>Legacy students (ref.)</td>
<td>4,022</td>
<td>779</td>
<td>.</td>
</tr>
<tr>
<td>Age</td>
<td>5,296</td>
<td>1,132</td>
<td>1.02</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>1,719</td>
<td>263</td>
<td>0.65***</td>
</tr>
<tr>
<td>female (ref.)</td>
<td>3,577</td>
<td>869</td>
<td>.</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian (ref.)</td>
<td>4,212</td>
<td>895</td>
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</tr>
<tr>
<td>African American</td>
<td>258</td>
<td>55</td>
<td>0.78</td>
</tr>
<tr>
<td>Hispanic</td>
<td>118</td>
<td>33</td>
<td>1.07</td>
</tr>
<tr>
<td>Asian</td>
<td>256</td>
<td>39</td>
<td>0.66*</td>
</tr>
<tr>
<td>Other</td>
<td>452</td>
<td>110</td>
<td>1.05</td>
</tr>
<tr>
<td>Financial Situation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Struggle</td>
<td>671</td>
<td>276</td>
<td>2.50***</td>
</tr>
<tr>
<td>tight but fine</td>
<td>3,057</td>
<td>619</td>
<td>1.28**</td>
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<tr>
<td>no problem (ref.)</td>
<td>1,568</td>
<td>237</td>
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<tr>
<td>Sexual orientation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>heterosexual (ref.)</td>
<td>4,999</td>
<td>1009</td>
<td>.</td>
</tr>
<tr>
<td>bisexual</td>
<td>111</td>
<td>54</td>
<td>2.24***</td>
</tr>
<tr>
<td>gay/lesbian/queer</td>
<td>113</td>
<td>28</td>
<td>1.41</td>
</tr>
<tr>
<td>questioning/other</td>
<td>73</td>
<td>41</td>
<td>2.88***</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, ***p<.001.
Table 13

Predicting Prevalence of Anxiety (detailed model) (N=6,428)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>SE</th>
<th>p</th>
<th>Odds Ratio</th>
<th>95% CI Lower</th>
<th>95% CI Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generational Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pioneers</td>
<td>0.11</td>
<td>0.12</td>
<td>.379</td>
<td>1.12</td>
<td>0.87</td>
<td>1.42</td>
</tr>
<tr>
<td>Partial legacy</td>
<td>0.22</td>
<td>0.08</td>
<td>.009</td>
<td>1.25**</td>
<td>1.06</td>
<td>1.47</td>
</tr>
<tr>
<td>Legacy students (ref.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.02</td>
<td>0.03</td>
<td>.475</td>
<td>1.02</td>
<td>0.97</td>
<td>1.07</td>
</tr>
<tr>
<td>Gender</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>-0.43</td>
<td>0.08</td>
<td>.000</td>
<td>0.65***</td>
<td>0.56</td>
<td>0.76</td>
</tr>
<tr>
<td>female (ref.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian (ref.)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>-0.25</td>
<td>0.16</td>
<td>.107</td>
<td>0.78</td>
<td>0.57</td>
<td>1.06</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.07</td>
<td>0.21</td>
<td>.750</td>
<td>1.07</td>
<td>0.71</td>
<td>1.60</td>
</tr>
<tr>
<td>Asian</td>
<td>-0.41</td>
<td>0.18</td>
<td>.021</td>
<td>0.66*</td>
<td>0.46</td>
<td>0.94</td>
</tr>
<tr>
<td>Other</td>
<td>0.05</td>
<td>0.11</td>
<td>.679</td>
<td>1.05</td>
<td>0.84</td>
<td>1.31</td>
</tr>
<tr>
<td>Financial Situation</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Struggle</td>
<td>0.92</td>
<td>0.10</td>
<td>.000</td>
<td>2.50***</td>
<td>2.03</td>
<td>3.07</td>
</tr>
<tr>
<td>tight but fine</td>
<td>0.25</td>
<td>0.08</td>
<td>.003</td>
<td>1.28**</td>
<td>1.09</td>
<td>1.51</td>
</tr>
<tr>
<td>no problem (ref.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual orientation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>heterosexual (ref.)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bisexual</td>
<td>0.81</td>
<td>0.17</td>
<td>.000</td>
<td>2.24***</td>
<td>1.60</td>
<td>3.15</td>
</tr>
<tr>
<td>gay/lesbian/queer</td>
<td>0.34</td>
<td>0.22</td>
<td>.115</td>
<td>1.41</td>
<td>0.92</td>
<td>2.16</td>
</tr>
<tr>
<td>questioning/other</td>
<td>1.06</td>
<td>0.20</td>
<td>.000</td>
<td>2.88***</td>
<td>1.93</td>
<td>4.28</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, ***p<.001

Results for Research Questions 3 and 4

Multiple Regression analysis was used to answer the following research questions:

3. While controlling for age, gender, sexual orientation, financial situation, and race/ethnicity, is generational status correlated with the severity of depression?
4. While controlling for age, gender, sexual orientation, financial situation, and race/ethnicity, is generational status correlated with the severity of anxiety?

Assumptions for Research Question 3

Some of the assumptions of multiple regression, such as, sample size, multicollinearity, outliers, and normality were discussed earlier when the data were examined for missing data and preliminary analysis. Additional diagnostics include Tolerance and Variance Inflation Indicator (VIF) values, which can provide additional checking for multicollinearity that may not be evident from the correlation matrix (Pallant, 2010). Tolerance indicates how much of the independent variable is not accounted for by the other independent variables. Values of less than .10 are considered high and suggest multicollinearity (Pallant, 2010). The lowest tolerance level for the independent variables in this model is generational status, which is .93, well above the .10 cut-off level. The VIF value represents the inverse of the Tolerance value, and values higher than 10 would be considered problematic. The highest VIF value in this model is generational status at 1.07, which is also well below the cut-off of 10.

Multivariate outliers were also examined by looking at the scatterplot and inspecting Mahalanobis distance. Standardized residuals on the scatterplot with values greater than 3.3 or less than -3.3 are defined as outliers (Tabachnick & Fiddell, 2007). Examining the scatterplot and Casewise Diagnostics output reveals 49 residual scores that are ±3.3, with some greater than 5.5. Mahalanobis Distance detected quite a few outliers that exceeded the critical value for the six independent variables, $\chi^2 = 34.53$. The maximum Mahalanobis distance was 111.4, greatly exceeding the critical value, $\chi^2 = 34.53$; 610 cases exceeded the critical value. Cook’s distance was also checked to see if
any residual values exceeded 1 or 4/n-k-1, indicating a dramatic effect on at least one variable in the model (Nelson, personal communication, June, 2012; Field, 2010).

According to Tabachnick and Fiddell (2007), cases greater than one could have an undue influence on the scores. While no cases were greater than one, 397 cases were greater than Cook’s distance of 0.00062, which was calculated from the equation 4/n-k-1. Despite these outliers, the decision was made to retain them. The rationale for this was twofold; (1) because the scale is finite, the scores represent actual numbers and should be retained, and (2) discarding scores on mental health measures would skew the actual distribution of the scale. The only cases not included are the ones that SPSS deleted listwise when running the multiple regression because the data were not available on all variables.

**Assumptions for residuals.**

Some of the assumptions that are unique to multiple regression are the following assumptions for the residuals; normality, linearity, homoscedasticity, and independence (Tabachnick & Fiddell, 2007). Normality of the residuals refers to the scores of the residuals being normally distributed around the dependent variable. The discussion below examines the assumptions as they relate to the depression raw score dependent variable. The normal probability plot follows a reasonably straight line from bottom left to top right, suggesting no violations of the assumption of normality. Linearity refers to the scores on the dependent variable having a linear relationship with the residuals. Homoscedasticity is the assumption that the variance of the difference between the predicted and observed scores (residuals) about the dependent variable is equal. Lastly, the independence of the residuals assumes that the residuals are randomly distributed.
(Tabachnick & Fiddell, 2007). Examining the scatterplot of the residuals reveals a rectangular shaped distribution of scores with the majority of scores gathered around the center, and no systematic pattern of scores, such as a curvilinear relationship. This suggests no violation of the assumptions of linearity, homoscedasticity and the independence of the residuals.

**Additional assumptions specific to research question 4.**

Assumptions that are unique to multiple regression are also inspected for research question 4, including; normality, linearity, homoscedasticity, and independence of the residuals (Tabachnick & Fiddell, 2007). Normality of the residuals refers to the scores of the residuals being normally distributed around the dependent variable. Examining the Normal P-Plot reveals a relatively straight line from bottom left to top right, suggesting no violations of the assumption of normality. Homoscedasticity is the assumption that the variance of the difference between the predicted and observed scores (residuals) about the dependent variable are equal. Lastly, the independence of the residuals assumes that the residuals are unique (Tabachnick & Fiddell, 2007). The scatterplot reveals a rectangular shaped distribution of scores with the majority of scores between -2 and 2 as well as no systematic pattern of scores. This suggests no violation of the assumptions of homoscedasticity, linearity, and the independence of the residuals.

Outliers were defined as those residuals which fell outside of the range of 3.3 to -3.3 (Tabachnick & Fidell, 2007) and were detected by examining the scatterplot. A visual examination revealed a few data points outside of this range, so Mahalanobis distance was checked to identify specific outlier values. There were 602 outliers that were beyond the critical value, $\chi^2 = 34.53$. To determine if these outliers had a dramatic
effect on a variable in the model, Cook’s distance was checked to see if any values exceeded one or $4/n-k-1$ (Field, 2010; Nelson, personal communication, June 2012). No cases were greater than 1, but 369 cases were greater than $4/n-k-1$, Cook’s $D = 0.00062$. For the same reasons as in research question 3, these cases were not filtered out of the analysis. The only cases not included are the ones that SPSS automatically deleted listwise (because of missing data on at least one of the variables) when running the multiple regression ($n = 21$), which is too small of a number to effect the outcome of the analysis.

**Model Summary for Research Question 3**

*While controlling for age, gender, sexual orientation, financial situation, and race/ethnicity, is generational status correlated with the severity of depression?*

$Y = a + b_1(age) + b_2(gender) + b_3(sex. orient.) + b_4(fin. sit.) + b_5(race) + b_6(gen. status) + e$

A simultaneous linear multiple regression was run to determine if generational status predicts the severity of depression in a sample of undergraduate college students, while controlling for a number of demographic variables. The variance in depression raw score explained by the model is 4.6%, $R^2 = 0.046$, $F(13, 6,298) = 23.28$, $p < .01$. Generational status was not a significant predictor of depression severity in this sample when the variable was defined as the three groups, and comparing legacy students to pioneers ($\beta =.002$, $p = .88$) or comparing legacy students to partial legacy students ($\beta =$
Generational status was then redefined as two groups by combining pioneers and partial legacy students and comparing them to legacy students. This was done in order to determine if generational status was a significant predictor with this redefined generational status variable. Generational status continued to not be significant with this redefined variable (β = .02, p = .21).

**Individual predictors of depression.**

Although the control variables were not the primary aim of the research question, they were also interpreted for significance since many of them were, in fact, significant predictors. In terms of depression scores, financial situation, gender, sexual orientation, and race/ethnicity all contributed a statistically significant unique contribution to depression scores. Financial situation made the strongest unique contribution to explaining depression scores in this model, with students who identify finances as a struggle when compared to students who state that finances are “not a problem” (β = .18, p < .001). Sexual orientation also made a unique contribution for students who identified as bisexual (β = .09, p < .001), students who identified as gay, lesbian, or queer (β = .04, p < .01), and students who identified as questioning or other (β = .07, p < .001) when compared to heterosexual students. Finally, race/ethnicity was also a significant predictor of depression scores, with Asians scoring higher in severity of depression when compared to Whites (β = .03, p < .05). See table 14 below for the full results of the multiple regression analysis examining depression severity by generational status.
Table 14

*Multiple Linear Regression Predicting Severity of Depression by Generational Status*

<table>
<thead>
<tr>
<th>Variable</th>
<th>β</th>
<th>t</th>
<th>p</th>
<th>CI Lower</th>
<th>CI Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>.</td>
<td>5.99</td>
<td>.000</td>
<td>3.98</td>
<td>7.85</td>
</tr>
<tr>
<td>Generational Status</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pioneers</td>
<td>0.002</td>
<td>0.15</td>
<td>0.88</td>
<td>-0.45</td>
<td>0.52</td>
</tr>
<tr>
<td>Partial legacy</td>
<td>0.02</td>
<td>1.46</td>
<td>0.14</td>
<td>-0.08</td>
<td>0.58</td>
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<td>Legacy students (ref.)</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Race</td>
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<td></td>
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<tr>
<td>African American</td>
<td>-0.02</td>
<td>-1.39</td>
<td>0.16</td>
<td>-1.00</td>
<td>0.17</td>
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<td>Hispanic</td>
<td>0.009</td>
<td>0.70</td>
<td>0.49</td>
<td>-0.52</td>
<td>1.10</td>
</tr>
<tr>
<td>Asian</td>
<td>0.03</td>
<td>2.52</td>
<td>0.01</td>
<td>0.17</td>
<td>1.34</td>
</tr>
<tr>
<td>Other</td>
<td>0.01</td>
<td>0.95</td>
<td>0.34</td>
<td>-0.23</td>
<td>0.65</td>
</tr>
<tr>
<td>Caucasian (ref.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Gender</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>-0.02</td>
<td>-1.87</td>
<td>0.06</td>
<td>-0.52</td>
<td>0.01</td>
</tr>
<tr>
<td>Female (ref.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial Situation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Struggle</td>
<td>0.18</td>
<td>12.75</td>
<td>0.000</td>
<td>2.24</td>
<td>3.06</td>
</tr>
<tr>
<td>tight but fine</td>
<td>0.06</td>
<td>4.57</td>
<td>0.000</td>
<td>0.38</td>
<td>0.96</td>
</tr>
<tr>
<td>no problem (ref.)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Sexual orientation</td>
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<td></td>
</tr>
<tr>
<td>bisexual</td>
<td>0.09</td>
<td>7.21</td>
<td>0.000</td>
<td>2.07</td>
<td>3.61</td>
</tr>
<tr>
<td>gay/lesbian/queer</td>
<td>0.04</td>
<td>2.95</td>
<td>0.003</td>
<td>0.43</td>
<td>2.12</td>
</tr>
<tr>
<td>questioning/other</td>
<td>0.07</td>
<td>5.84</td>
<td>0.000</td>
<td>1.85</td>
<td>3.72</td>
</tr>
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<td>heterosexual (ref.)</td>
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<td>-0.01</td>
<td>-0.49</td>
<td>0.63</td>
<td>-0.12</td>
<td>0.07</td>
</tr>
</tbody>
</table>

N = 6,312, *p < .05, **p < .01, ***p < .001

Model Summary for Research Question 4

*While controlling for age, gender, sexual orientation, financial situation, and race/ethnicity, is generational status correlated with the severity of anxiety?*

\[ Y = a + b_1(\text{age}) + b_2(\text{gender}) + b_3(\text{sex. orient.}) + b_4(\text{fin. sit.}) + b_5(\text{race}) + b_6(\text{gen. status}) + e \]
A multiple regression was run to determine if generational status was associated with increased severity of anxiety. The variance in anxiety raw score explained by the model is 5.3 %, $R^2 = 0.053$, $F(13, 6414) = 27.35$, $p < .001$. The primary outcome of interest for this research question is whether generational status is a significant predictor of anxiety severity scores. In this analysis, generational status was a significant predictor of anxiety severity when partial legacy students were compared to legacy students, $\beta = .02$, $p < .01$. As in research question 1, generational status was then redefined as two groups by combining pioneers and partial legacy students and keeping legacy students. With this definition, the combined pioneer and partial legacy student group continued to score higher in severity of anxiety, when compared to the legacy students, $\beta = .03$, $p < .05$. The variance in anxiety raw score explained by the model was very similar to when the model was run with three groups, with .1 % less variance explained 5.2 %, $R^2 = 0.052$, $F(12, 6415) = 29.42$, $p < .001$.

**Individual predictors of anxiety score.**

Statistically significant individual predictors that made a unique contribution to anxiety raw scores were; sexual orientation, gender, financial situation, age, and race/ethnicity. Of note, African Americans had slightly lower anxiety raw scores when compared to Whites, $\beta = -.03$, $p < .01$. Other notable contributions were that males had lower anxiety raw scores, $\beta = -.13$, $p < .001$, and identifying finances as a struggle when compared to students whose finances were not a problem also had higher anxiety raw scores, $\beta = .16$, $p < .001$. As with depression raw scores, sexual orientation predicted higher anxiety raw scores in all classifications when compared to heterosexuals. Please refer to Table 15 for all the results.
<table>
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<th>p</th>
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<th>Upper</th>
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<tr>
<td>Male</td>
<td>-.13</td>
<td>-10.76</td>
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<td>-1.19</td>
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<td>Financial Situation</td>
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<tr>
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<td>tight but fine</td>
<td>.07</td>
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<td>.000</td>
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<td>.67</td>
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<td>no problem (ref.)</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>Sexual orientation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>.06</td>
<td>4.99</td>
<td>.000</td>
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<td>1.90</td>
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<td>gay/lesbian/queer</td>
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<td>3.17</td>
<td>.002</td>
<td>.35</td>
<td>1.51</td>
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<tr>
<td>questioning/other</td>
<td>.06</td>
<td>4.66</td>
<td>.000</td>
<td>.88</td>
<td>2.15</td>
</tr>
<tr>
<td>heterosexual (ref.)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.03</td>
<td>2.23</td>
<td>.02</td>
<td>.01</td>
<td>.14</td>
</tr>
</tbody>
</table>

N = 6,428

**Chapter Summary**

This chapter presents the results of the analyses for the four research questions in this dissertation. Before the primary analyses were run, data were checked for missing data, normal distribution, outliers and other preliminary reviews of the data. Descriptive statistics were run on all variables. A series of chi square and t-tests revealed that there were significant differences on demographic variables by generational status, and that three groups would provide a more fine grained analysis. Therefore, the three groups
were retained and analyzed for the primary research questions using multiple and logistic regression. Results were also run when combining partial legacy and pioneer students compared to legacy students. Generational status was not a significant predictor of the severity of depression, but the partial legacy group by itself, and the partial legacy and pioneer groups combined were significant for severity of anxiety.

Partial legacy students were more likely to screen positive for minor depression when compared to none. In addition, when the partial legacy and pioneers groups were combined, they continued to be more likely to screen positive for minor depression than legacy students. The results also revealed that generational status was a significant predictor of the prevalence of anxiety. Partial legacy students were more likely to screen positive for anxiety than legacy students. When partial legacy and pioneers were combined, they continued to be more likely to screen positive for anxiety than legacy students, yet pioneers alone were not more likely to screen positive for anxiety. Significant predictors associated with anxiety include sexual orientation, gender and financial situation. Significant predictors for the depression screening include financial situation, sexual orientation, and gender.
Chapter Five: Discussion

This study examined the mental health outcomes of college students by generational status, which, to the best of this writer’s knowledge, is the first study to do so. In particular, this study aimed to; 1) understand if generational status is associated with the prevalence of depression and anxiety, and 2) determine separately whether generational status was associated with the severity of anxiety and depression.

This chapter elaborates on findings presented in the Results chapter by discussing the implications of finding relatively few differences in mental health outcomes across generational status. It was theorized that pioneers, and to a lesser degree, partial legacy students, would have higher prevalence and severity of anxiety and depression than legacy students. Acculturative stress is presented as a theoretical framework for understanding the stressors and experiences of pioneers navigating the university environment. In addition, there is a discussion of how generational status has been defined in the literature, how generational status is defined in this dissertation, and the methodology by which the decision was made to retain three groups of students by generational status.

This dissertation used acculturation and the attendant stressors as a theoretical framework to understand the experiences of pioneers as they attend college for the first time. While both novel and stressful experiences of pioneers have been captured in the research literature, this was done mostly in the context of how pioneers are at a distinct
disadvantage in terms of the transition to the college environment, academic readiness, and academic achievement (Ayala & Striplen, 2002; Choy, 2001; Horn & Nunez, 2000; Lara, 1992). Low student retention, a lack of integration into the university environment, and psychosocial development have also been foci of research (Pascarella et al, 1996; Terenzini, 2004). In addition to this lack of integration with the college community has been the recognition that pioneers are often in a situation of double alienation, both from their culture of origin and the university culture (Hsiao, 1992; Lara, 1992; London, 1992). This dissertation extends the line of research with pioneers into mental health outcomes. Following a discussion of the results, the implications on existing theory and research are discussed. Considerations for social work practice are also taken into consideration. The limitations of this study and promising directions for future research are also discussed.

**Key Findings**

The present study tested four research questions using multinomial logistic regression, binomial logistic regression, and multiple linear regression. Specifically, the research questions examined separately the prevalence and severity of anxiety and depression across generational status. As discussed earlier in this dissertation, generational status was defined two ways for the analysis—by breaking the generational status into three groups (pioneers, partial legacy, and legacy students), and by combining the pioneers and partial legacy students and comparing them to legacy students. In most cases, generational status was not a significant predictor of the prevalence of anxiety or depression, nor the severity of anxiety or depression. However, partial legacy students as
a distinct group, as well as when combined with pioneers, were more likely to screen positive in prevalence and severity of anxiety. The same was true of the prevalence of minor depression—that partial legacy students on their own, and when combined with pioneers, were more likely to screen positive for minor depression. Pioneers alone were no more likely to screen positive for the prevalence or severity of anxiety, or the prevalence of minor depression.

**Implications of the Findings**

**Limited association between mental health outcomes and generational status.**

There are a number of important questions that arise from these findings. For instance, what is to be made of the general lack of association between the prevalence and severity of anxiety for pioneers? One possibility is that pioneers are simply not more susceptible to mental health problems, such as depression and anxiety, than legacy students. Another possible explanation is that there was a selection bias in this study. Volunteering for studies may skew the population of interest (Hartman, Foorsen, Wallace, & Neely, 2002), and students who volunteer may be more interested or motivated about the study than people who did not.

Another possibility is that pioneers and partial legacy students who attend university may be representative of the more academically and mentally resilient, or “healthy” proportion of potential first generation college students. For instance, the decision to go to college, applying, being accepted, and attending, represents a considerable degree of aspiration and persistence, and there is evidence to support this. In fact, educational persistence towards completion of a degree among first generation
students has been associated with better aspiration and persistence (Somers, Woodhouse, & Cofer, 2004), although first year students were much less likely to proceed towards degree completion than upper classmen. The sample was not broken down by year in school, but in future research, it would be interesting to explore if mental health outcomes for first year students compared to seniors or upper classmen would differ by generational status. Although academic persistence should not be seen as a proxy for mental health problems, research has shown a strong association between academic persistence, well being, and overall health (Chemers, Hu, & Garcia, 2001).

Another possible explanation that is related to the persistence and resilience of pioneers who attend four year universities, is the argument that acculturative stress is less of a barrier to integration into the campus environment for pioneers who choose to do so. Berry’s (2003) model of acculturation patterns predicts the integration path to be far less susceptible to emotional or psychological problems. Indeed, Pike and Kuh (2005) found that pioneers who were connected to the campus environment, such as living on campus, were much more likely to be engaged socially as well as succeed academically.

Lastly, age in this study was limited to traditional aged college students (18–22). Since pioneers tend to be older than legacy students (Nunez & Cucarro-Alamin, 1998; Pike & Kuh, 2005), there could also be differences in mental health outcomes if the sample was extended to include older students. On the other hand, the sample was truncated to capture traditional college-aged students, in order to examine students who were at similar developmental levels.
Significant findings for partial legacy students.

As discussed above, most of the findings on mental health measures were not significant by generational status. There were some surprising findings, however, among partial legacy students. Partial legacy students were more likely to screen positive for minor depression and anxiety, both alone, and when combined with pioneers. Partial legacy students also had higher anxiety raw scores than legacy students. What is to be made of these findings for partial legacy students? Is there something unique about this group in terms of mental health outcomes?

Theoretically, there is very little explanation, at least in terms of being exposed to acculturative stress. For instance, partial legacy students would presumably have more access to knowledge about post-secondary education than pioneers, given that at least one of their parents attended college or university. At the same time, this group has the unique experience of having at least one parent who attended, but did not graduate, which could instill a possible transference of feelings to the current student. This is a complicated situation, where, on the one hand, the student has access to certain aspects of college capital, namely, that they can draw from some of the experiences of their parents. On the other hand, these students have the experience being passed down from their parents of failing to succeed or complete the ultimate goal of attending a college or university – obtaining a degree. Returning to the idea of family tradition, which was discussed earlier, and which was the basis of the acculturative model; breaking with tradition (pioneers), or continuing a tradition (legacy students), each has its own trajectory. Perhaps there is a unique stressor for partial legacy students, who are
continuing a journey that was begun by their parents, but that was not finished. Could it be that partial legacy students also experience, even more acutely, the navigation of two cultures (Hsiao, 1992; Somers, Woodhouse, & Cofer, 2004) but with the added burden of having a parent that had not succeeded in obtaining the goal of completing their degree?

No research has examined this question, due in part to the fact that most prior research has defined generational status as two categories (Terenzini, Spring, Yaeger, Pascarella, & Nora, 1996; U.S. Department of Education, 1997). It may be that partial legacy students have an (external) feeling of obligation, or duty, to fulfill the unfulfilled wishes and dreams of their parents, and that the parents of partial legacy students “passed on” the anxiety of the college experience to their children. One could imagine that these parents had higher levels of anxiety about the college experience in light of the fact that they did not graduate. It is possible that some of these parents could have feelings of failure over not finishing their degrees, and that their children could inherit those fears. In contrast, pioneers’ parents have no college experience, and thus no anxiety-provoking experiences related to college to pass on. This explanation is highly theoretical, but it would be an interesting question to explore in future research.

**Impact of separating generational status into three groups.**

The decision to keep three groups of students by generational status allowed for a more fine grained analysis of the groups. In addition, it allowed for a comparison of the two-group and three-group models. Although most studies of first generation students define generational status by two groups (e.g., Terenzini, Spring, Yaeger, Pascarella, & Nora, 1996; U.S. Department of Education, 1997), there is a precedent for defining
generational status as three groups as well (Ishitani, 2006; National Center for Education Statistics, 1998; Pascarella et al., 2004). The fact that significant findings were found for partial legacy students was justification for analyzing the groups both ways. It also opened a potential future area of research, in terms of the possibility of a unique stressor associated with partial legacy students. This has not been identified in past research, and without breaking generational status into three groups, this would have been obscured by associating the increased risk for mental health outcomes with pioneer status.

**Limitations of acculturative stress as an explanatory theoretical model.**

Acculturative stress was used in this dissertation as a theoretical framework to understand the unique experiences of pioneers entering college or university. It was theorized that pioneers would have higher levels of mental health problems, and in particular, higher prevalence and severity of anxiety and depression. As reported earlier, pioneers did not experience more mental health problems than legacy students, except on the prevalence of minor depression and the prevalence and severity of anxiety when they were combined with partial legacy students. These findings suggest a few possibilities.

One possibility is that acculturative stress is not as influential as was theorized, despite reports of the difficulty of integrating into college environments for pioneers (e.g., London, 1989; Orbe, 2004). Because there was no measure of acculturative stress in this study, there is no way to test whether or not acculturative stress is higher among pioneers. In order to examine this question, future research could include a measure of acculturative stress along with measures of mental health conditions, to determine if there is an association between the two. Another possibility is that access to information could
possibly buffer some of the stress associated with entering the college environment for pioneers who could not utilize their parents’ past experiences of college or university.

**Implications for Research on Mental Health among Pioneers and Partial Legacy Students**

Previous research on pioneers has focused on the areas of pre-college planning, transitioning to college, and the effects of their experiences on persistence (Terenzini et al., 1996). A thorough review of the research literature revealed this dissertation to be, to the best of this writer’s knowledge, the first study of mental health outcomes by generational status that has been conducted. Future research could further explore if there is a relationship between generational status and mental health outcomes. One idea would be to elaborate on this study. For instance, one possibility would be to add a measure of resiliency to see how well pioneers and partial legacy students scored compared to legacy students. In addition, one could control for this variable to account for differences among groups when examining mental health outcomes. Another idea, as mentioned earlier, would be to add a measure of acculturative stress. While the experiences of acculturative stress in first-generation students have been described in a number of qualitative reports (London, 1989; Orbe, 2004), a measure of acculturative stress would give empirical support (or not) to the idea that acculturative stress accurately reflects the experiences of pioneers.

An important finding from this dissertation was the identification of partial legacy students as a group of students who may be at greater risk for mental health problems. Future research could examine partial legacy students, in addition to pioneers, by
defining these groups as they were done in this dissertation. Further research on the mental health outcomes of partial legacy students could also raise awareness among university administrators about the possibility that this group could be vulnerable to mental health problems. Efforts could be made by colleges and universities to identify these students and offer access to mental health resources, in the same way that researchers have focused on evaluating programs aimed at improving student retention among pioneers (Dale, 1995).

Other possibilities for future research would be to redesign the theoretical models in order to increase the variance explained by the models. As part of model re-design, more measures of mental health could be added, including measures of suicidal ideation and behavior, such as Beck Scale for Suicidal ideation (BSS), to capture more breadth of possible mental health problems among this population.

Limitations

There are a number of limitations to this dissertation. One of the main limitations is the overall variance explained in each of the four regression models. Looking at all four models, the variance explained was very low (between 3% and 4.9%). It is possible that more variance could be explained if the age range was not restricted to 18–22, since close to 19% of pioneers were above age 22. The reason for the age restriction was to capture traditional age college students at similar levels of identity development. Most traditional-aged students are starting to experiment with various potential career roles, and becoming independent for the first time, while older nontraditional students tend to seek higher education for further career investment in a field that has already been
chosen, in order to gain improved work and home satisfaction (Gianakos, 1996).

Nevertheless, this choice to refine the population eliminated 19% of the pioneer sample, 12% of the partial legacy sample, and 4% of the legacy sample, which could affect the results. Future research could examine the data both with and without the age restriction to see if the results differed.

The lack of data on college attendance among siblings of pioneers is another possible limitation. It is possible that although pioneers would not acquire knowledge of the university culture from their parents’ experiences, they could gain such knowledge from a sibling who had attended or graduated from college. The 2011 version of the Healthy Minds Study did not capture data on college attendance for siblings of students who took the survey.

Another possible limitation is the use of the Patient Health Questionnaire Anxiety Module instead of the Generalized Anxiety Disorder 7 (GAD-7). The GAD-7, which was developed from the PHQ Anxiety Module, was developed to screen for and determine the severity of generalized anxiety disorder. It differs from the PHQ Anxiety Module in that all of the items are answered (as opposed to the PHQ Anxiety Module, where the first item is a skip-out item if no symptoms are endorsed). The psychometric properties of the Generalized Anxiety Disorder-7 (GAD-7), which was developed from the Anxiety Module of the PHQ, have been tested much more than the Patient Health Questionnaire, which only has the original psychometric validation tests (Spitzer et al., 1999). In addition, because the first question on the Anxiety Module is a skip-out item,
scores of 1 were replaced with 7; otherwise participants would not have a completed scale score.

Other limitations include the fact that there may have been differences in generational status by year in school. It is very possible that incoming freshman pioneers would score much higher on mental health screens, due to the adjustment period, than pioneers who are juniors or seniors. While the study did control for age, this is not an ideal proxy for year in school, especially since students do not always start school right out of high school. To add to this point, the study had no way of capturing pioneers who dropped out of school during the first or subsequent years, and many of these (now former) students would have potentially scored higher on measures of mental health.

Another important measure that would aid this study would have been a family income item instead of a subjective item of financial well-being. The subjective item was how a student would characterize their financial situation, with the possible responses as; “it’s a financial struggle”, “it’s tight, but I’m doing fine”, and “finances aren’t really a problem”. A more objective item, such as family income, would provide a more precise measure of income for our sample, and allow for a comparison of previous reported income numbers. For instance, the data that approximately 25% of all first generation students are from disadvantaged economic backgrounds (Tinto & Engle, 2008). In the same manner, a scholarship item would be helpful as well to be able to control for how burdened students were with tuition debt.

In addition, the cross-sectional design limited the ability to track mental health outcomes over time. Even though the measures capture a time frame of two weeks (for
depression symptoms) and four weeks (for anxiety symptoms) to account for changes in mood, a repeated measures design would give a more accurate account of mental health outcomes over time.

While there are numerous challenges for college students today, including finances, high tuition rates, and a difficult job market, it is unclear whether entering college as a pioneer constitutes a risk factor for mental health problems. It has been shown to be a risk for academic outcomes, with lower retention rates among pioneers (Tinto et al., 2008), but more research is needed to determine if generational status represents a unique risk for mental health problems.

Chapter Summary

This chapter presents a discussion of the results, including implications of the key findings, limitations of the study, and areas of future research. The results from this dissertation are inconclusive in terms of whether or not generational status is a predictor of mental health problems. There is some evidence that being a partial legacy student constitutes a significant risk for the severity and prevalence of anxiety, and the prevalence of minor depression. However, there is no evidence that pioneers status alone constitutes a risk for mental health problems. More research with pioneers and mental health outcomes could include expanding a research agenda to include measures of acculturative stress and resiliency. Future research could also focus on unique risk factors for mental health problems in partial legacy students.
References


## Appendix A

### PATIENT HEALTH QUESTIONNAIRE (PHQ-9)

**NAME:**

Over the last 2 weeks, how often have you been bothered by any of the following problems? (use "✓" to indicate your answer)

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<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Little interest or pleasure in doing things</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Feeling down, depressed, or hopeless</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Trouble falling or staying asleep, or sleeping too much</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Feeling tired or having little energy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Poor appetite or overeating</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Trouble concentrating on things, such as reading the newspaper or watching television</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Thoughts that you would be better off dead, or of hurting yourself in some way</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DATE:**

**add columns: + + **

**TOTAL:**

10. If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

- Not difficult at all
- Somewhat difficult
- Very difficult
- Extremely difficult

---

PHQ-9 is adapted from PRIME MD TODAY, developed by Drs. Robert L. Spitzer, Janet B.K. Williams, Kurt Kroenke, and colleagues, with an educational grant from Pfizer Inc. For research information, contact Dr. Spitzer at spitzer@med.cornell.edu. Use of the PHQ-9 may only be made in accordance with the Terms of Use available at http://www.pfizer.com. Copyright ©1999 Pfizer Inc. All rights reserved. PRIME MD TODAY is a trademark of Pfizer Inc.
Appendix B

**Patient Health Questionnaire: Anxiety Module**

Over the last four weeks, how often have you been bothered by any one of the following problems?  

<table>
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<th></th>
<th>Not at all</th>
<th>Several days</th>
<th>More than half the days</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Feeling nervous, anxious, on edge, or worrying a lot about different things.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>b. Feeling restless so that it is hard to sit still.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>c. Getting tired very easily.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>d. Muscle tension, aches, or soreness</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>e. Trouble falling asleep or staying asleep.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>f. Trouble concentrating on things, such as reading a book or watching TV.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>g. Becoming easily annoyed or irritable.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>