

8-9-2022

Does anxiety sensitivity mediate age-related differences in anxiety in middle-aged and older adults?

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Does anxiety sensitivity mediate age-related differences in anxiety in middle aged and older
adults?

By

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A Dissertation
Submitted to the Faculty of
Mississippi State University
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy
in Applied Psychology (Clinical Psychology Concentration)
in the Department of Psychology

Mississippi State, Mississippi

August 2022

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2022

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Title of Study: Does anxiety sensitivity mediate age-related differences in anxiety in middle aged and older adults?

Pages in Study 58

Candidate for Degree of Doctor of Philosophy

Anxiety is a mental illness that can have significant deleterious impacts on an individual's functioning. Although anxiety has been studied in older adults, there is conflicting evidence on differences in anxiety as a function of age. Anxiety sensitivity is a construct that is positively related to anxiety but has limited research in older adults. Extant literature suggests that older adults experience less anxiety sensitivity than do younger adults. According to Socioemotional Selectivity Theory, this may be due to older adults letting go of the things that make them anxious. The current study proposed that age impacts self-rated anxiety such that it is lower in older adults than it is in middle-aged adults and posits that anxiety sensitivity may mediate the relationship between anxiety and age. The results suggested a significant indirect effect but no direct effect, precluding the presence of mediation. There was a significant relationship between age and anxiety sensitivity. Further examination revealed that the relationship between age and anxiety sensitivity was not significant for people under 60 years old, but it remained significant for participants 60 years and older.

DEDICATION

I would like to dedicate this dissertation to my husband, John Peterson, who selflessly worked hard to support me and our kids through my years of graduate school. I would also like to dedicate this work to my three amazing children, who have given me joy and inspiration to keep going down this long road and see it through.

ACKNOWLEDGEMENTS

I would like to express my gratitude to several people, without whom this project would not have been possible. First, to Dr. Carolyn Adams-Price, who has provided immense support and guidance through this process and whose wealth of knowledge was an invaluable resource. I would also like to thank my committee members, Dr. Danielle Nadorff, Dr. Mitchell Berman, and Dr. Mary Dozier. Your input and advice have been integral to the completion of this research, and prompted me to explore ideas I would not otherwise have considered. Finally, I want to thank Dr. Michael Nadorff, who without hesitation provided important information when we needed consultation on specific topics.

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CHAPTER I

INTRODUCTION

Anxiety disorders are among the most frequently diagnosed mental illnesses, with some evidence suggesting that anxiety remains a significant problem even in old age (Byrne & Pachana, 2010; Grenier et al., 2019; Schoevers et al., 2003). Anxiety can have wide-ranging and significant consequences for older adults, including increased cognitive deficits, health problems, social isolation, and loneliness (Bunce et al., 2012; Doménech-Abella et al., 2019; El-Gabalawy et al., 2011; Santini et al., 2020). Though some evidence suggests that anxiety decreases with age, there is also research to suggest that anxiety remains stable or is higher in old age (Grenier et al., 2011; Mackenzie et al., 2011).

Anxiety sensitivity is a construct related to anxiety in which one fears experiencing symptoms of anxiety due to the perceived consequences of anxiety (Reiss & McNally, 1985). Anxiety sensitivity is thought of as a precursor to anxiety, and is associated with increased health problems, stress, and lower self-efficacy (Gutiérrez et al., 2011; Mohlman & Zinbarg, 2000; Ruiz, 2014). Some research suggests that older adults may have lower levels of anxiety sensitivity, possibly due to the use of better coping skills compared to younger adults or interpreting physiological symptoms as common aging processes (e.g., older adults becoming homebound due to agoraphobia) (Mahoney et al., 2015; Robertson & Hopko, 2009).

Research on anxiety across the lifespan has been plagued with methodological problems and inconsistencies. These include disagreements on anxiety comorbidities, how geriatric anxiety

should present, and differing criteria for what constitutes “old age” (Bryant et al., 2008). Much of the research on age-related changes in anxiety (including the current study) comes from cross-sectional and correlational studies. The few longitudinal studies that have been conducted used relatively small time frames and restricted ages, making it difficult to ascertain what changes are truly due to advancing age (Bendixen et al., 2018; Fung & Lam, 2017; Grenier et al., 2019; Lindsay et al., 2012; Welzel et al., 2019).

Although studies on the differences in anxiety across the lifespan are limited in scope, there is substantial research on aging and depression. While much research suggests that depression decreases with age, there is increasing evidence to suggest that depression follows a U-shaped distribution, with depression decreasing in middle age and early old age (50s through 70s) increasing in old-old (age 80 and up) populations (Stek et al., 2006; Sutin et al., 2013; Tampubolon & Maharani, 2017). As depression and anxiety are highly comorbid, particularly in old age (Cairney et al., 2008; King-Kallimanis et al., 2009; Kvaal et al., 2008; Skoog, 2011), and share some overlapping symptoms, it is possible that anxiety follows a similar pattern in older adults. The purpose of this study is to first examine the nature of the relations between age and both anxiety and anxiety sensitivity in a cross-section of middle-aged and older adults ages 50 to 85. Should the relation be linear and negative between age and both anxiety and anxiety sensitivity, I will then conduct an exploratory mediation model to determine if anxiety sensitivity mediates the relation between age and anxiety in older adults.

CHAPTER II

LITERATURE REVIEW

Anxiety

Anxiety disorders involve pathological fear responses that are debilitating and create functional problems (American Psychiatric Association, 2013). Anxiety disorders are one of the most common classes of disorders (Giacobbe & Flint, 2018). Anxiety is a worldwide problem affecting people of all ages, backgrounds, and countries (Polanczyk et al., 2015). Estimates of the prevalence of anxiety disorders range from a 5 to 25% lifetime prevalence (Martín et al., 2019). Anxiety disorders are often chronic, and research suggests anxiety disorders are often comorbid with other mental illnesses (such as depression or substance use), as well as physical illnesses (such as cardiovascular disease or gastrointestinal problems) (Martín et al., 2019; Snyder & Handrup, 2018). Concerningly, as many as a fourth of individuals worldwide with anxiety receive no treatment (Evans-Lacko et al., 2017).

Anxiety can have a myriad of negative consequences for both individuals and society. People with anxiety disorders may have working memory deficits, and both neurological and behavioral research has supported this link (Cañadas-Pérez et al., 2007; Moran, 2016). Additionally, having an anxiety disorder can result in deficits in verbal reasoning ability during increased cognitive demands (Derakshan & Eysenck, 1998). In addition to verbal reasoning deficits, anxiety is associated with greater difficulty with abstract reasoning (Modi et al., 2018).

Individuals with significant anxiety can also experience functional difficulties related to their worry. For example, anxiety is linked to decreases in both job performance and job satisfaction, including feeling demoralized in the workplace (Magee, 2013; Schell & Grasha, 2000). Lower job satisfaction in anxious individuals may be due to the tendency for anxious persons to engage in social comparison, which influences their self-concept (Butzer & Kuiper, 2006). Anxious individuals may also be more prone to performance errors and worse cognitive speed and efficiency (Schell & Grasha, 2000). Anxiety in high-stress careers is associated with increased employee turnover (Jensen et al., 2013). Indeed, anxious individuals tend to miss more workdays than non-anxious workers, which can be detrimental to the efficiency of the organization (Jensen et al, 2013; Plaisier et al., 2012).

Anxiety disorders comprise approximately 2% of healthcare costs in the United States (Konnopka & König, 2020). The health care costs for anxious people with co-existing health problems are particularly high (Konnopka & König, 2020; Palacios et al., 2018; Vasiliadis et al., 2013). For individuals experiencing pre-existing health problems (such as breast cancer, chronic pain, and irritable bowel syndrome), anxiety is associated with lower pain tolerance and greater intensity of pain perception (Grinsvall et al., 2015; Fink et al., 2010; Pompili et al., 2012; Zhuo, 2016). Overall, the consequences of anxiety for both individuals and society are noteworthy, making anxiety an important research topic.

Anxiety Sensitivity

A known factor in the etiology of anxiety is *anxiety sensitivity*. As stated earlier, anxiety sensitivity is conceptualized as the fear of physiological arousal and anxiety symptoms due to the perceived social, physical, and mental health consequences of anxiety (Reiss & McNally, 1985). In other words, people with anxiety sensitivity become anxious more easily than others. Anxiety

sensitivity comprises three factors: physical concerns, cognitive concerns, and social concerns (Taylor, 1999). The physical concerns factor posits that physical symptoms of anxiety are perceived to be the sign of a devastating and threatening physical consequence, such as heart palpitations indicating an impending heart attack. The cognitive concerns factor involves a fear that cognitive variables (such as attentional difficulties) may be a sign of a serious cognitive problem (such as dementia). Finally, the social concerns factor involves a fear that anxiety symptoms that are observed by others will lead to deleterious social consequences, such as rejection or mocking (Taylor, 1999; Taylor et al., 2007). There has been some suggestion that the social concerns subdomain may be more adequately subsumed under negative evaluation sensitivity, rather than anxiety sensitivity (McWilliams et al., 2000). However, research on the two factors has suggested that they are, indeed, two separate constructs (McWilliams et al., 2000).

Research on the development of anxiety sensitivity has implicated both genetic and environmental factors (Mantar et al., 2011; Reiss & McNally, 1985). Stein et al. (1999) conducted a twin study on anxiety sensitivity and found that approximately 45% of anxiety sensitivity is due to genetic factors. Other research suggests that hereditary factors are more influential in the development of anxiety sensitivity in people who endorse high anxiety sensitivity versus low anxiety sensitivity (Taylor et al., 2008). Studies on environmental causes of anxiety sensitivity suggest that classical conditioning and observational learning may be influential in developing anxiety sensitivity (Reiss & McNally, 1985), and that environmental factors may be more influential in men than in women (Taylor et al., 2008).

Research has implicated anxiety sensitivity as a factor in multiple facets of mental health, including self-efficacy (Ruiz, 2014), depression, and somatization (Mohlman & Zinbarg, 2000).

Anxiety sensitivity is a strong precursor of anxiety, both generally and specifically (Bardeen & Daniel, 2018; Bardeen et al., 2013; Bravo & Silverman, 2001; Gutiérrez et al., 2011; Kämpfe et al., 2012; McCracken et al., 2008; Mehta et al., 2016; Mohammadkhani et al., 2016; Mohlman & Zinbarg, 2000; Naragon-Gainey, 2010; Ruiz, 2014; Wen & Zinbarg, 2007). Anxiety sensitivity is strongly related to constructs related to anxiety, such as attentional bias to threatening stimuli, mood disturbances, negative thinking, and pathological worry (Bardeen & Daniel, 2018; Bravo & Silverman, 2001; Mehta et al., 2016; Mohammadkhani et al., 2016; Mohlman & Zinbarg, 2000; Ruiz, 2014), as well as physical health problems, disability, stress, and chronic pain (Bardeen et al., 2013; Gutiérrez et al., 2011; McCracken et al., 2008; Mehta et al., 2016;). Anxiety sensitivity also has strong connections to specific disorders and facets of anxiety, including generalized anxiety disorder and trait anxiety, hypochondriasis, PTSD, and panic disorder (Berman et al., 2010; Bravo & Silverman, 2001; Kämpfe et al., 2012; Mohammadkhani et al., 2016; Mohlman & Zinbarg, 2000; Naragon-Gainey, 2010).

Some research has suggested that the three subdomains of anxiety sensitivity are related to different specific anxiety disorders. For example, Li and Zinbarg (2007) found that physical and cognitive concerns are predictive of the development of panic disorder, with the relation between panic disorder and the physical concerns appearing to be particularly strong. Additionally, people endorsing high anxiety sensitivity are more likely to evidence physical symptoms during panic attacks, as compared to individuals who are low in anxiety sensitivity (Benítez et al., 2009; Taylor et al., 1992; Zinbarg et al., 1997). Other research has implicated the cognitive domain in the development of generalized anxiety disorder, and the social domain in the development of social anxiety disorder and social phobia (Baek et al., 2019; Rector et al., 2007; Rodriguez et al., 2004; Zinbarg et al., 1997). The overall research consensus appears to

implicate anxiety sensitivity in the development and maintenance of a wide variety of anxiety-related concepts (Naragon-Gainey, 2010).

Anxiety and Anxiety Sensitivity Across the Lifespan

Although anxiety disorders have many similar features, anxiety may manifest differently across the lifespan. Estimates of the prevalence of anxiety disorders in older adults range from 1.2% to 15%, with prevalence in medical and residential care settings estimated to reach up to 28% in some populations (Byrne & Pachana, 2010; Grenier, 2019; Grenier et al., 2011; Mackenzie et al., 2011; Schoevers et al., 2003). Studies on the rates of anxiety in older versus younger adults have shown mixed results. Some research suggests that the prevalence of anxiety disorders is lower in older adults (Fung & Lam, 2017; Skoog, 2011). Other research suggests that anxiety diagnoses remain stable or are more prevalent in old age, with one study finding that up to half of older adults with generalized anxiety disorder have a diagnosis onset in old age (Chou, 2009). Skoog (2011) speculates that fewer anxiety diagnoses in older adults may be explainable by the high comorbidity of anxiety and depression diagnoses. Given that anxiety disorders are precluded as the main diagnosis in the presence of a depressive disorder, fewer anxiety diagnoses in old age may reflect the transferring of diagnoses from anxiety to depression (Skoog, 2011).

Another reason why older adults may be under-diagnosed for anxiety is that they may be less likely to self-report anxiety symptoms and more likely to minimize symptoms of anxiety (Levy et al., 2003). Age-related changes in the prevalence of anxiety disorders also may vary based on the specific disorder diagnosed (Kessler et al., 2005). Anxiety disorders have some neurological basis in threat perception (Giacobbe & Flint, 2018), and anxiety diagnoses related to the arousal of the autonomic nervous system (such as panic disorder) may be less common in older adults due to changes in brain structure and functioning in old age, as well as changes in

cardiovascular reactivity (Boutcher & Stocker, 1996; Brenes et al., 2007; Martens et al., 2010). Indeed, there is evidence to suggest that autonomous nervous system reactivity (e.g., heart rate variability) is lower in old age, especially in frail older adults (Agelink et al., 2001; Parvaneh et al., 2015). Health anxiety, another specific type of anxiety, is also less prevalent in old age than in younger adulthood (Gerolimos & Edelstein, 2012a; Gerolimos & Edelstein, 2012b). Conversely, disorders such as generalized anxiety disorder may be as common or more common in old age (Mackenzie et al., 2011). In summary, in a sample of older adults that does not include the very old, self-rated anxiety should be relatively low as a function of age due to lower levels of anxiety sensitivity. This prediction is consistent with research suggesting a lower prevalence of anxiety in older adults (Fung & Lam, 2017; Skoog, 2011)

Older adults may present with different symptoms of anxiety than younger individuals. Specifically, older adults may experience fewer overall symptoms of anxiety, fewer somatic symptoms, and fewer symptoms related to the autonomic nervous system (Skoog, 2011). Older adults may also present with more in agitation, tension, and irritability (Skoog, 2011). Risk factors for anxiety in both younger and older adults include trauma, poor coping skills, and being a woman, but in older adults may also include cognitive impairment and chronic health problems (Skoog, 2011).

Anxiety is also associated with multiple deficits in functioning in older adults. Older adults with anxiety diagnoses tend to have more deficits in memory and cognitive functioning, independent of other diagnoses such as depression (Bunce et al., 2012; Forsell & Winblad, 1997; Mantella et al., 2007; Fung & Lam, 2017; Fung et al., 2018; Williams et al., 2017). Some evidence suggests that anxiety is associated with suicidality in old age (Bendixen et al., 2018), as well as chronic health problems (El-Gabalawy et al., 2011) and frailty (Uchmanowicz &

Gobbens, 2015). Anxiety in old age may also be related to fewer quality relationships with others (Fung & Lam, 2017).

In sum, the presentation of anxiety in old age may differ from that of younger adults, including fewer diagnoses and symptoms related to autonomic nervous system arousal, fewer overall anxiety symptoms, greater agitation, tension, and irritability, and greater memory and cognitive deficits (Beaudreau & O'Hara, 2008; Boutcher & Stocker, 1996; Levy et al., 2003; Skoog, 2011; Wilson et al., 2011). Thus, anxiety assessment and reduction is an important treatment goal for interventions involving older adults.

Anxiety sensitivity has not been extensively studied in older adult populations. Some research suggests that older adults may not experience anxiety sensitivity at the same rates as younger adults, due to the fact that their anxiety symptoms may be interpreted as normal functioning of old age (e.g., heart racing might indicate a heart condition (Mahoney et al., 2015); this may also be due to better emotion regulation strategies (Mahoney et al., 2015). However, in older adults who do report higher levels of anxiety sensitivity, research indicates anxiety sensitivity may be related to a history of medical problems, somatization, hypochondriasis, social anxiety, depression, and panic (Bravo & Silverman, 2001; Deer & Calamari, 1998; Mohlman & Zinbarg, 2000; Panayiotou et al., 2014). Some research suggests that lower levels of anxiety sensitivity in older adults may be due to the use of better emotion-regulation strategies, including mindfulness-based coping skills (Mahoney et al., 2015; Robertson & Hopko, 2009). Although several studies have suggested that anxiety sensitivity is lower in older adults compared to young adults, an exhaustive review of the literature using search terms (older adults, elderly, geriatric, geriatrics, aging, senior, seniors, older people, aged 65, aged 65+, anxiety sensitivity, anxiety sensitivity index, ASI, ASI-3) conducted in March of 2020 was unable to find any studies

addressing differences in anxiety sensitivity as a function of age in middle-aged and older adults, specifically.

Guiding Theory

The influence of emotion regulation skills on anxiety in old age is supported by Carstensen et al.'s (1999) Socioemotional Selectivity Theory, which proposes that older adults' social goals are greatly impacted by time perception. Sometime between later adulthood years and old age, time perception switches from open-ended to limited time. As a result, social goals transition from knowledge-based goals to emotion-based goals, utilizing emotion regulation skills in the process. For instance, emotional well-being appears to increase as one transitions from middle-age into old age (Frijters & Beaton, 2012). As such, older adults are more likely to let go of the things that make them anxious and be less influenced by factors such as anxiety sensitivity. For example, older people may be less concerned about what other people think about them (Carstensen et al., 1999). Older adults may utilize mindfulness strategies as a way to decrease their anxiety sensitivity (Mahoney et al., 2015). Treatment studies on older adults using mindfulness-based approaches indicate that mindfulness is an effective therapy tool to combat anxiety in older adults (Helmes & Ward, 2017; Mahoney et al., 2015; Young & Baime, 2010; Franco et al., 2017). Importantly, research on the factors leading to the development of anxiety sensitivity across the lifespan is limited (Mantar et al., 2011; Reiss & McNally, 1985). Moreover, the relation between anxiety sensitivity and anxiety in aging populations, specifically, has not been extensively explored; however, the limited research that exists suggests that anxiety sensitivity and age are negatively related.

Issues with Anxiety Research in Older Adults

As previously mentioned, research on anxiety in older adults is mixed, with some suggesting that older adults have decreased levels of anxiety and others suggesting that anxiety increases with age. However, several studies have sought to establish the prevalence of anxiety in older populations. For example, Welzel et al. (2019) examined the prevalence of anxiety symptoms in a sample of *oldest-old* individuals in Germany. Using a cross-sectional design, the researchers found a prevalence rate of 17.2% for 82 to 85 year-olds, and 15.9% for 86 to 90-year-olds. Other correlational studies have examined prevalence rates of anxiety disorders in older adults, with varying age ranges used as the criteria for old age. Fung and Lam (2017) and Mantella et al. (2007), for example, used a minimum age cut-off of 60 years, whereas Bunce et al. (2012) used a population with a minimum age of 70. In general, these studies utilize a relatively high minimum age cut-off, leaving out an examination of anxiety in middle-age, which is crucial to capturing the full picture of age-related differences.

A review of the literature by Bryant et al. (2008) on anxiety prevalence in old age highlighted the methodological problems with epidemiological studies on anxiety in older adults, including differences in prevalence rates, disagreements on comorbidities, and differing opinions on the presentation of geriatric anxiety relative to younger populations. In their review, the authors noted that anxiety disorder diagnoses have prevalence rates in the community ranging from approximately 1% up to 14%, and rates of 4.5% to 56% in clinical populations. The authors also noted that the evidence regarding the prevalence of anxiety in comorbid mental and physical health presentations is mixed but concluded that anxiety remains a significant concern in older people (Bryant et al., 2008).

In addition to establishing prevalence rates, other research has examined changes in anxiety across the lifespan, particularly as one enters late life. Similar to studies on prevalence rates, most studies examining age-related differences in anxiety have also been cross-sectional and correlational (Basevitz et al., 2008; Chou, 2009; Fuentes & Cox, 2000; Goncalves & Byrne, 2013; Nilsson et al., 2019; Samuelsson et al., 2005). For example, Goncalves and Byrne (2013) compared worry in younger (16 to 29 years old) and older (65 to 85 years old) adults and found that older adults reported lower reported worries overall. Nilsson et al. (2019) compared four groups of older adults (70 to 74 years, 75 to 78 years, 79 to 84 years, and 85 and older) and found that rates of anxiety across old age depended on the diagnostic criteria used (i.e., ICD-10 versus DSM-V). Basevitz et al. (2008) examined differences in worry (a component of anxiety) in old age by comparing younger and older adults' ratings as well as self-reported retrospective accounts of anxiety older adults experienced earlier in life. Results supported the notion that older adults worry less. In contrast, authors of another study comparing anxiety rates in younger and older adults concluded that both age groups have similar rates of anxiety (Fuentes & Cox, 2000). Thus, despite some research suggesting that anxiety is less frequent in old age, other research suggests that older adults often experience new episodes of anxiety, with some research even suggesting that up to 50% of older adults with anxiety diagnoses receive their diagnosis in late life (Chou, 2009; Samuelsson et al., 2005).

Research on geriatric anxiety has been criticized for having a wide range in prevalence estimates in both cross-sectional and longitudinal data, differences in how anxiety is assessed in existing research, and the difficulties in assessing anxiety in older versus younger adults. For example, although some research suggests that anxiety disorders (such as panic disorder) decrease in old age, more common diagnoses like generalized anxiety disorder are as common or

more common in older populations (Grenier et al., 2011; Lenze & Wetherell, 2011; Mackenzie et al., 2011). There are also discrepancies in research on the course of anxiety, such as some research suggesting less anxiety in late life while other research suggests that older adults report an extensive history of anxiety (sometimes up to 20 years) that has not improved with age (Beaudreau & O'Hara, 2008; Grenier et al., 2011; Mackenzie et al., 2011). Lindsay et al. (2012) reviewed anxiety disorder research in older adults and concluded that some of the discrepancy in the literature is likely due to methodological differences, particularly with differences in how anxiety is assessed (e.g., if sub-threshold symptoms are included, or if comorbid presentations are excluded). Although studies on anxiety across the lifespan are important, little research has focused on differences in rates of anxiety across aging populations.

Longitudinal data on changes in anxiety in aging populations exist, but research on changes across the lifespan is sparse. Schuurmans et al. (2005), for example, conducted a 6-year longitudinal study of individuals aged 55 years and up who were diagnosed with an anxiety disorder, and found that 23% still met the criteria for an anxiety disorder, and 47% still had subthreshold anxiety symptoms as they aged. Bendixen et al. (2018) found similar results using a sample of older adults referred to a geriatric psychiatry unit at a general hospital (the authors did not report age cut-offs but reported an average age of 74.7 years). The study measured anxiety levels at baseline and at a 33-month follow-up and found that 74% of the older adults retained similar levels of anxiety at follow-up and 13.1% had increased levels of anxiety at follow-up. Kang et al. (2016) studied a sample of Korean women ages 65 and up and found high persistence rates of both anxiety symptoms and diagnosed anxiety patients at 2-year follow-up. Pietrzak et al. (2012) also found no significant change (decrease or increase) in anxiety symptoms in older adults aged 50 years and up over the course of two years. Sami and Nilforooshan (2015)

conducted a review of longitudinal data on anxiety changes in older adults and found that older adults with anxiety disorders have high rates of relapse, and low rates of treatment for anxiety. They also found that consistently across the literature, anxiety in older adults is especially likely to be associated with or progress to depression and mixed anxiety-depression. Notably, the limited longitudinal studies on anxiety changes as one ages have not included data on changes from young or middle adulthood into old age, so it is not clear if the differences outlined in the cross-sectional research indicates a true causal age-anxiety relation. However, results from longitudinal studies in aging adults are consistent in that anxiety remains relatively stable in this population. While longitudinal evidence on changes in anxiety across middle and old age is desirable, longitudinal data can be difficult to obtain due to issues of time, expense, and participant drop-out. As such, the current study utilized a cross-sectional sample of older adults.

Importance of Anxiety Research in Older Adults

Anxiety in old age is associated with several factors that are not as prevalent in younger adult populations. Anxiety in old age is associated with greater cognitive deficits and more chronic and serious health problems (Bunce et al., 2012; El-Gabalawy et al., 2011). Older adults with anxiety also present with greater, often disabling, worries and poorer quality sleep than younger adults (Altunoz et al., 2018). Anxiety in older adults is associated with a deterioration of social networks, social isolation, and increased loneliness (Doménech-Abella et al., 2019; Santini et al., 2020). Anxiety disorders are underdiagnosed in older adults, possibly due to a perception of avoidance and anxiety as common products of aging and thus fewer diagnoses from clinicians, as well as avoidance of treatment and less help-seeking behavior in anxious older adults (Fuentes & Cox, 2000; Schuurmans & van Balkom, 2011). The presentation of anxiety in older adults also may differ from that of younger adults, with older adults presenting with greater health worries,

fewer physiological symptoms, and greater irritation and agitation (Skoog, 2011). These differences may contribute to the underdiagnosis of anxiety disorders among older populations (Schuurmans & van Balkom, 2011). Given these issues and the consequences and correlates of anxiety in older adults, it is vitally important to have a thorough understanding of geriatric anxiety in order to better prevent and treat older adults with anxiety.

Current Study

A review, above, of the few studies to date provides some evidence that anxiety rates decline with age among older adults. However, other studies have pointed to little to no reductions in anxiety among aging populations. Thus, the primary aim of this study is to assess levels of self-rated anxiety in middle-aged and older adults in a community sample on a web-based platform. The second aim on the study is to determine if anxiety sensitivity, a construct central to the etiology of anxiety, is significantly associated with age in middle-aged and older adults. While Mahoney et al. (2015) examined these constructs utilizing samples of younger and older adults, the current study will compare anxiety sensitivity and anxiety in middle-aged and older adults, rather than utilizing a comparative sample of younger adults. Finally, a mediational analysis will be conducted to see if differences in anxiety related to age can be accounted for by anxiety sensitivity. In other words, do levels of anxiety sensitivity explain, in part or in full, differences in overall anxiety for middle-aged and older adults?

Three predictions are made: First, that overall anxiety (the dependent variable) will be negatively correlated with the reported age of participants (the independent variable). Though the research on anxiety in old age is inconsistent, there is evidence that anxiety is not as prevalent in old age. Second, anxiety sensitivity (the mediator) will also be negatively correlated with the participants' reported age. This prediction is consistent with previous literature on rates of

anxiety sensitivity in old age, as well as literature on increased emotion regulation as a method of emphasizing emotional health, including anxiety (Carstensen et al., 1999; Mahoney et al., 2015; Robertson & Hopko, 2009). Third, anxiety sensitivity will be positively correlated with general anxiety. Extant research supports anxiety sensitivity as a predictor of anxiety both in general (Bardeen & Daniel, 2018; Bardeen et al., 2013; Kämpf et al., 2012; Mohammadkhani et al., 2016) and in older adults who report higher anxiety sensitivity (Bravo & Silverman, 2001; Deer & Calamari, 1998; Mohlman & Zinbarg, 2000; Panayiotou et al., 2014). Finally, the strength of the relationship between age and anxiety will be reduced or eliminated when anxiety sensitivity is included within the model. In other words, anxiety sensitivity will mediate, in part or whole, the relationship between age and anxiety. This prediction is based on existing research suggesting that as people age, they focus more on emotional well-being and become less influenced by the things that make them anxious (such as the influence of anxiety sensitivity), thus having decreased rates of general anxiety (Carstensen et al., 1999; Mahoney et al., 2015; Robertson & Hopko, 2009).

CHAPTER III

METHOD

Participants and Procedures

The current study was approved by the Mississippi State University Institutional Review Board (#17-456). The data set for the current study was collected as part of a larger study in 2018. The study included multiple measures. Participants were 404 community-dwelling older adults aged 50 through 82 years old living in the United States. Participants were recruited through Amazon Mechanical Turk (MTurk). Amazon MTurk is an online workplace wherein “requesters” (organizations and individuals) recruit others to complete tasks (“Human Intelligence Tasks,” or HITs). Workers on MTurk complete HITs in exchange for monetary compensation. MTurk has been increasingly used for participant recruitment in scientific research, including psychology (Cunningham et al., 2017; Goodman et al., 2013; Paolacci et al., 2010; Shapiro et al., 2013). MTurk has been utilized as a way to recruit participants to complete a wide variety of research tasks, including instrument creation and validation, control groups in treatment-control studies, and representative samples for specific participant needs (Chan & Holosko, 2016). Online participant recruitment and participation is not new, and MTurk participants are generally comparable or more diverse than those gathered through traditional offline research methods. Additionally, samples recruited through MTurk often have more clinical mental health problems represented than traditional samples and more than are present in the general population (Buhrmester et al., 2011; Horton et al., 2011; Shapiro et al., 2013). MTurk

can be useful in obtaining participants for research requiring specific types of samples, such as specific ages or ethnicities (Arditte et al., 2015; Gillan & Daw, 2016). Amazon MTurk was utilized in the current study due to its ability to recruit diverse samples of specific age groups, in this case middle-aged and older adults.

The current study recruited 404 participants who were at least 50 years old (workers who were 49 years of age and under were screened out of the study). Recruiting both middle-aged and older adults was necessary to compare age-related differences in anxiety. Additionally, middle-age is a time of transitioning social goals, when anxiety sensitivity may begin to decrease due to changes in time perception and thus more emphasis on emotional goals such as emotion regulation skills (Carstensen et al., 1999). To ensure that participants would not lie about their age in order to participate in the study and receive compensation, participants were not told that the current study was only limited to adults above age 50; rather, participants who self-reported an age below 50 years old were screened out at the start of the study. 90 participants were excluded from the analyses for not meeting the age cutoff or for missing data, resulting in a final count of $N = 314$.

Participants included 118 men (37.22%), 198 women (62.46%), and one participant who identified as “other”. The mean age of the participants was 58.40, with a range of 50 to 82 years old. The participants were predominantly white (87.3%), with 6.7% identifying as African American, 4.1% identifying as Asian, 1.6% identifying as Hispanic or Latino, and 0.3% identifying as American Indian or Alaskan native. The majority of the participants had at least some college education, with 42.3% reporting a two- or four-year degree, 18.4% reporting a postgraduate degree, 11.1% reporting a high school or equivalent degree, and 0.3% reporting having less than a high school degree. The majority of the participants were married (49%), with

other participants reporting being divorced (23.2%), widowed (6.4%), or single and never married (8.5%). 2.9% reported being engaged, cohabitating, or being in a domestic partnership. Compared to the general population of adults aged 65 and older (United States Census Bureau, 2018a; United States Census Bureau, 2018b), our sample had more women (62.46% versus 50.8%). Compared to the general adult population, our sample had more Caucasian participants (87.3% versus 61.1%), fewer African American participants (6.7% versus 12.3%), and fewer Hispanic or Latino participants (1.6% versus 17.8%). Percentages for Asian participants and for American Indian/Alaskan Native participants were comparable. For education, our sample had more participants with 2 or 4-year degrees (42.3% versus 27.8%), more participants with postgraduate degrees (18.4% versus 12.1%), fewer participants with a high school diploma or equivalent (11.1% versus 47.7%), and fewer participants with less than a high school diploma (0.3% versus 12.4%). More of our participants reported being divorced (23.2% versus 10.8%), and fewer of the participants reported never being married (11.4% versus 33.3%). Statistics for married and widowed individuals were comparable. While there were some large differences in demographics between our sample and the general population, it is important to keep in mind that the majority of the reported U.S. Census data was not broken down by age groups (with the exception of reported sex). For the current study, compensation was set at \$8 to approximate minimum wage and motivate participants to complete the study. This compensation amount is consistent with the guidelines set by the American Psychological Association (American Psychological Association, 2013).

Measures

Age of Participants

Age was measured using a single question wherein participants were asked to write their age in numbers. For the purpose of the current study, age was conceptualized as a continuous variable.

Geriatric Anxiety Inventory

The Geriatric Anxiety Inventory (GAI) is a 20-item scale that measures cognitive and physiological symptoms of anxiety in older adults (Pachana et al., 2007). In the current study, the GAI was used to assess anxiety in both middle-aged and older adults. Though the GAI is a measure specifically assessing anxiety in older adults, the measure has been used in middle-aged participants and has evidenced good to excellent reliability ranging from $\alpha = .88$ to $\alpha = .94$ (Poulsen & Pachana, 2012; Stanley et al., 2011). In the current study the scale had a reliability estimate of $\alpha = .98$. In the original scale, responses are in a dichotomous yes/no format; however, in order to gain a better range of the levels of anxiety in the participants and obtain a larger range of responses to the measure, response options were changed to Likert format ranging from 1-*strongly agree* to 5-*strongly disagree*, with lower scores indicating greater anxiety and requiring reverse scoring before analysis. Additionally, changing the response item format to be Likert format makes the scale more similar to the other measures in the study and thus easier for the participants to answer. Changing the format of the response items means that the scale cannot be used to make clinical judgments and clinical diagnoses; however, the current study is not intending to diagnose or treat the participants. An additional limitation to changing the item format of the scale is that the established psychometrics may not be applicable to the scale as it is used in the current study. However, for the original GAI, internal reliability estimates for the

have been good to excellent (ranging from $\alpha = .80$ to $\alpha = .95$) (Gould et al., 2014; Kneebone et al., 2016). The GAI has also been reported to have good convergent validity with other measures of anxiety (Gould et al., 2014; Johnco et al., 2015). An example of an item in this questionnaire is “My own thoughts often make me anxious.”

Anxiety Sensitivity Index

Anxiety sensitivity was measured using the third version of the Anxiety Sensitivity Index (ASI-3) (Taylor et al., 2007). The ASI-3 is an 18-item scale that measures anxiety sensitivity in 3 domains (cognitive, social, and physical). Responses are in Likert format, ranging from 1-*very little* to 5-*very much*, with higher scores indicating higher anxiety sensitivity. Internal consistency reliability estimates for the ASI-3 have been good, ranging from $\alpha = .80$ to $\alpha = .91$ (Rifkin et al., 2015; Wheaton et al., 2012). The ASI-3 also demonstrates good convergent validity, correlating with measures of anxiety and with specific anxiety disorders, and is sensitive to changes in anxiety sensitivity in clinical patients pre- and post-treatment (Jardin et al., 2018; Rifkin et al., 2015; Wheaton et al., 2012). An example of an item from the ASI-3 is “When my chest feels tight, I get scared that I won’t be able to breathe properly.”

Analyses

The purpose of this paper is to examine differences between middle-aged and older adults on anxiety sensitivity and to see the extent to which anxiety sensitivity predicts overall anxiety as a function of age in older adults and middle-aged adults. For the purpose of this study, all three variables were conceptualized as continuous variables. Much of the previous literature on age and anxiety has conceptualized age as a continuous variable, with categorical conceptualization of age being more common in literature comparing younger and older adults (Bryant et al.,

2008). The data was examined for outliers or other anomalies, and the relations between aging and both anxiety and anxiety sensitivity (as well as anxiety and anxiety sensitivity) were examined for linearity, normally distributed residuals, and other assumptions central to regression. A Monte Carlo simulation was run to obtain a power estimate for the indirect effect in the mediation model using an online application created by Schoemann et al. (2017). Within the app, a one mediator model was selected, and the objective was set to finding power. Using the sample size (318), 1,000 replications with 20,000 Monte Carlo draws per replication, random seed set at 1234, a 95% confidence interval, and using correlations as the input method, we obtained a power estimate of 0.81.

In order to test predictions 1 through 3 above, we first examined the linearity of the data by generating a residual plot. We then computed correlations and conducted a mediation analysis using Model 4 in PROCESS for SPSS (Hayes, 2018). Specifically, we examined anxiety sensitivity as a mediator of the relation between age and anxiety (see Figure 1). PROCESS computes standard errors that are heteroscedasticity-consistent, thus eliminating the need for examining the data for homoscedasticity (Hayes, 2018), but other assumptions of normality, homogeneity of variance, and independence were tested. In addition to reporting simple regression parameters, total and direct effects were examined, along with confidence intervals and significance tests. Indices of mediation provided by PROCESS were computed, including the unstandardized indirect effect and the standardized indirect effect, with Hayes (2018) specifically referring to the standardized indirect effect as the index of mediation. The main focus was on unstandardized parameter estimates. PROCESS utilizes a regression-based method for assessing mediation, rather than one based on structural equation modeling.

Within the model proposed in the current study, assessing for mediation will involve examining the contribution of the indirect effect of age on anxiety through anxiety sensitivity on the total effect in the model (the combination of the direct effect of age on anxiety and the indirect relation through anxiety sensitivity). If the parameter estimates for the indirect model indicates a significant mediation effect (i.e., a non-zero estimate), we can conclude that anxiety sensitivity does, in fact, mediate the relation between age and anxiety, providing support for prediction three. If, in contrast, we do not find a significant direct effect of age on anxiety (and older adults do not, in fact, have lower anxiety as middle-aged adults), this does not preclude the possibility of a significant mediation effect. It is possible that mediation could be occurring in the absence of a direct effect, indicating that while older adults do not have lower anxiety (and anxiety sensitivity does not lower anxiety), it may prevent older adults from experiencing higher levels of anxiety. As PROCESS utilizes confidence intervals as a method for interpreting effects within mediation models (with confidence intervals for significant effects not including zero), this result would manifest as the confidence intervals including zero for the direct effect of age on anxiety but not the indirect effect.

CHAPTER IV

RESULTS

We found significant correlations between anxiety sensitivity and anxiety ($r = .42, p < .001$), and between age and anxiety sensitivity ($r = .16, p < .01$); however, age and anxiety were not significantly related. Full correlation results can be seen in Table 1. A simple mediation analysis was conducted to examine anxiety sensitivity as a mediator of the relationship between age and anxiety. The mediation analysis was conducted through Model 4 in PROCESS for SPSS (Hayes, 2018). Process computes standard errors that are heteroscedasticity-consistent, thus eliminating the need for examining the data for homoscedasticity. When we ran the mediation, the direct effect of age on anxiety sensitivity was significant, $b = -2.74, BCa CI [.01, .03]$, as was the direct effect of anxiety sensitivity on anxiety, $b = .74, BCa CI [.56, .92]$. Interestingly, neither the direct effect of age on anxiety nor the total effect were statistically significant. Despite this, there was a small but significant indirect effect, indicating that anxiety sensitivity is a mediator in this model. The unstandardized indirect effect was $b = -.01, BCa CI [-.02, -.005]$ and the standardized indirect effect was $b = -.07, BCa CI [-.11, -.02]$. This result was unusual and seemed somehow contradictory. In order to explore our results further, we separated our data based on age (186 participants under 60 years old, and 128 participants 60+ years old) and re-ran the correlations. Anxiety and anxiety sensitive were significantly related in both age groups ($r = .53, p < .001$, for under 60 and $r = .28, p < .01$ for 60 years and older), and age and anxiety were not related. We found a difference between the groups with the relationship between anxiety

sensitivity and age. For the under 60 participants, age and anxiety were not related; however, the correlation was significant for those who were 60 and up ($r = .22, p < .05$). This was the only difference between the age groups. Finally, in order to explore the differences in age groups further, we ran two separate mediations for the two age groups. The results provided further support for our previous analyses. For the participants who were 60 years of age and older, age and anxiety sensitivity were significantly related ($b = -.03, BCa CI [-.05, -.01]$), as were anxiety sensitivity and anxiety ($b = -.60, BCa CI [-.95, -.23]$). For participants under the age of 60, anxiety and anxiety sensitivity were significantly related ($b = -.83, BCa CI [-1.02, -.64]$). Similarly to our overall mediation, the effects were significant but small. Correlations between the variables can be seen in Table 2 and correlations within the age groups can be seen in Tables 3 and 4.

CHAPTER V

DISCUSSION

Anxiety can have significant mental and physical health implications as one gets older; thus, understanding anxiety in later life is vitally important to the health and well-being of middle aged and older adults. Research on the prevalence of anxiety in older adults is mixed, with some studies suggesting higher levels of anxiety in old age and some suggesting lower rates of anxiety (Chou, 2009; Fung & Lam, 2017; Skoog, 2011). Additionally, not much is known about anxiety during the transition from middle age to late life, as few studies comparing older adults with younger ages have specifically compared middle-aged adults. Thus, the current study aims to look specifically at anxiety in middle and old age, and its relationship to anxiety sensitivity.

Anxiety sensitivity, a fear of anxiety symptoms due to the perceived consequences of having anxiety, is an important factor related to the development and maintenance of anxiety and may help explain the discrepancies in anxiety research in later life. Anxiety sensitivity is linked to both anxiety in general, as well as specific symptoms and anxiety disorders (Baek et al., 2019; Li & Zinbarg, 2007; Naragon-Gainey, 2010). Some previous studies have suggested that older adults have lower levels of anxiety sensitivity than young adults, possibly due to better emotion-regulation strategies (Mahoney et al., 2015; Robertson & Hopko, 2009). This could impact the amount of anxiety that people experience as they reach middle and older adulthood. However, previous studies failed to examine differences between middle-aged and older persons in levels

of anxiety sensitivity. Contrary to expectations, we found higher levels of anxiety sensitivity in the oldest participants in our sample.

The transition from middle-age to old age can bring about changes in time perception, with older adults becoming more focused on the limited time they have left rather than viewing the future as open-ended. As a result, older adults focus on emotion-based goals rather than knowledge-based goals and may utilize emotion regulation skills to make the most of the time that they have left (Carstensen et al., 1999). This change in focus and goals may lead older adults to experience less anxiety sensitivity than middle-aged adults, resulting in lower levels of anxiety. Thus, we proposed that anxiety sensitivity is a mediator between age and anxiety.

We conducted a mediational analysis to examine the possibility of anxiety sensitivity as a mediator in the relationship between age and anxiety. We expected that both anxiety sensitivity and anxiety would be negatively correlated with age; however, anxiety and age were not significantly related. Additionally, anxiety sensitivity and age were positively correlated. We also expected that anxiety sensitivity will be positively related to anxiety, and this hypothesis was supported. Finally, we hypothesized that anxiety sensitivity would mediate the relationship between age and anxiety, and this hypothesis was supported by our data.

Our prediction that age and anxiety would be negatively correlated with age was based on previous literature that anxiety is lower in old age; however, we found that age and anxiety were not related. Though this result is inconsistent with our hypothesis, it is theoretically consistent with the idea that anxiety is not as influential for older adults.

Our prediction that anxiety sensitivity and anxiety would be positively related was supported by our data. This is not a surprising result, as anxiety sensitivity has been consistently shown to be an important factor in the development and maintenance of anxiety. Our hypothesis

about anxiety sensitivity and age, however, was not supported. Contrary to our hypotheses, our data suggested that anxiety sensitivity tends to be higher among older adults. This was surprising, as we expected that older adults would have adaptive coping skills (such as mindfulness) that would aid them in combating anxiety-related concerns.

In order to explore this further, we separated the sample into two groups (under 60 years old, and 60 years of age and older) and ran correlations between our variables. For both groups, anxiety sensitivity and anxiety were positively related and there was no relationship between age and anxiety. However, the relationship between anxiety sensitivity and age differed between the two groups. For the older group, age and anxiety sensitivity were positively related, but for the participants who were younger than 60, there was no significant relationship between age and anxiety. In other words, the only difference between the two groups was that age and anxiety sensitivity were significantly and positively related in the older group. In essence, this suggests that the positive relationship between age and anxiety sensitivity is driven by differences in older adults rather than by differences in middle aged individuals. It is really in old age that these differences begin to manifest. For older adults specifically, anxiety sensitivity tends to be higher in the very old. Of course, we cannot rule out the possibility that anxiety sensitivity was highest in the oldest individuals due to cohort differences.

Lastly, we predicted that anxiety sensitivity would be a mediator for age and anxiety. We found no significant direct or total effects for our model; however, our results did support anxiety sensitivity having a small significant indirect effect. Since we did not have a significant direct effect, we cannot conclude that anxiety sensitivity is a mediator. There are two possible explanations for this. First, our data could indicate that older adults tend to have higher levels of anxiety sensitivity, particularly among the very old. In adults that are between the ages of 50 and

60 (our middle-aged group), age does not really influence anxiety sensitivity. Alternatively, it is possible that anxiety sensitivity is acting as a suppressor variable, which would explain the significant indirect effect with a nonsignificant direct effect. In effect, this interpretation would indicate that rather than older adults having more anxiety sensitivity, there is something preventing the middle-aged adults from being anxious. It is also important to note that while we found a significant indirect effect, our effect size was small. Our findings, though significant, indicate that the impact of this relationship on the participants in our sample is limited.

The idea that older adults may be more likely to experience anxiety is intriguing, particularly in light of the often contradictory research findings on aging and anxiety. As summarized in the literature summary, research on anxiety as one ages suffers not just from discrepant findings, but also methodological flaws and inconsistent methodologies that make comparisons and generalizations difficult. This study is unique in that we included middle aged adults in our sample, and our examination of anxiety in these two age groups may shed light on the differences in the research consensus on aging and anxiety. Widening the age range of the sample may help us truly tap into details that we might have missed if we only included the younger end of older adults. This, our study may provide additional information about what makes the existing research so contradictory.

There are several possible reasons for the differences in anxiety in the older age group. Older adults, particularly the very old, are at risk for many health conditions that often have more serious consequences than younger and middle-aged adults. Some of these health problems may have similar symptoms to anxiety. It is possible that rather than using coping skills to handle anxiety about anxiety-consistent symptoms, older adults may worry more about the potential consequences of these experiences. For example, they may interpret a racing heartbeat to be a

sign of a heart attack, or feeling lightheaded and dizzy to a possible stroke (Taylor, 1999; Taylor et al., 2007). Knowing that these health problems can easily be deadly in old age may cause older adults to have a great deal of anxiety. Older adults might also worry more about the social consequences of the natural physical and mental declines associated with older age, such as being seen as frail or being heavily dependent and on other people for daily functioning (Adams-Price & Morse, 2009). This may be especially concerning for old-old individuals.

Though our findings on anxiety sensitivity were surprising, they seem to mirror the trajectory of other similar constructs in later life. Research on well-being in later life suggests that old-old individuals tend to have lower subjective well-being than younger older adults suggesting that older adults in late-late life may be experiencing worsening psychological functioning (Chou et al., 2012). Depression and anxiety are highly related constructs, and there is evidence that the trajectory of depression across the lifespan is U-shaped (Tampubolon & Maharani, 2017). In other words, depression tends to be lower in older adults until old-old age, when it begins to increase. As anxiety sensitivity is an important component of anxiety, it would make sense that it follows a similar path as depression across old age.

There are several limitations to our study. In order to get more detail on anxiety, we changed the GAI response format from dichotomous to Likert format. As the GAI has not been systematically validated using this format, it is possible that this affected the results of our study.

There is research to support the use of MTurk in psychology research, including specifically aging research (Cunningham et al., 2017; Shapiro et al., 2013). Results of research using online platforms is generally comparable to research generated through traditional methods (Buhrmester et al., 2011; Horton et al., 2011; Walter et al., 2019). However, there are some differences noted in MTurk research utilizing older adult populations. Aging samples recruited

through MTurk tend to be both younger and higher educated. (Turner et al., 2021). Indeed, our sample was a highly educated sample, with 60.7% reportedly having at least a bachelor's degree. It is possible that the results may differ with a sample with a wider range of education levels. We also had very few old-old participants, with the majority of our participants being on the younger end of older adulthood. As such, our results may not generalize to the very old (such as people in their late 80s and 90s). Despite these limitations, we found no evidence of invalid or random responding in our data. Future research could utilize a sample with more educational and age diversity, possibly by recruiting participants in person from nursing homes, assisted living centers, or the community.

Our methodology was cross-sectional in nature, and thus no causal interpretations can be made about age and anxiety. Due to the nature of our study, we also cannot rule out cohort effects as contributor to our results. More detailed causal information about age, anxiety, and anxiety sensitivity could be gleaned from a longitudinal study.

The current study provides valuable information about anxiety and anxiety sensitivity in middle-aged and older adults, particularly as it relates to differences in anxiety sensitivity prevalence within old age. Interestingly, it is the very old participants in our sample who self-reported greater levels of anxiety sensitivity. This may be due to the very old having greater fears of dependency (Adams-Price & Morse, 2009); future research could examine concepts like dependency fears in the context of anxiety and anxiety sensitivity. Additionally, it may be that there are cohort effects to consider within our sample. Another important consideration is that our findings, though significant, had small effects. Our study provides some early evidence that anxiety sensitivity may be greater in the very old, but more research is needed to provide further evidence of our findings. As replication is a cornerstone of good research, conducting a

replication study to compare to our findings could be an important next step in further examining anxiety sensitivity in later life. Important and rich information could also be gathered on this topic through conducting a longitudinal study to examine these factors across the lifespan, with follow-up continuing until very late life, utilizing a more diverse sample.

This study may be particularly useful for clinical decision making with older adult populations. Anxiety may be seen as a common part of old age, particularly with the very old who may be more home-bound and dependent on others. Older adults of advanced age may be particularly sensitive and pay extra attention to potential symptoms of anxiety, which are often shared with other health conditions common in older adults (e.g., forgetting things, racing heart). This study highlights the importance of assessing anxiety sensitivity in older adults and considering its implications for their perceptions of their mental and physical health. Overall, this study adds important information to the current literature on anxiety in older adults, particularly in the very old.

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APPENDIX A

TABLES

Table A1

Measure Descriptive Statistics

Measures	<i>M</i>	<i>SD</i>	<i>Range</i>
Anxiety Sensitivity	1.77	.68	1.00-4.28
Anxiety	3.77	1.18	1.00-5.00
Age	58.51	6.52	50-82

Table A2

Correlations between Measures

Measures	AS ^a	Anx	Age
1. Anxiety Sensitivity	-	-	-
2. Anxiety	.42**	-	-
3. Age	.16**	-.03	-

**Significant at $p < .001$

Table A3

Correlations for Participants 60 years of Age and Older

Measures	ASI	Anx	Age
1. Anxiety Sensitivity	-	-	-
2. Anxiety	.28**	-	-
3. Age	.22*	-.05	-

**Significant at $p < .001$, *Significant at $p < .05$
 $n = 128$

Table A4

Correlations for Participants Younger than 60 Years

Measures	ASI	Anx	Age
1. Anxiety Sensitivity	-	-	-
2. Anxiety	.53**	-	-
3. Age	-.04	-.11	-

**Significant at $p < .001$

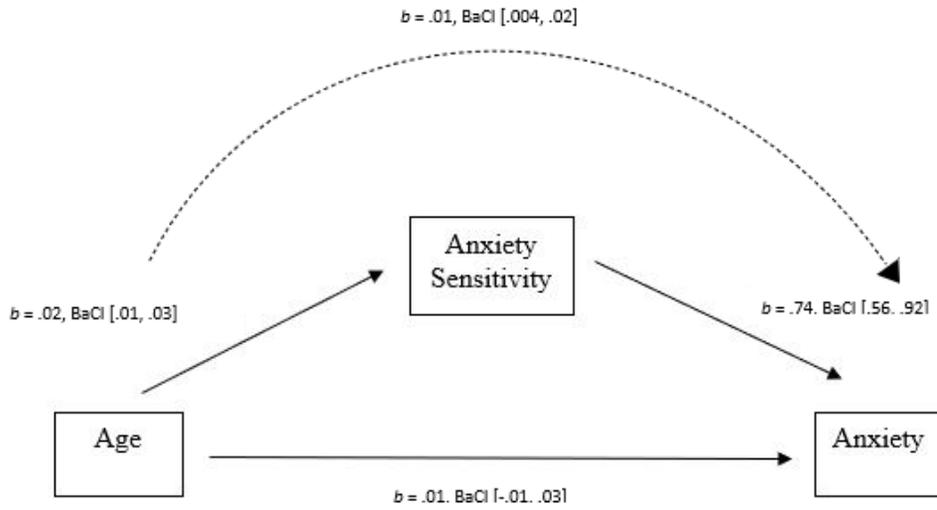
$n = 186$

APPENDIX B

FIGURES

Figure B1

Mediation Model for Current Study



APPENDIX C

INSTITUTIONAL REVIEW BOARD APPROVAL LETTER



NOTICE OF DETERMINATION FROM THE HUMAN RESEARCH PROTECTION PROGRAM

DATE: November 20, 2017
TO: Carolyn Adams-Price, PhD, Psychology, Danielle Nadorff;Katherine Peterson;Michael Nadorff
PROTOCOL TITLE: Aging, Anxiety, Creativity, and Well-Being: An MTURK study
PROTOCOL NUMBER: IRB-17-546
Approval Date: November 20, 2017 Expiration Date: November 19, 2022

EXEMPTION DETERMINATION

The review of your research study referenced above has been completed. The HRPP had made an Exemption Determination as defined by 45 CFR 46.101(b)2. Based on this determination, and in accordance with Federal Regulations, your research does not require further oversight by the HRPP.

Employing best practices for Exempt studies are strongly encouraged such as adherence to the ethical principles articulated in the Belmont Report, found at www.hhs.gov/ohrp/regulations-and-policy/belmont-report/# as well as the MSU HRPP Operations Manual, found at www.orc.msstate.edu/humansubjects. Additionally, to protect the confidentiality of research participants, we encourage you to destroy private information which can be linked to the identities of individuals as soon as it is reasonable to do so.

Based on this determination, this study has been inactivated in our system. This means that recruitment, enrollment, data collection, and/or data analysis **CAN** continue, yet personnel and procedural amendments to this study are no longer required. **If at any point, however, the risk to participants increases, you must contact the HRPP immediately. If you are unsure if your proposed change would increase the risk, please call the HRPP office and they can guide you.**

If this research is for a thesis or dissertation, this notification is your official documentation that the HRPP has made this determination.

If you have any questions relating to the protection of human research participants, please contact the HRPP Office at irb@research.msstate.edu. We wish you success in carrying out your research project.

Review Type: EXEMPT
IRB Number: IORG0000467