

DEATH ANXIETY AND EXECUTING LIFE'S FINANCIAL DENOUEMENT: DEATH ANXIETY'S EFFECT ON LIFESPAN ESTIMATION AND FINANCIAL PLANNING

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DEATH ANXIETY AND EXECUTING LIFE'S FINANCIAL DENOUEMENT: DEATH
ANXIETY'S EFFECT ON LIFESPAN ESTIMATION AND FINANCIAL PLANNING

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“...in this world, nothing is certain except death and taxes.”

- Benjamin Franklin

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Abstract

Retirement planning consists of two distinct phases: accumulation and decumulation. Accumulation is the process in our adult life that financially prepares us for retirement through saving and investing. Decumulation consists of determining one's lifespan expectancy and deciding how to spend the wealth one has accumulated. While some retirees spend too little, many retirees underestimate their lifespan and how far their savings will need to go. These retirees are left with little to sustain them later in life when expensive health problems tend to arise. The problem of decumulation has become of much interest in recent literature as researchers seek to understand retiree spending decisions. This research seeks to explore the relationship between age and death anxiety and the effects that death anxiety has on lifespan estimation and retiree spending.

Utilizing a multimethod approach, this research consisted of four interviews with retiree-aged individuals, two interviews with financial advisors, and an Amazon MTurk survey with 130 subjects. In all three studies, there was no indication that increased age leads to an increase in death anxiety. Study 3 found a Pearson correlation of -0.007 between age and death anxiety ($p = 0.9$; $N=130$). Study 3 found some evidence of death anxiety influencing live-to age estimation accuracy ($r = -0.094$; $p=0.29$; $N=130$). However, mother's age had a stronger effect on an individual's live-to age estimation than death anxiety ($r = 0.271$) and every interviewee in study 1 cited their mother's age as reasoning for their own live-to age estimation. And finally, this research found that individuals high in death anxiety could plan to spend more than those lower in death anxiety shown by how an increase in death anxiety can lead to an increase in the tendency to spend. Study 2 found that spending had to be encouraged as many clients had been hyper savers their entire life. Study 3 also found that the statement, "I worry about running out of money," had a strong negative Pearson Correlation of -0.424 ($p < 0.05$; $N = 130$) with Death Anxiety.

Introduction

One of the most important responsibilities in adulthood is guaranteeing that one has adequate financial resources for one's entire life. This guarantee comes through careful and diligent retirement planning. If done properly, one will secure a comfortable retirement by managing accumulation and decumulation, the two phases of retirement planning, well.

As more and more attention is given to 401(K) contributions and pursuing retirement goals, the *first* phase of accumulation, the *second* phase is often forgotten: the decumulation phase. This second phase involves many considerations of factors like withdrawal rates, lifespan estimation, and estate planning. These two distinct phases, accumulation and decumulation, are equally important and decisions are often unique to an individual's financial situation.

Accumulation

The first phase, accumulation, takes place during an individual's working days, often from age 18 to retirement. It is the process by which individuals contribute the wealth they earn throughout their working days towards saving for retirement. This phase of accumulating wealth is achieved through retirement funds, pensions, investing in common stocks and bonds, and careful budgeting, and is crucial to securing a comfortable lifestyle in retirement. The accumulation phase focuses on deciding when to start saving, how much to save, and what assets will yield the greatest returns over one's investment horizon. Prior research has related to exponential growth bias, underestimating retirement savings growth, and utilizing nudge theory to encourage saving for retirement (Wagenaar & Timmers, 1979; McKenzie & Liersch, 2011; Thaler & Sunstein, 2009).

Decumulation

The second phase, decumulation, takes place after an individual has retired from working, usually from retirement through end-of-life. It is the process by which retired individuals must

make decisions on the appropriate amounts to withdraw from the wealth they have earned over their lifetime for spending. These decisions often require an individual to estimate their lifespan and determine their projected spending, while still planning for different types of risk in retirement. Prior research has related to the 4% rule, how individuals estimate their life-expectancy, and applying behavioral finance to explain retiree spending (Bengen, 1994; Payne et al, 2012; Shu & Shu, 2018).

According to the life-cycle model, individuals should be spending the entirety of their wealth by the time they die (Heckman, 1976). Unfortunately, due to human limitations and the complexity of the task, this is often not the case. Ackerly et al. (2022) found that most retirees will match their spending to their income, conforming to a familiarity bias from their working days which leads to underspending. Others spend too much and are left with little to sustain them in their later years. Overspending in retirement will lead to senior citizens running out of money and being forced to return to work, or having their children or government pay for their care.

According to the U.S. Census Bureau, 16.8% of the population is aged 65 years and over. Financial management in retirement and the factors which affect retiree decision-making is an important area of research because of the considerable portion of the population affected and the consequences of underspending and overspending.

Death Anxiety

Ernest Becker, the conceptual father of Terror Management Theory (TMT), has noted that death anxiety is the main motivator for human behavior. While I neither support, nor refute this claim, it is evident that death anxiety has a strong connection to human decision making. Previous research has explored measures for death anxiety but has lacked focus on elderly samples (Zuccala et al, 2019). In prior work, death anxiety has been related to an individual's ideal life expectancy,

pursuing a higher social class, increasing spending and consumption on food, and greater risk-taking behavior (Cai et al, 2022; Mandel & Smeesters, 2008; Tomkins, 2022; Rupprecht et al, 2021). This paper seeks to explore the impact that death anxiety has on decumulation in retirement.

What Is Death Anxiety

The fear of death is a fundamental phobia in the human experience. It has been noted that there are four main classes of fears: Interpersonal events or situations, death and related health issues, animals, and agoraphobic fears (Arrindell et al, 1991). Of these 4 types, Type II, Death, was found in all 25 studies regarding self-assessed fears (Arrindell et al, 1991). Due to the universal nature of this phobia, it is important to understand what the fear of death, which here will be referred to as *death anxiety*, means for retirees and how it affects their decision-making in retirement.

Death anxiety and the *fear of end-of-life experiences* are two distinct concepts. Death anxiety is the measure of an individual's anxiety surrounding their own death. The end-of-life experience comprises everything from terminal health issues to the final moments before passing. It has been noted that, "the most central coping mechanism to encounter fears and to protect oneself is...avoidance" (Frijda et al, 1989; Rupprecht et al, 2021; Smith and Freund, 2002).

According to Rindfleisch et al (2009), TMT theorizes that individuals will attempt to reduce their mortality-salience to "transcend the fear of death." Mortality-salience is simply one's awareness of the brevity of their own life. To reduce the likelihood of experiencing paralyzing fear which could threaten survival, this mortality-salience is generally not a part of conscious experience (Becker, 1973; Yalom, 1980; Lehto and Stein, 2009). Understanding the effects that

death anxiety has on the elderly population and their financial decision-making may provide financial advisors and individuals with tools to manage these unconscious effects.

Age and Death Anxiety

Individuals beginning retirement, or entering retirement age, may experience increased levels of death anxiety due to their increased awareness of their own mortality. Routledge & Juhl (2010) have noted that “retirement could be an age-related cue and an upheaval event, increasing death awareness and the perception of life as nearing its end.” Related research has also found that there is a strong connection between retirement anxiety and death anxiety which has been attributed to retirement being perceived as the “beginning of old age” (Segal-Karpas and Bergman 2019, Osborne 2016). This increased mortality-salience in old age may induce greater levels of death anxiety in individuals in, or nearing, retirement.

Wisocki (1988) has noted that the primary worries of the elderly are losing motor skills, having a failing memory, and suffering other losses associated with increased age. It has also been found that individuals around the ages of 30 and 60 experience greater loneliness (Luhmann and Hawkley, 2016). However, Luhmann and Hawkley (2016) note that increased loneliness with increased age is more than simply the result of age-related losses. Regardless of the cause, it is evident that retirees are experiencing increased levels of psychological duress associated with their increased age. Research has also found that fears concerning health also increase with age suggesting that individuals, unsurprisingly, prefer a physically and psychologically healthy end-of-life experience (Wisocki 1988).

Finally, age may be a very important factor in heightening an individual’s death anxiety, but conflicting research exists. Recent research conducted in Germany has found that increased

age is correlated with lower levels of death anxiety (Surall and Steppacher, 2018). However, it has been noted that retiree concerns surrounding death are not generally less but rather focused on different fears, such as helplessness and dependence (Stricherz and Cunnington, 1982). Russac et al (2007) have shown that there is a significant spike in death anxiety among 20-year-old adults, and a second spike in women in their 50s. However, Fortner & Neimeyer (1999) found that “lower ego integrity, more physical problems, and more psychological problems are predictive of higher levels of death anxiety in elderly people.” There is clear evidence that age is predictive of death anxiety, but only to the extent of age-related crises. Unfortunately, these age-related crises are abundant in old age and coping mechanisms are only effective to a certain point (Staudinger et al, 1997). As mentioned before, death anxiety is theorized to be a largely unconscious experience, therefore it is reasonable to assume that age-related crises will increase death anxiety in the old and oldest old. See figure 1 for full theoretical model.

Hypothesis 1: I hypothesize that there is a positive correlation between an individual’s age and their anxiety concerning death.

Death Anxiety and Life Expectancy

It is important to understand the impact of death anxiety on lifespan estimation to avoid underestimations and experiencing financial regret. For example, Hurwitz & Mitchell (2022) found that “giving people information about objective survival probabilities more than doubled regret expressed about not having purchased long term care.”

Rupprecht and Lang (2021) define *ideal life expectancy* as “a personal and relatively stable desire regarding the length of life.” It is important to note that ideal life expectancy conveys an individual’s ideal length of life for their self and not the ideal life expectancy they have for humanity. Recent research concerning ideal life expectancy has found that individuals who are unafraid of death prefer the shortest lifespans, and that those who fear death only prefer longer lifespans when age-related diseases are not a factor (Rupprecht et al, 2021). These results suggest that individuals hope to live longer to avoid death only if the end-of-life experience is not diminished by disease and health related issues.

Although ideal life expectancy research has shown us what age individual’s hope to live to, retiree estimations of their remaining lifespan is tremendously important to assess for financial planning. Current research is scarcely aware of the effects of death anxiety on lifespan estimation in the elderly. Based on ideal life expectancy results, it is obvious that death anxiety influences an individual’s views on the rest of their life, but their ideal life expectancy lacks an understanding of their realistic expected lifespan and confidence levels. Understanding the factors of lifespan estimation will allow retirees to make more informed financial decisions early in retirement.

Hypothesis 2: I hypothesize that individuals with higher death anxiety will overestimate their lifespan.

Death Anxiety and Spending Decisions

Finally, I would like to discuss the impact of death anxiety on retiree spending decisions. To avoid confronting emotions surrounding end-of-life and death, individuals may make irrational decisions concerning spending in retirement. Anxiety-driven decision making, and the motivating nature of death anxiety provide a key framework for retiree spending.

The effects of death anxiety have shown that individuals higher in death anxiety are generally more likely to accept a bet when compared to lower-anxiety groups, especially when the odds of winning are low (Tomkins, 2022). It has also been shown that spending money (and saving money) can “relieve future-related anxiety” and give people a “sense of control over their fate” (Zaleskiewicz et al, 2013). However, death anxiety’s effect on spending in retirement is unknown.

Previous research has shown that the introduction of death-related stimuli can increase the spending and consumption of food (Mandel and Smeesters, 2008). Mandel and Smeesters (2008) speculate that this increased spending in response to increased mortality-salience is used as a means of escaping from self-awareness. Rindfleisch et al (2009) found that materialistic individuals will form strong connections with their preferred brands to achieve this same escape. Though this suggests that increased mortality-salience can increase spending and consumption, the effects of death anxiety on spending in retirement have not been shown.

Hypothesis 3: I hypothesize that individuals high in death anxiety will plan to spend more than those lower in death anxiety.

Methodology

Research Design

This research was conducted in three different studies. Studies 1 and 2 were exploratory studies and involved interviews. For study 1, 4 retired individuals were interviewed. For study 2, 2 financial advisors were interviewed. Study 3 is a survey analysis of 130 Mechanical Turk (MTurk) respondents aged 55 and older and living in the U.S. In this study, I collected age, live-to age estimations, death anxiety scores, and spending tendency information. It is proposed that age is correlated to death anxiety, and that death anxiety will influence an individual's lifespan estimation and spending. A model (Figure 1) has been configured to illustrate the 4 variables of interest: age, death anxiety, estimated lifespan, and spending.

Study 1

This study was conducted to gain a richer understanding of how retirement aged individuals think about live-to age estimations, death anxiety, and spending in retirement. The qualitative results of these interviews are intended to complement the quantitative results of study 3.

Sample

Study 1 consisted of 4 individuals in retirement ranging in age from 67 to 72. Two of the interviewees were female and two were male. This study used a convenient sample of people that are known to the researcher and his advisor, Dr. Dale Rude. Interviewees are located across the United States.

Measures

Age

To measure *age*, interviewees were asked to self-report and their response was recorded. Official identification was *not* requested to verify the self-reported age of interviewees.

Estimated Lifespan Accuracy

To measure *estimated lifespan accuracy*, interviewees were asked to report their live-to-age estimation. Using United States Life Tables (Arias et al, 2020), individuals will be given an estimated lifespan accuracy (ELA) score based on their self-reported current age, gender, and live-to-age estimation. Interviewees were also asked open-ended questions regarding their how they arrived at their live-to-age estimation (see appendix A).

Death Anxiety

To measure *death anxiety*, participants were asked to self-report using the Death Anxiety Scale (Templer, 1970; see Appendix D), a 15-item binary survey consisting of 6 items keyed false and 9 items keyed true. Scores for DAS can range from 0 to 15. Interviewees were also asked open-ended questions regarding their feelings on death, in the general sense and their own death, and how they manage those feelings (see appendix A).

Spending Tendency

To measure *spending tendency*, interviewees were given 3 statements consisting of financial retirement sentiments answered on a 7-point Likert scale ranging from “strongly disagree” to “strongly agree.” Retirement Sentiment 1 is “*It is a good idea to save retirement money in case you get sick.*” Retirement Sentiment 2 is “*I worry about running out of money.*” Retirement Sentiment 3 is “*I want to spend my retirement money while I am young enough to enjoy it.*” Interviewees were also asked open-ended questions regarding their views on retirement spending, the 4% rule, and other related areas (see appendix A).

Procedures

Interviews were conducted privately and spanned from 30 to 60 minutes. All interviews were conducted through video-conferencing technology.

Study 2

Study 2 was conducted to bring a deeper understanding to the results from studies 1 and 3. This study provided much insight to the effects of death anxiety on financial planning in retirement from a professional perspective. Interviewees were asked questions regarding how their clients estimate their expected lifespan, the impact of death anxiety on their work, and the spending tendencies of their retired clients (see appendix B). Financial advisors have a unique vantage point from which they observe decumulation. Similar to study 1, the qualitative results of these interviews complement the quantitative results of study 3.

Sample

Study 2 consisted of 2 individuals in the financial advising profession, each with 10+ years of experience. One of the financial advisors was female and the other was male. This study used a convenient sample of people that are known to the researcher and his advisor, Dr. Dale Rude. These financial advisors work for large firms in two highly populated cities in the United States.

Measures

Estimated Lifespan Accuracy

To measure *estimated lifespan accuracy*, interviewees were asked how their clients estimate their expected lifespan, how they assist them in their estimations, and the impact of death anxiety on their estimations (see Appendix B).

Death Anxiety

To measure the effects of *death anxiety* on retirement planning, interviewees were asked how death affects their work with clients, how they navigate death-related financial planning with clients, and the ways that death and death anxiety affect their clients' spending decisions (see Appendix B).

Spending Tendency

To measure *spending tendency*, interviewees were asked questions regarding their older clients' views on retirement-spending, how they decide how much to spend, and the impact of death anxiety on their decision-making (see appendix B).

Procedures

Interviews were conducted privately and spanned from 45 to 60 minutes. All interviews were conducted through video-conferencing technology.

Study 3

This study utilized Amazon's Mechanical Turk website and Qualtrics survey software to collect data from retirement aged individuals across the U.S. Subjects were asked questions regarding their live-to age estimations, death anxiety, and spending tendencies (see appendix C). This study correlated the data to determine the relationship between three dependent variables: estimated lifespan accuracy (ELA), death anxiety (DA), and spending tendency (ST).

Sample

Study 3 consisted of 130 subjects recruited through Amazon's Mechanical Turk (MTurk). The sample consisted of 76 females and 54 males. Ages ranged from 55 to 80 with a mean of 66 and a standard deviation of 5. DAS scores ranged from 0 to 15 with a mean of 7 and a standard deviation of 4.

Measures

Age

To measure *age*, participants were verified by MTurk's platform and asked on the survey to self-report. Due to the online nature of the survey, it was not possible to verify participant age through official identification.

Death Anxiety

To measure *death anxiety*, participants were asked to complete the Death Anxiety Scale (Templer, 1970; see appendix D). Recent research has noted that there is a lack of standard measures for death anxiety (Menzies et al, 2022; Zuccala et al, 2019). Existing measures validated by recent studies are the Death Anxiety Scale (DAS; Templer, 1970), Death Concern Scale (DCS; Dickstein, 1972), and the Death Anxiety Questionnaire (DAQ; Conte et al, 1982) (Menzies et al, 2022; Zuccala et al, 2019). It is important to note that much of the research concerning death anxiety measures has heavily relied on student samples (60.7%) and general community samples (14.7%) showing a severe lack of death anxiety measures related to the elderly population (Zuccala et al, 2019). This study utilized the Death Anxiety Scale for its simplicity and proven reliability. An investigation of the psychometric properties of the Death Anxiety Scale translated to Spanish found that among 187 students ranging in age from 19 to 46 had a mean score of 5.98 (SD = 2.84) with a Cronbach alpha of 0.73 (Tomás-Sábado & Gómez-Benito, 2002).

The Death Anxiety Scale (DAS; see Appendix D) is a 15-item binary survey consisting of 6 items keyed false and 9 items keyed true. Scores for DAS can range from 0 to 15.

Estimated Lifespan Accuracy

To measure *estimated lifespan accuracy*, participants will be asked to report their estimated *live-to* age. Payne et al. (2012) have noted that *live-to* or *die-by* framing exerts a significant effect

on life expectancy estimates. Due to this bias, “live-to” framing was selected because it offers the most optimistic age expectancy. It should also be noted that this paper focuses less on the *ideal* life expectancy of all ages and more on the *live-to* age expectations of individuals.

To better understand how well individuals estimate their expected lifespan, three variables must be known: current age, their live-to age estimation, and their statistically expected live-to age. United States Life Tables (Arias et al, 2020; see appendix H for life tables) use an individual’s gender and age to determine this statistically expected live-to age. Using these U.S. Life Tables, an estimated lifespan accuracy (ELA) score (formula below) will be calculated for subjects based on their self-reported current age, gender, and live-to age estimation.

ELA is calculated by taking the difference of an individual’s live-to age estimation and their actual expected lifespan. This actual expected lifespan is derived from the 2020 U.S. Life Tables and is based on an individual’s gender and age.

$$ELA = (Live-To\ Age) - (Life\ Table\ Age)$$

Spending Tendency

To measure *spending tendency* individuals were asked 3 statements consisting of financial-related retirement sentiments answered on a 5-point Likert scale ranging from “strongly disagree” to “strongly agree” coded from 5 to 1, respectively (see appendix G). Retirement Sentiment 1 is “*It is a good idea to save retirement money in case you get sick.*” Retirement Sentiment 2 is “*I worry about running out of money.*” Retirement Sentiment 3 is “*I want to spend my retirement money while I am young enough to enjoy it.*” The statements were generated to gauge subjects’

views on the topics of saving for possible health-related problems in the future, their anxiety concerning running out of money, and the appropriate timing to spend retirement money.

Procedures

Using the Amazon MTurk platform and Qualtrics survey software, the measures were presented to the subjects for completion online. Upon completion, subjects were given a 7-digit code to submit as verification of completion and to receive payment. Amazon's MTurk website was selected to distribute the survey because it has proven to be a reliable means of collecting behavioral research data (Mason and Suri, 2011). Using MTurk's *qualifications* feature, participant eligibility was limited to ages 55 and up and must be living in the United States. Participants were paid \$2.00(USD) for completing the survey and submitting a code they received upon completion. I would like to note that not all subjects submitted their code for payment. Of the 130 subjects' data used, 27 (20.8%) did not submit their code to receive payment.

Data Cleaning Protocol

During the collection of data, an unprecedented number of suspected non-human responses, known as bots, were received. In all, I collected 573 responses through MTurk. Of those 564 responses, 130 (23.0%) qualified as human. I developed a five-step data cleaning protocol based on a similarly distributed research survey by Griffin et al (2021) to ensure data integrity.

First, I removed all responses which did not complete the survey. Second, I used Google's invisible reCAPTCHA and Qualtrics Fraud Detection software, known as RelevantID, to identify potential bots. Google's reCAPTCHA returns a score from 0.0 to 1.0 using different criteria to detect non-human interactions. Based on recommendations from Google's Developer 2020 Guide,

I removed all responses with a reCAPTCHA score of less than 0.5 (Google Developers, 2020). Qualtrics Fraud Detection determines a score from 0 to 130 after analyzing a respondent's browser, operating system, and location data (Qualtrics 2023). I removed all responses with a fraud score greater than 30 as suggested by Qualtrics Support (Qualtrics 2023). Third, I removed all responses with durations under 90 seconds, as this was determined to be the minimum amount of time it should take to complete the survey. The average completion time after data cleaning was 497 seconds (8.3 min.) with a standard deviation of 408 seconds (6.8 min.). Fourth, I removed all responses which contained conflicting data such as reported age less than 55 or live-to age estimate less than reported age. And lastly, I removed all responses that included duplicate Amazon IDs or IP addresses. This included all IP address which were part of a larger sequence (ex. 123.12.45.1, 123.12.45.2, 123.12.45.3, etc.). Because this data cleaning protocol was meant to be thorough, it is possible that eligible subjects were incorrectly rejected, however, all MTurk workers can communicate with requesters if they have issues with the survey or would like to appeal a rejected assignment. To date, only four subjects have appealed the decision to reject their work. For three a mechanical error was made during flagging, and the decision was reversed. The other did not meet age requirements and the decision was upheld.

Analysis

To test hypothesis 1, I correlated subject ages with their death anxiety scores. To test hypothesis 2, I correlated subject estimated lifespan accuracy (ELA) scores with their death anxiety scores. And finally, to test hypothesis 3, I correlated subject spending tendency scores (ST) with their death anxiety scores.

Results

Study 1

Interview #1

Introduction

The first interviewee was a 71-year-old retired (non-working) male. For his privacy, I will refer to him as Henry. Henry scored an ELA score of 10.3, overestimating his live-to age as 95. He scored a 5 on the Death Anxiety Scale, indicating low levels of anxiety surrounding his death. And lastly, he had a spending tendency score of 9, indicating a higher tendency to spend. Henry was pleasant to speak with and was very comfortable talking about his lifespan estimation, his thoughts about death, and his spending habits.

Estimated Lifespan Accuracy

When asked what age he expected to live to, Henry replied, “I expect to live to 95... that’s how old my mom was.” This response was very common across all interviews, as each interviewee exhibited an anchoring bias by setting their parent’s age at death, or current age, as the baseline for their own lifespan estimations (Tversky & Kahneman, 1974). While this method of estimating one’s lifespan is reasonable, many neglect to consider their own gender, ethnicity, health, and many other factors which contribute to an individual’s expected lifespan. Before our interview Henry had not thought much about the age he would live to.

Death Anxiety

Henry had one of the higher DAS scores among the four interviewees. When discussing his thoughts surrounding death, he was more concerned with “who would be affected” if he were to die. He mentioned his wife and children would be greatly affected upon his passing. This sentiment is consistent with research that suggests retiree concerns surrounding death are not

generally less but rather focused on different fears (Stricherz & Cunnington, 1982). Henry communicated more concern with the welfare of his loved ones, than his own future after death. In fact, when asked about his anxiety surrounding death, Henry replied, “just because you’re paranoid doesn’t mean bad things can’t happen.”

Spending

Henry was very open about his finances and spending habits in retirement. He was not worried about running out of money, as him and his wife were comfortable living on only the social security and pension income they are receiving. Henry says, “I look at the investment account every day, and I go, ‘Yeah, you know what? What the heck?’” Before retirement, Henry never imagined that he would spend what he does on vacations and personal things. When asked about his spending tendencies, he expressed that my interview had “got [him] thinking about this and how much we’re actually spending.” He was astonished to tell me that “we spend a heck of a lot more than I thought.”

Interview #2

Introduction

The second interviewee was a 72-year-old non-retired (working) female. For her privacy, I will refer to her as Laura. Laura scored an ELA score of 2.1, overestimating her live-to age as 90. She scored a 4 on the Death Anxiety Scale, indicating low levels of anxiety surrounding her death. And lastly, she had a spending tendency score of 6, indicating a higher tendency to spend. Laura was very humble and contented talking about her lifespan estimation, her feelings about death, and her travelling habits.

Estimated Lifespan Accuracy

Similar to Henry, Laura cited her mother's age as reasoning for her own estimation, saying, "Well, I was hoping for 90, like my mom." She admitted to not thinking about it very much at all, instead choosing to think more about staying active, healthy, and experiencing what life has to offer day-to-day. She says, "I don't think we can dwell on, 'Well, if I'd only lived a little while longer, I could have done this or this...' what's the point of thinking like that, if you want to do something, do it."

Death Anxiety

When discussing the anxiety surrounding her death, it is evident that Laura is more anxious when thinking about her health than her death. She talked about her love for walking when she travels and the importance of maintaining a healthy lifestyle to have an "uneventful life" (no adverse health events). Her external anxiety about her death was minimal.

Spending

Laura's spending habits were limited to spending on travel and saving for health-related problems in the future. When asked how much she needed to retire comfortably, Laura responded, "I'm not saying that I need a million dollars because what we don't know is health, you know, and we don't know other adverse things that could happen..." Laura was aware that future spending could increase due to unforeseen health problems and was taking action to maintain a comfortable savings for unfavorable future events.

Interview #3

Introduction

The third interviewee was a 69-year-old retired (non-working) male. For his privacy, I will refer to him as Thomas. Thomas scored an ELA score of 1, only overestimating his live-to age by

one year at 87. He scored a 0 on the Death Anxiety Scale, indicating very low levels of anxiety surrounding his death. And lastly, he had a spending tendency score of 3, indicating a lower tendency to spend. Thomas was humorous and easily talked about his lifespan estimation, thoughts about his death, and his conservative retirement spending habits.

Estimated Lifespan Accuracy

With an ELA score of 1, Thomas was the most accurate of the interviewees when estimating their lifespan. Though he “never really thought about it,” Thomas stated that “this guy next door... celebrated 80 and he’s pretty rough looking” so he estimated his own lifespan to be within that range too. He mentioned his mother’s “great health” and age at passing as reasoning for his lifespan estimation as well.

Death Anxiety

Thomas also exhibited the lowest death anxiety among all interviewees, reflected by his DAS score of 0. He says, “I’ve done a lot of stupid stuff, but I’m not really afraid to die” when asked about his anxiety surrounding death. When asked how he manages his feelings around his own death, Thomas admits that “I think it’s just kind of avoiding, and I didn’t even think about it before... [my family member] died... last year.” This coping mechanism of avoidance is consistent with previous research (Frijda et al, 1989). At certain points in our conversation, Thomas made jokes about his passing, humorously responding to a question concerning long-term care insurance that he plans to “[Self-insure] or go the way of the Eskimo.”

Spending

When asked about his spending in retirement, Thomas was very adamant about spending very little. Concerning a recent renovation, he says “once we’re finished here, then we’ll go back to almost spending nothing.” When it comes to saving money for future health-related problems,

he believes that “you should save any way, no matter what you think your health is going to be.” During our conversation of Bengen’s 4% Rule, Thomas states he hasn’t had to think about what percentage to withdraw and he only plans to take out of his retirement savings what “the government makes me [him] take out.”

Interview #4

Introduction

The fourth interviewee was a 67-year-old retired (non-working) female. For her privacy, I will refer to her as Rebecca. Rebecca scored an ELA score of 6.2, overestimating her live-to age as approximately 93. She scored a 5 on the Death Anxiety Scale, indicating low levels of anxiety surrounding her death. And lastly, she had a spending tendency score of 1, indicating a low tendency to spend. Laura was insightful and open in talking about her live-to age estimation, death anxiety, and spending habits.

Estimated Lifespan Accuracy

Like the other interviewees, Rebecca cited her mother’s age at death as her main source for estimating her lifespan, saying, “Well, my mom lived to [age]. My dad had all kinds of health problems [and] I have none of them.” She reasoned that “if subsequent generations do as well as the prior generation we should assume, we’ll get close to that.” Though her reasoning is sound, she overestimated the expected age for her gender and current age by about 6 years. When asked how much she thinks about her lifespan estimation, Rebecca responded, “Well, certainly, [I] we have, just in terms of should we purchase long-term care insurance... I was the youngest person in my grad school class, so I kind of run with a crowd that’s a bit older...people just talk about it. It’s just part of life right now.” This experience is consistent with research that suggests retirement is an “upheaval event” denoting the end of life (Routledge & Juhl, 2010).

Death Anxiety

Rebecca's death anxiety score was one of the highest in the group of interviewees. When asked how often she thinks about death, she replied, "having had [multiple] parents die in the last year, you know, that kind of slapped us in the face with it." She says she does not think about death "daily", but it has become more apparent as time goes on. When asked about her feelings concerning death, Rebecca says, "it's just part of the spectrum of life I guess...it doesn't freak me out." Rebecca also mentioned that she is "the only one of [her friends] that has a spouse that doesn't have serious health issue." Her experience of losing many loved ones at once and seeing her friends with health problems seems to be a common experience for many retirees.

Spending

During my interview with Rebecca, she received a phone call about the current renovations on her home. She mentioned that one could easily spend "\$30,000 on a sewer repair" and that she's "not that good at taking money out... but we have, you know, if we want to do a major remodeling." Rebecca was very mindful about her spending habits saying she "never felt like we have had enough. It was all about safety for me..." when discussing how she and her husband planned and saved for retirement.

Study 2

Interview #1

Introduction

The first financial advisor interview was with a female who had many years of experience as a financial advisor to all age groups. Her clientele consisted of high-net-worth individuals with \$10 million or more in financial assets. For confidentiality reasons, I will refer to her as Sara. During our conversation it was apparent that Sara cared very much for all her clients and listened

to them well. She talked about her many strategies when it comes to confronting death and its effect on lifespan estimation and spending.

Estimated Lifespan Accuracy

When asked what factors contribute most to her clients' lifespan estimation, Sara replied, "I would say, family history. So parents and maybe even siblings, or if a good friend has had an accident...I would say health is the main one, and then just the reality that... there are other things, accidents, that can happen." Sara made it clear that she never asks her clients directly to say "I think I have 6 and a half years left" but had a "general conversation" about their asset allocation and possible time horizons.

Death Anxiety

It was evident that death anxiety was not a prominent discussion amongst her clientele, but believed they brought that topic up with other professionals. When asked about her strategies to confront this topic, Sara answered, "you can kind of use that euphemistic term of estate planning to get people to focus on the fact that... the underlying reality is you're no longer here to do it on your own." This use of a non-threatening term, estate planning, is consistent with the idea of avoidance of death-related fears.

Spending

When asked about her clients' expense tracking habits, Sara responded that the majority do not track their spending. She attributed this lack of expense tracking to a large part of her clients having "a very substantial portfolio" and a "really good job, a good income" so "they felt comfortable that they could maintain their lifestyle" without much thought to what they were spending. Death anxiety had little to no discernable effect on their spending decisions.

Interview #2

Introduction

The second interview was with a male financial advisor who had 14+ years of experience as a financial advisor to all age groups. For confidentiality reasons, I will refer to him as John. During our conversation it was apparent that John clearly understood the needs of his clients and worked diligently to offer them as many solutions possible based on their individual situations. He talked about his approach to discussing death with his retired clients and its effect on their lifespan estimations and spending.

Estimated Lifespan Accuracy

John's approach to discussing his clients' estimated lifespan consisted of using the term "end of your plan." He mentioned that death is a common topic "for the younger clients, not so much for the older clients" and only when they have to start putting together estate planning documents. When asked about overestimating their lifespans, John replied, "I don't usually get it on that end of the spectrum of overestimate. It's usually the other end of the spectrum... men in particular." He says that when they underestimate by a substantial amount they get into mentality of "If I only have this many years to live, [I will] spend it while I have it" John also mentioned another factor "often overlooked" that contributes to his clients' lifespan estimation is that "if people do feel like they're on a spending pattern that's not sustainable."

Death Anxiety

Like Sara, the death anxiety of John's clients was not easily ascertainable. When asked about the impact of death anxiety on his clients, John replied that it was "tough for [him] to just give [me] an answer unless the client shares with [him] the anxious feelings they have about death." He mentioned that his older clients (aged 60 and older) seem to be at terms with death, his clients essentially saying that "this is a fact of life... I've seen parents pass away...my brothers

and sisters pass away. I've seen my friends pass away" so it seemed as if they had "mentally prepared themselves."

Spending

John discussed that as his clients approach their fifties, sixties, and seventies they begin to start thinking about "what kind of legacy I want to leave behind, or what kind of charities I'd like to contribute to if I don't have kids." He mentioned that he sees the most anxiety, not about death, but about running out of money, his clients saying, "what I have anxiety about is running out of money before I run out of life." John mentioned that "they've been hyper savers for decades" and his job is often to encourage his clients to "loosen up a little bit and spend the fruits of their labor." He says that it is not always a conversation about the numbers, but letting his clients know that they "have the opportunity right now in your sixties to do the things that you want to do because you're physically able to."

Study 3

Study 3 reports no significant findings of the impact of death anxiety on lifespan estimation and spending in retirement. I found no evidence that age is related to death anxiety ($r = -0.007$; $p = 0.9$). I also found a weak negative correlation between estimated lifespan accuracy and death anxiety ($r = -0.094$; $p = 0.29$). Finally, there was little correlational evidence that death anxiety affects spending ($r = -0.007$; $p = 0.9$). I did find evidence that the fear of running out of money and the fear of dying may be correlated ($r = -0.424$; $p < 0.05$), but this relationship may be a direction for future research.

Summary of Results Across the Three Studies

Hypothesis 1: Age and Death Anxiety

In all three studies, there was no indication that increased age leads to an increase in death anxiety. Confirming previous studies which have concluded that age has little to no effect on an individual's death anxiety.

Study 1

In study 1, all interviewees reported varying levels of death anxiety on the death anxiety scale with little range in their ages. The conversations of all interviews indicated little fear of dying and more fear towards future health-related issues.

Study 2

In study 2, both financial advisors reported that there were no noticeable differences in their client's death anxiety when compared to their age. Both advisors mentioned that their older clients had come to terms with the fact of death due to the deaths of loved ones. Retirement financial planning, such as conversations about estate planning and retirement spending, did not have any notable effect on the death anxiety of their clients.

Study 3

With a confidence level of 95%, a regression analysis using age as the independent variable and death anxiety as the dependent variable showed a statistically insignificant relationship between the two ($p = 0.9$; $N=130$). Given a Pearson Correlation of -0.007 , there is no significant correlation between an individual's age and their death anxiety.

Hypothesis 2: Death Anxiety and Lifespan Estimation

The three studies report mixed results on the effect of death anxiety on an individual's ability to accurately determine their live-to age estimation. Overall, there is some evidence of death

anxiety influencing live-to age estimation accuracy, however, other variables, such as mother's age, seem to affect an individual's live-to age estimation more than death anxiety.

Study 1

In study 1, all interviewees overestimated their expected lifespan for their respective gender and age group (based on 2020 U.S. Life Tables, see appendix H). ELA scores ranged from 1 to 10.3 (M=4.9; SD=3.7). It should also be noted that all interviewees cited their mother's age at death as their initial reason for their given estimation.

Study 2

Study 2 showed inconclusive results, as neither financial advisor asks their clients to report a lifespan estimation, but rather they generate different financial scenarios for a range of possible time horizons. Both advisors noted that it was unclear whether death anxiety had any effect on their clients' lifespan estimations unless it was explicitly stated by their client. It is notable that my interview with John indicated that males tend to underestimate their lifespans more than females.

Study 3

In study 3, Estimated Lifespan Accuracy scores ranged from -18 to 46 with a mean of 0 and a standard deviation of 9. Live-To Age Estimates ranged from 65 to 130 with a mean of 85 and a standard deviation of 10 years. With a confidence level of 95%, there was a Pearson Correlation of ≈ -0.094 between DAS and ELA showing a weak negative correlation between the two ($p=0.29$; $N=130$).

ELA uses the absolute value of the difference between an individual's lifespan estimation and their expected lifespan (based on 2020 U.S. Life Tables, see appendix I). However, this does not account for how much over or under they may be estimating. When accounting for under-over direction of estimation, there is a weak *positive* Pearson Correlation of 0.106.

As stated before, in all interviews, the age of their mother at death was cited as their initial source for determining their own live-to age estimation. Study 3 shows that an individual's Mother's Age and their live-to age estimate has a Pearson Correlation of 0.271. Father's Age has a 0.043 Pearson Correlation, indicating that an individual's Mother's Age has a stronger relationship with their live-to age estimation than their Father's Age or DAS (Table 1).

Table 1. *Pearson Correlations with Live-To Age Estimate*

<i>Pearson Correlation Table</i>	
	<i>Live-To Age Estimate</i>
<i>Mother's Age</i>	0.271
<i>Father's Age</i>	0.043
<i>Avg. Parents Age</i>	0.203
<i>Death Anxiety Scale (DAS)</i>	-0.077

It should also be noted that when comparing gender (*coded as female = 0, male = 1*) and ELA, there is a Pearson correlation of -0.095 ($p = 0.29$; $N = 130$), indicating a weak correlation between the two variables.

Hypothesis 3: Death Anxiety and Spending

Study 1

In study 1, interviewee ST-3 scores ranged from 1 to 9. Only 1 out of 4 interviewees had become comfortable spending their retirement savings, while the others were more inclined to save for health and other reasons.

Study 2

The results of study 2 are inconclusive as both financial advisors reported that death anxiety has little to no effect on the financial discussions of their clients, however, the death anxiety of their clients was not obviously apparent. Spending decisions were determined more by the legacy

and charitable donations that client's planned to leave behind. One financial advisor mentioned that many of his clients had to be reassured that they could feel comfortable spending their accumulated wealth after a living a lifetime with a hyper saving mentality.

Study 3

Using participant answers to Financial Question 2 (FQ2, see appendix E) as a measure for spending, gives a Pearson Correlation of -0.007 between DAS and FQ2, showing an extremely weak negative correlation. FQ2 ranged from 1% to 80% with a mean of 15% and a standard deviation of 15%. Given the following scenario, FQ2 asked subjects what percentage of their retirement savings they would plan to spend each year.

(Financial Question 2) You are retiring at age 66. You have \$221,000 saved for retirement. Your annual family income as you approach retirement has been \$64,000. Social security will cover 40% of your retirement income. Your retirement funds are invested in stock and bond mutual funds. Assume they will return a steady 8% per year. What percentage of your retirement savings would you plan to spend each year?

Discussion

These three studies provide a framework for thinking about death anxiety in retirement and its effect on lifespan estimation and spending. To my knowledge, this is the first study of the psychological impact of death and death anxiety on financial planning and decumulation. Of the 130 participants, 63 (48%) had a death anxiety score of greater than or equal to 7. This indicates that death anxiety is very much existent in retiree minds. My multimethod approach clearly shows that death anxiety is not only present in retirees minds, but it may be affecting their financial decision-making in retirement.

Age and Death Anxiety

This research did not find any significant correlation in study 3 between an individual's age and their death anxiety for ages 55 to 80. Study 1 may offer insight to this as many of the interviewees reasoned that being afraid of dying will only limit how much they can enjoy living. For many of the interviewees, their fears were focused more on running out of money, evident by their aggressive saving, even in retirement. Two interviewees also mentioned concerns of experiencing health issues later in life. Study 2 confirms this with both financial advisors stating that their older clients had come to terms with the ending of their life. They mentioned that getting older not only exposed their clients to more loss as their loved ones around them died, but that this loss of their loved ones had "mentally prepared" them for their own passing.

Death Anxiety and Lifespan Estimation

The effect of death anxiety on retiree aged individuals' ability to accurately estimate their lifespan was minimal. Study 3 reported that the Pearson Correlation between DAS and the direction of age estimation of -0.093 ($p=0.3$; $N=130$) indicates that an increase in death anxiety would lead to underestimation of their expected age.

Study 2 confirms this conclusion as both financial advisors mentioned that their clients are aware of their health and family history and, generally, know what age they expect to live-to. One financial advisor (John) stated that some of his clients will underestimate by large amounts. This underestimation was attributed to factors such as recent health diagnoses, health history (consumption of alcohol, smoking, etc.), parent's ages at death, and recent losses of loved ones. Individuals with higher death anxiety might be underestimating their lifespan due to thoughts of death always being relevant (mortality salience) causing them to imagine a shorter life than they can realistically expect based on objective factors such as their current age, gender, and health.

Study 1 reported consistent findings across all interviews that mother's age at death was used as the primary reason for their own live-to age estimation. This could be due to women statistically living longer than men, so a mother's age offers the most optimistic estimation possible when compared to a father's age. Study 1 also found that all retirees overestimated their age, indicating a reluctance to imagine a shorter lifespan.

Death Anxiety and Spending

And finally, this research confirms the hypothesis that individuals high in death anxiety will plan to spend more than those lower in death anxiety shown by how an increase in death anxiety can lead to an increase in the tendency to spend. This conclusion also confirms previous research which found that exposure to death-related stimuli can increase the purchase quantities and consumption of food (Mandel & Smeesters, 2008). This could be explained by the avoidance of this fear of death through spending.

Study 3 found that retirement statement 2, which states, "I worry about running out of money," had a strong negative Pearson Correlation of -0.424 ($p < 0.005$; $N = 130$) compared to the other retirement sentiments 1 ($r = -0.085$; $p = 0.4$; $N = 130$) & 3 ($r = -0.004$; $p = 0.96$; $N = 130$).

This indicates that there is a moderate inverse relationship between the fear of running out of money and the fear of dying. This could imply that an increase in the fear of running out of money decreases death anxiety. Study 2 supports this conclusion as one advisor (John) told the story of a retiree who, having very little money for his retirement, reasoned that he would get an assisted suicide when he ran out. This is a possible direction for future research to explore further.

Table 2. Means, Standard Deviations, and Intercorrelations

ST-3	Mean	Std Dev	R1	R2	R3
R1	1.408	0.641	1.000	0.169	0.209
R2	2.308	1.258	0.169	1.000	0.044
R3	3.362	1.196	0.209	0.044	1.000

Note: Cronbach's Alpha = 0.26

Additional Findings

Retiree Study

During all my interviews with retiree aged individuals, it was evident that their mother's age at death had an important influence on their lifespan estimates. Though many of them were aware of their own health and gave examples of the lifespans of their friends and family members, each interviewee came back to the age of their parents, in particular, the age of their mother, as evidence that they too would live as long, or longer. Many factors contribute to an individual's lifespan, so it was notable that a mother's age at death, or current age, was so influential on their lifespan estimates. This may be attributed to the statistical fact that women live longer than men. Therefore, it is possible that each of the interviewees opted for a more optimistic estimate of their lifespan by anchoring their live-to age to the age their mother lived to.

Financial Advisor Study

It is notable that both financial advisors mentioned that their clients don't outwardly express their anxiety about death. It was mentioned that grief is clearly visible in some of their clients, but

anxiety about death was nearly impossible to detect. This observation makes me question if their clients have suppressed their death anxiety to focus on their wealth management. Study 3 revealed that there is a strong correlation between “I worry about running out of money” and death anxiety. Is it possible that the fear of running out money is potent enough to temporarily, or permanently, overcome the fear of dying? If so, how can we effectively manage these fears to make reasonable, critical financial decisions in retirement?

Also, my interviews with both financial advisors revealed their strategies in approaching the topic of death. They mentioned using terms such as discussing “estate planning” or the “end-of-the-plan.” Both advisors were careful about avoiding the term “death.” One advisor cited his reason for this as being that death is an uncomfortable topic. Whether it is more uncomfortable for the advisor or the client I do not know. Avoiding directly speaking about “death” to their clients may have adverse consequences as the client is unaware of their own death anxiety and its influence on their financial decisions, however, it may be this roundabout method which allows their clients to process this “upheaval event” and make more logical decisions.

Amazon MTurk Study

And finally, Study 3, the Amazon MTurk study, additionally reported that the number of children an individual has, and their death anxiety has a Pearson Correlation of -0.122 ($p=0.2$; $N=130$). This correlation may suggest that leaving a legacy has a calming effect by which the individual feels a sense of significance in their children. The MTurk study also found a Pearson Correlation of -0.216 ($p = 0.01$; $N = 130$) between an individual’s self-reported GPH-2 health score and their death anxiety. This may suggest, unsurprisingly, that poorer health would lead to an increase in death anxiety.

Limitations

Although all three studies were as thorough as possible, there are a few improvements which could be made to improve the results of this research. Increasing the sample size for Study 3, interviewing a wider range of ages of retirees, and using a more reliable measure of spending would all improve the findings of these studies.

First, due to the unprecedented influx of non-human responses, the sample size for study 3 was limited to 130 observations. Using a larger sample size will offer more statistically significant results for retirement-aged individuals.

Second, study 1 was limited to a convenient sample of retiree aged individuals known to the researcher and his advisor, Dr. Dale Rude. This convenient sample only offered an age range of 5 years from 67 to 72. Future interviews could gain much insight from retirees in every age group (i.e. 55 to 60, 60 to 65, 65 to 70, etc.). While the limited age range offered consistent results, exploring a wider age range would have immensely added to the richness of this research since study 3 observed ages from 55 to 80, a range of 35 years.

And lastly, this research lacked a reliable means of measuring the spending of participants. It was, unfortunately, outside the scope of this research to track the daily, or monthly, spending habits of the participants over a certain period. While the spending measure chosen is indicative of an individual's tendency to spend, being able to obtain a more thorough measurement of their spending would have improved the results of this research.

Directions for future research

While these studies had many findings, this paper only scratches the surface of death anxiety's effect on the financial decision making of retirees. First, these studies only ranged in age from 55

to 80. Future directions for research could be to explore the effects of death anxiety in the oldest old who are making financial decisions.

Second, during all of my interviews, the topic of long-term care (LTC) insurance was brought up. While there are many differing opinions on the value of LTC insurance versus self-insuring, future directions for research could explore death anxiety's effect on the decision to purchase long term care insurance. Study 3 did not have any significant findings. The correlation between DAS and whether a person had purchased LTC insurance was 0.010.

Lastly, it may be worthwhile to explore the relationship between death anxiety and the fear of "running out" of retirement savings. Due to the strong negative correlation between death anxiety and retirement statement 2 there may be a connection between the anxiety surrounding the loss of retirement savings and death. Study 2 found that many retirees exhibit more fear about outliving their retirement savings than living a shorter life. Is the fear of financial insecurity greater than the fear of death to the point that it replaces it? Or is something entirely different going on?

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Figure 1

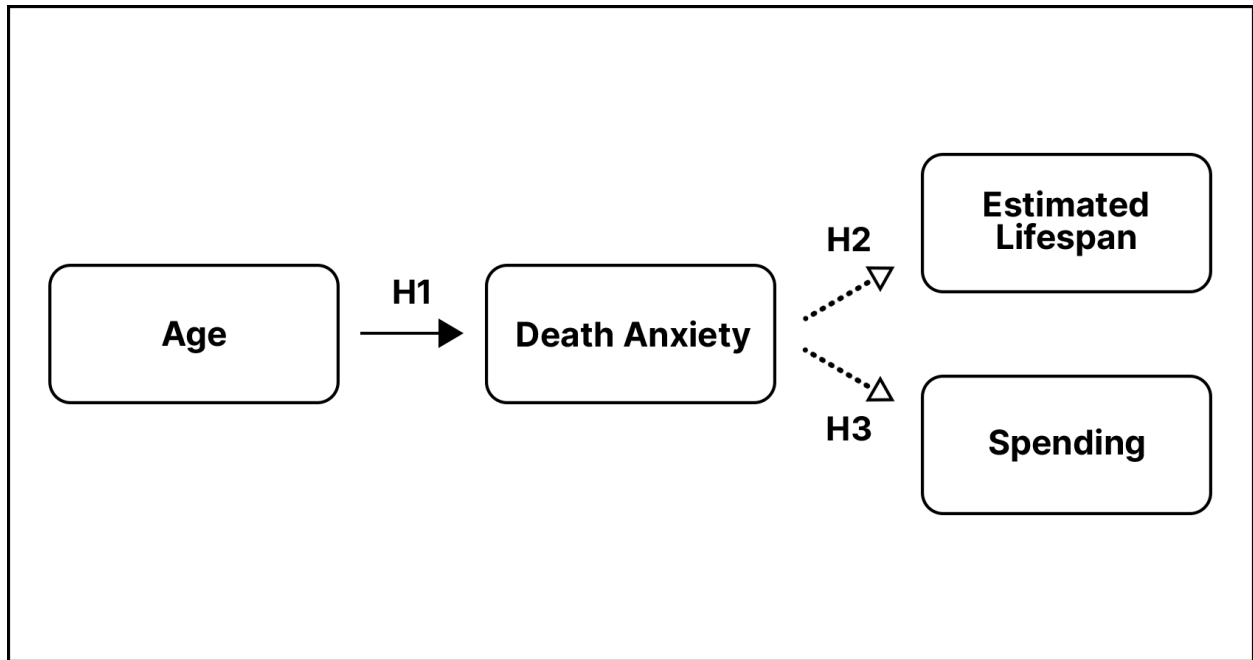


Figure 1. *Proposed Death Anxiety Model for Lifespan Estimation and Spending*

Appendix A – Retiree Interview Questions

What age do you expect to live to?

How did you arrive at this number?

How much do you think about it?

How often do you think about death? Your own death?

What do you think about your own death?

How does thinking about your death make you feel?

How do you manage those feelings?

How much do you have saved to last your through retirement?

How long do you believe your retirement money will last?

How did you arrive at this number?

Are you familiar with the 4% rule?

**In addition to demographic questions, Templar's Death Anxiety Scale (Appendix E), Financial Questions & Likert's (Appendix F & G), and Financial Sentiment Questions (H).*

Appendix B – Financial Advisor Interview Questions

Is your client's death a common topic of conversation?

Do they bring it up, or do you? What is the ratio?

How do you approach this topic with them?

What are ways that your clients think/talk about death?

How do they manage their anxiety/feelings about their death?

How does their interest in this topic change as they age?

How do clients estimate how long they will live?

What factors do they consider?

How significant is the impact of death anxiety in their estimation?

How do you help them manage this estimation process?

How do clients decide how much they can spend in retirement?

What factors do they consider?

How significant is the impact of death anxiety in their estimation, if any?

How do you help them to manage this process of decumulation?

What percentage of your clients track their day-to-day expenses? Actively use a budget?

Appendix C – Amazon MTurk Survey Questions

Included demographic questions, Templar’s Death Anxiety Scale (Appendix E), Financial Questions & Likert’s (Appendix F & G), and Financial Sentiment Questions (H).

Appendix D – Templar's Death Anxiety Scale

1. I am very much afraid to die. (T)
2. The thought of death seldom enters my mind. (F)
3. It doesn't make me nervous when people talk about death. (F)
4. I dread to think about having to have an operation. (T)
5. I am not at all afraid to die. (F)
6. I am not particularly afraid of getting cancer. (F)
7. The thought of death never bothers me. (F)
8. I am often distressed by the way time flies so very rapidly. (T)
9. I fear dying a painful death. (T)
10. The subject of life after death troubles me greatly. (T)
11. I am really scared of having a heart attack. (T)
12. I often think about how short life really is. (T)
13. I shudder when I hear people talking about a World War III. (T)
14. The sight of a dead body is horrifying to me. (T)
15. I feel that the future holds nothing for me to fear. (F)

Appendix E – Financial Questions 1 & 2

1. You are retiring at age 66. You have \$221,000 saved for retirement. Your annual family income as you approach retirement has been \$64,000. Social security will cover 40% of your retirement income. Your retirement funds are invested in stock and bond mutual funds. Assume they will return a steady 8% per year. *If you keep spending at the same rate, how long will your retirement savings last?*

2. You are retiring at age 66. You have \$221,000 saved for retirement. Your annual family income as you approach retirement has been \$64,000. Social security will cover 40% of your retirement income. Your retirement funds are invested in stock and bond mutual funds. Assume they will return a steady 8% per year. *What percentage of your retirement savings would you plan to spend each year?*

Appendix F – Financial Likert’s 1, 2, & 3

“Please rate the following statements based on the previous situation.” [FQ 1 & 2]

1. How likely are you to run out of money?

a. Input scale from Very Unlikely, Unlikely, Neutral, Likely, Very Likely

2. I wish I had saved more.

a. Input scale from Very Unlikely, Unlikely, Neutral, Likely, Very Likely

3. I will regret having too much money at the end of my life.

a. Input scale from Very Unlikely, Unlikely, Neutral, Likely, Very Likely

Appendix G – Financial Sentiments Likert’s 1, 2, & 3

Please rate the following statements

1. “It is a good idea to save retirement money in case you get sick.”

a. Input scale from *Strongly disagree, Disagree, Somewhat disagree, Neutral, Somewhat agree, Agree, Strongly agree*

2. “I worry about running out of money.”

a. Input scale from *Strongly disagree, Disagree, Somewhat disagree, Neutral, Somewhat agree, Agree, Strongly agree*

3. “I want to spend my retirement money while I am young enough to enjoy it.”

a. Input scale from *Strongly disagree, Disagree, Somewhat disagree, Neutral, Somewhat agree, Agree, Strongly agree*

Appendix H – 2020 U.S. Life Tables

Age	Male	Female	Male	Female
55	24.27	27.86	79.27	82.86
56	23.48	27.01	79.48	83.01
57	22.71	26.16	79.71	83.16
58	21.95	25.32	79.95	83.32
59	21.21	24.49	80.21	83.49
60	20.47	23.67	80.47	83.67
61	19.74	22.85	80.74	83.85
62	19.03	22.04	81.03	84.04
63	18.32	21.24	81.32	84.24
64	17.63	20.45	81.63	84.45
65	16.94	19.66	81.94	84.66
66	16.26	18.88	82.26	84.88
67	15.58	18.1	82.58	85.1
68	14.91	17.34	82.91	85.34
69	14.24	16.58	83.24	85.58
70	13.59	15.82	83.59	85.82
71	12.94	15.08	83.94	86.08
72	12.3	14.36	84.3	86.36
73	11.67	13.64	84.67	86.64
74	11.05	12.94	85.05	86.94
75	10.46	12.26	85.46	87.26
76	9.88	11.6	85.88	87.6
77	9.32	10.95	86.32	87.95
78	8.77	10.31	86.77	88.31
79	8.25	9.7	87.25	88.7
80	7.74	9.1	87.74	89.1

Source: SSA, Actuarial Life Table, 2020