Western Kentucky University
TopSCHOLAR®

8-1-2011

The Unconscious Influence of Mortality Salience on Younger and Older Adults

Ellen Johnson
Western Kentucky University, ellenrjohnson@gmail.com

Follow this and additional works at: http://digitalcommons.wku.edu/theses

Part of the Developmental Psychology Commons

THE UNCONSCIOUS INFLUENCE OF MORTALITY SALIENCE ON YOUNGER
AND OLDER ADULTS

A Thesis
Presented to
The Faculty of the Department of Psychology
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
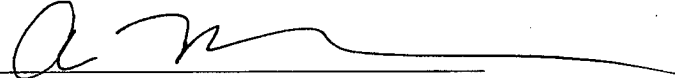Of the Requirements for the Degree
Master of Arts

By
Ellen Johnson

August 2011

THE UNCONSCIOUS INFLUENCE OF MORTALITY SALIENCE ON YOUNGER
AND OLDER ADULTS

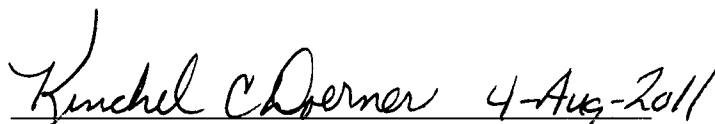Date Recommended _7/27/2011_

_____
Andrew Mienaltowski, Director of Thesis

_____
Jacqueline Pope-Tarrence

_____
Aaron Wichman

_____ _4-Aug-2011_
Dean, Graduate Studies and Research   Date

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF FIGURES

THE UNCONSCIOUS INFLUENCE OF MORTALITY SALIENCE ON YOUNGER AND OLDER ADULTS

Ellen Johnson   August 2011   66 Pages

Directed by: Drs. Andrew Mienaltowski, Jacqueline Pope-Tarrence, and Aaron Wichman

Department of Psychology   Western Kentucky University

Past research has examined the many ways individuals behave in response to unconscious primes. For instance, unconsciously activating stereotypes leads people to exhibit behavior that parallels the target stereotype (e.g., Bargh, Chen, & Burrows, 1996; Dijksterhuis & van Knippenberg, 1998). Priming methodology has also been extended to inducing mortality salience, such that specific behaviors emerge in response to thinking about one's own death. Two theories, socioemotional selectivity theory and terror management theory, hypothesize how individuals cope with thoughts about the end of life. The present study attempted to extend past research by comparing older and younger adults' responses to unconscious mortality salience.

Fifty-nine younger adults and 52 older adults were randomly assigned to one of two prime conditions: death prime or negative prime. The unconscious primes were administered through word searches, which contained 20 target words related to each prime. Defenses to the primes were assessed via suitability ratings and reaction times to a picture-caption task, which contained both neutral and emotional (positive and negative) captions paired with neutral pictures. A defense was operationalized as higher suitability ratings and faster reaction times to the positive captions, as well as lower suitability ratings and slower reaction times to the negative captions. Based on terror management theory, it was expected that individuals who were primed with death would display

specific defensive behavioral responses as compared to those who were primed with negativity, regardless of age. Socioemotional selectivity theory, however, predicts that these defenses may also emerge when older adults are primed with negativity due to the increased tendency for older adults, relative to younger adults, to automatically implement default emotion regulatory goals.

Analyses revealed that both younger and older adults embraced the neutral and positive captions after being primed with death. Participants primed with negativity were also more likely to embrace positivity. Age differences emerged such that younger adults were faster when reacting to emotional captions in the death condition than in the negative condition. Conversely, older adults primed with negativity reacted faster to emotional captions than those primed with death. Implications for terror management theory and socioemotional selectivity theory are discussed. Overall, both young and older adults displayed defenses to prime-activated threats of death and negativity. The implementation of death-related defenses was stronger for younger adults than the implementation of negativity-related defenses, but the opposite was true for older adults.

Introduction

Many studies have demonstrated that directing thought toward previously experienced concepts can activate mental constructs that, in turn, affect behavioral responses. Previous research has examined both conscious and unconscious methods for demonstrating this phenomenon (e.g., Bargh et al., 1996; Dijksterhuis et al., 1998; Dijksterhuis & van Knippenberg, 1998; Fitzsimons & Bargh, 2003). One unconscious method, priming, has been used to activate stereotypes and character traits. The current study utilized priming in order to unconsciously induce mortality salience. These inductions drive individuals to think about death. Much past research has relied on conscious mortality salience inductions (e.g., DeWall & Baumeister, 2007; Maxfield et al., 2007) in which participants were explicitly asked to think about their own death.

However, the implications for unconsciously activating thoughts about death have yet to be thoroughly examined. Much of the existing priming literature also focuses solely on examining how priming impacts the behavior of younger adults (i.e., college students). There exists a gap in the literature when it comes to considering how these methods might impact the behavior of older adults. In light of this oversight, the current study attempted to extend past findings by applying priming techniques to older samples, for whom death is logically a more immediate concern. This study compared younger and older adults' reactivity to unconscious death primes as well as the defense mechanisms that members of each age group might spontaneously adopt to suppress thoughts of death.

Age Differences in Emotional Goals

Many aspects of the human experience change as people get older. This is especially evident when investigating differences in social goals between younger and

older adults. For instance, socioemotional selectivity theory posits that future time perspective shifts across the lifespan such that older adults perceive that they have less time left in their life than do younger adults. This shift in future time perspective leads to a shift in goal pursuit (Carstensen, Isaacowitz, & Charles, 1999). By default, younger adults see their time as more expansive, and therefore seek goals that enhance novelty and build knowledge. On the other hand, older adults perceive their time as being limited and thus prioritize the pursuance of goals that enhance their odds of having positive emotionally meaningful experiences, such as spending more time with loved ones (Carstensen, 2006).

Although the aforementioned goals are the typical or "default" motivators for each age group, environmental factors may alter one's goals, regardless of age. For instance, if younger adults view a certain facet of their time as being limited (i.e., upcoming graduation or relocation away from a familiar social group), they tend to behave in a way that is more typical of older adults (Fredrickson & Carstensen, 1990). Essentially, they may begin to feel more motivated to spend time with old friends and loved ones rather than to seek out new acquaintances and expand their group of friends. In addition, an older adult who views his or her time as being more expansive tends to act more like a typical younger adult in terms of goal pursuance. Instead of aiming to spend more time with their close friends and family, they seek out opportunities to learn, expand their horizons, and experience new things. Therefore, regardless of age, the types of social goals pursued may depend on a person's future time perspective (Carstensen, 2006). In sum, socioemotional selectivity theory posits that older adults tend to naturally pursue goals tied to regulating emotion and carefully managing one's time and relations

given their nearness to death (Lang & Carstensen, 2002). Under normal circumstances, younger adults do not experience this limited time pressure and do not have the same intense focus to regulate their exposure to negativity. In fact, seeking novelty and building new relationships require one to be willing to experience some negativity if a positive outcome does not emerge. Older adults are certainly less willing to accept this risk.

Terror Management Theory

In addition to socioemotional selectivity theory, terror management theory also offers predictions as to how limits on perceived future time drive behavior. According to this theory, reminders of death present a threat to one's psychological well-being. In the face of this threat, individuals unconsciously form defenses in order to avert potential terror. Pyszczynski, Greenberg, and Solomon (1999) outlined a dual-process model of defense against the threat of death. First, a proximal defense develops immediately after one experiences a conscious threat of death. This early form of defense acts to remove the negative thoughts about death that spontaneously emerge during the threat from one's consciousness. The proximal defense allows one's consciousness to deny the threat of death by using a variety of strategies, such as suppressing thoughts of death from consciousness or distracting oneself from potential terror. After a delay, a later, distal defense forms. This second line of defense attempts to increase positive thoughts by placing the individual in a meaningful "death-transcending reality." Ultimately death cannot be completely denied; therefore, this defense works to emphasize an individual's self esteem and focuses on increasing faith in one's worldview (Pyszczynski et al., 1999).

Terror management theory further posits that the reaction to death-related stimuli is unique when compared to reactions to other negative constructs. For instance, induced mortality salience leads to an increase in worldview defense (e.g., American participants primed with mortality salience displaying a stronger preference than control participants for pro-American authors). However, priming other negative mental states, such as pain or public speaking, fails to produce the same results, suggesting that mortality salience leads to a display of defensive behaviors that is specific to coping with the threat of death (Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994). Additionally, it has also been shown that mortality salience leads individuals to automatically tune their thoughts toward positive emotional information. Participants who were primed with death completed word stems with more positive words than did participants who were primed with dental pain (DeWall & Baumeister, 2007). This provides further evidence that individuals defend against thoughts about their own death in a variety of ways and that these defenses may not be identical to those used when merely coping with negativity in one's life.

Both socioemotional selectivity theory and terror management theory attempt to explain how individuals respond to reminders of their own mortality. Although socioemotional selectivity theory predicts that younger and older adults will behave according to their age-appropriate future time perspective (i.e., time restricted for older adults but not for younger adults), terror management theory does not include an age qualification. According to terror management theory, both conscious and unconscious reminders of death result in specific exhibitions of psychological defense. More specifically, younger adults, as well as older adults, should attempt to reduce their

4

thoughts of death and increase positive thoughts when reminded of their own mortality either consciously or subconsciously. Past research has not shown, however, if older adults exhibit stronger defenses than do younger adults to death-related stimuli.

Mortality may naturally be more salient to older adults than younger adults because they have less time left in life. Therefore, older adults may be more predisposed to thinking about death. In fact, numerous studies have demonstrated evidence that older adults' limited perception of the time that they have left in life serves as a strong motivating factor in social cognition (for review, Carstensen, 2006; McAdams, de St. Aubin, & Logan, 1993). As a result, death primes may elicit immediate defenses from older adults that are stronger than those of younger adults, leading older adults to be more deliberative when exposed to death-related cues in their environment.

On the other hand, the death prime may pose less of a threat to older adults than to younger adults because older adults may be more accustomed to thinking about death. In this case, younger adults may exhibit stronger proximal and distal defenses after being primed with death. Additionally, although prior research suggests that younger adults display defenses against threats of death but not against negativity primes, older adults may be more likely to implement psychic defenses against negativity than against death. This possibility is consistent with research demonstrating that older adults are more effective at selecting and implementing emotion regulation strategies than young adults when faced with uncontrollable negative outcomes in their lives (Blanchard-Fields, 2007). The current study sought to identify differences in the automatic defenses younger and older adults develop in response to unconscious death threats.

Implicit Goal Activation

Goal pursuit has typically been considered to be a largely conscious process. For example, a series of studies demonstrated that when individuals consciously formed goal implementation intentions (e.g., stipulate specifically when and how they will pursue a goal), they were more likely than those who did not form goal implementation intentions to complete their goal (Gollwitzer & Brandstatter, 1997). Essentially, the conscious intention to engage in goal-directed behavior was linked to specific opportunities that promoted goal pursuit. It has also been shown that the way participants conceptualize their goals can affect intrinsic motivation to complete those goals. Participants who were told to avoid failure (rather than to approach success) demonstrated decreased intrinsic motivation to complete word puzzles (Elliot & Harackiewicz, 1996). It is clear from these findings that goal-directed behavior can be explicitly and consciously manipulated.

However, recent research has demonstrated that individuals can engage in goal-directed behavior without conscious awareness. For instance, it was shown that individuals who were unconsciously primed with a friend-related theme displayed more helpful behaviors than individuals who were primed with a co-worker-related theme (Fitzsimons & Bargh, 2003). These two unconscious relationship primes created differing subconscious representations of the participants' relationships and differentially guided the participants' motivation to help via unconscious schema activation. In another study, participants who were unconsciously primed with stereotypes of the elderly later walked more slowly down a hallway than did control participants (Bargh et al., 1996). In this case, unconsciously thinking about elderly stereotypes led participants to behave in a manner consistent with the activated stereotypes. These studies along with others point to

6

the fact that goal-states and motivation can be unconsciously primed (Dijksterhuis & Aarts, 2010). Additionally, the unconscious activation of goals may lead individuals to act without conscious choice or awareness.

Past research has chronicled the many ways in which implicit goals have been measured. In general, investigators implement some behavioral task related to the prime in order to measure the strength of the implicit goal. For instance, after priming achievement goals, researchers typically compare the performance of experimental participants to that of control participants on a cognitive task, such as the Wisconsin Card Sorting Task (e.g., Hassin, Bargh, Zimerman, 2009) or a series of word-search tasks (e.g., Bargh, Gollwitzer, Lee-Chai, Barndoller, & Trotschel, 2001). Implicit interpersonal goals have been measured by priming participants with various thoughts about social relationships (e.g., friends or co-workers) and then assessing the participants' willingness to help the experimenter with a subsequent study (Fitzsimons & Bargh, 2003). It is apparent from these studies that implicit goal activation leads to goal-directed behavioral effects on subsequent related tasks.

Priming Mortality Salience

In the past, mortality salience researchers have largely used explicit methods for priming thoughts of death. The most commonly implemented method to induce thoughts of death is to directly ask participants to think about their own death and to write about how these thoughts make them feel. Researchers in this area also typically ask participants to write about what they think will happen to them when they die (e.g., DeWall & Baumeister, 2007; Greenberg et al., 1994; Maxfield et al., 2007). By using this method, participants are consciously aware that they are thinking about their own death.

Research on the implicit and unconscious priming of death has been utilized, but is not the typical method for inducing mortality salience. For instance, participants exposed to subliminal masked presentations of the word "dead" exhibited an increased worldview defense compared to participants exposed to masked presentations of the word "pain" (Arndt, Allen, & Greenberg, 2001). This study indicates that the effects of thinking about one's own mortality are evident even without participants' conscious awareness of the mortality salience induction.

In another study, researchers investigated the effect that subliminal mortality salience has on visual attention toward different types of images. When compared with control participants, those who were subliminally primed with death spent significantly less time looking at images of physical injury. In addition, those in the death condition spent more time looking at threatening images (Hirschberger, Ein-Dor, Arzouan, & Zivotofsky, 2010). This finding demonstrates that subliminal death primes lead participants to exhibit distinguishable behaviors that indicate a defense against death-thought accessibility. Also, it is important to note that, in these two studies, the authors did not attempt to distinguish between proximal and distal types of defense. Furthermore, the priming used in these studies took place on a trial-by-trial basis suggesting that (a) defense from subliminal threats of death may take place immediately after the presentation of a prime and continue to be re-implemented with each additional stimulus, and (b) averaging responses across trials did not eliminate their ability to track noticeable differences in their participants' defensive behaviors during the priming tasks.

The current study attempted to bridge a gap in the field by implicitly activating mortality salience in an older adult sample. Although researchers have used explicit

methods to induce mortality salience in older adults (e.g., Maxfield et al., 2007), the unconscious induction of mortality salience has not been utilized. Word searches have been used in other types of research to unconsciously prime concepts. For instance, Hassin and colleagues (2009) demonstrated that individuals who were unconsciously primed by completing word searches that contained words related to achievement displayed higher performance on the Wisconsin Card Sorting Task. Participants were unaware of any link between the priming task and the subsequent behavioral task. Furthermore, participants' thoughts of high performance remained outside of their consciousness during the priming task. This finding suggests that unconscious priming of a construct impacts observable behavior.

In the present study, word searches that contain target words related to death were used to lead younger and older participants to unconsciously think about their own mortality. By including older adults in this research, a more complete understanding of implicit goal priming was sought. The behavioral implications resulting from the unconscious word search priming techniques were assessed using a picture-caption task in which participants were instructed to rate the extent to which they thought the picture-caption pairings matched (i.e., suitability rating). Some of the captions offered emotional (positive/negative) interpretations of the pictures. A defense to death thoughts was indicated when participants expressed a higher suitability rating for positive captions and lower suitability ratings for negative captions. In addition, participants' reaction times to the picture-caption task served as an indicator of how much time was invested when processing the caption (Bassili, 1993). If experiencing threat and attempting to form a defense to that threat, an individual may require more time than when not experiencing

threat to evaluate a caption's relevance to a picture stimulus. Therefore, faster reaction times indicated a faster implementation of the defense. In sum, participants' defenses to the mortality salience induction manifested themselves in participants' responses to the captions as well as their reaction times in the picture-caption task. Furthermore, this manifestation of goal-directed behavior remained unconscious throughout the entire experiment (e.g., Bargh et al., 1996; Hassin et al., 2009).

Taking into account previous research supporting terror management theory, it was hypothesized that both younger and older adults would defend against thoughts of death following an unconscious mortality salience induction. Defensive behaviors were operationalized relative to the picture-caption task and will be elaborated upon in the method section that follows. Additionally, given the robust support found for socioemotional selectivity theory, it was also hypothesized that older adults' default focus on emotion regulation would yield age differences when participants were primed with negative information not related to death, such that only older adults would exhibit a defense against negative thoughts. The manipulation used in this study to prime participants did not ask them to consciously reflect on death or on a negative experience that they have had in the past. Rather, the manipulation capitalized on a nonconscious priming technique that has worked in the past to activate goals (e.g., Hassin et al., 2009). Given this, it is difficult to draw a direct parallel between the proximal and distal defense mechanisms used by participants in the current studies and those operating in prior work.

In the current study and consistent with the findings from the subliminal priming studies discussed earlier, participants were expected to engage in defense tactics immediately after the prime manipulation. However, given that other studies that have

found a proximal defense to mortality salience included a time delay between the prime

and the measurement of the resulting changes in behavior, it was not entirely clear a

priori if the participants' defenses would be activated early on after the prime or require a

brief period of time before emerging. Exploratory analyses were used to determine the

extent to which young and older adults implemented proximal and distal defenses to each

priming condition in the manipulation by examining the early and late halves of the

defense measure that participants completed immediately after the priming manipulation.

Method

This study employed a 2 (Age Group: younger and older adults) × 2 (Condition:

death prime and negative prime) between-subjects design. The main dependent variable

that was considered was the process by which participants provided judgments in the

picture-caption task after being primed. Both the suitability ratings and the time that it

took to provide these ratings in the picture-caption task were examined. Additionally,

temporal sequence was added as an exploratory within-subjects factor to determine if the

participants' responses in the picture caption task (i.e., reaction time and ratings) varied

as a function of the time that had elapsed since the end of the priming task. Specifically,

participants' performance during the early and late trials of the task were examined to

determine if the timing of the trials impacted the choices made by participants or the time

that it took for them to respond.

Participants

Fifty-nine younger adults (29 female, 30 male), ranging in age from 18 to 32 ($M =$

19.51, $SD = 2.02$), were recruited from introductory level psychology courses in

exchange for course credit. The 52 older adults (27 female, 25 male), ranging in age from

63 to 80 ($M = 67.92$, $SD = 4.09$), were recruited from the community through mail-out invitations and phone calls encouraging participation.

Materials

Word searches. Older and younger participants were randomly assigned to one of two conditions: death prime or negative prime. Word searches were used to unconsciously prime the different conditions. The two priming word searches were created by generating 20 words related to death and 20 negative words not related to death. The Affective Norms for English Words (ANEW; Bradley & Lang, 1999), a collection of words rated on their pleasure, was used to generate negative words. Word searches have been used in previous research to unconsciously manipulate goals (Hassin et al., 2009). Participants in the *death* condition were asked to find words in a word search that contained 20 words related to death (e.g., ashes, burial, cemetery; see Appendix A). Participants in the *negative* condition were asked to find words in a word search that contained 20 negative words not related to death (e.g., agony, betray, corrupt; see Appendix B). All participants completed a neutral word search containing words related to birds (see Appendix C) before beginning the word search for their assigned experimental condition. Participants were scored on the number of words out of 20 that they found within a five minute period for each word search as a gauge of individual differences in how invested participants were in the task.

Picture-caption task. In order to assess the effects of the word search primes, a picture-caption task was presented to participants. More specifically, this task contained 24 neutral photographs paired with captions from 3 different categories: positive, negative, and neutral. Overall, there were 6 picture-caption pairings for the positive and

negative categories (or 12 emotional picture-caption pairings) and 12 pictures for the neutral category. The 24 neutral photographs were chosen from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 2008) and Google Images. The IAPS is a collection of photographs from a variety of semantic categories that are rated in terms of their emotional nature. Photographs were also chosen from Google Images based on their similarity in appearance to the neutral IAPS photographs as well as their non-emotional nature.

Each photograph/caption pairing was presented on a computer screen with one photograph/caption appearing at a time. Participants were instructed to indicate the extent to which they thought that the caption matched the photo provided, or how well the photo and caption matched. Responses ranged from 1 (very slightly or not at all) to 5 (completely). A manipulation check was performed at the end of the experiment to ensure that the participants perceived the captions as falling into the three intended categories – positive, neutral, and negative. The outcome of this manipulation check is discussed in the results section.

PANAS. The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988; see Appendix D) is a commonly used mood assessment tool. It consists of 10 adjectives that assess one's positive mood (interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, and active) and 10 that assess negative mood (distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, and afraid). In the current study, ten words were added to the positive affect (5) and negative affect (5) components of the PANAS. Watson and colleagues (1988) report internal consistencies of .89 for momentary positive affect and .85 for momentary negative affect,

and the current study found internal consistencies of .88 for momentary positive affect

and .85 for momentary negative affect. Participants completed the schedule with respect

to how they currently felt by indicating the extent to which they are experiencing the

feelings represented by each adjective using a 1 to 5 Likert scale rating (1 = *very slightly*

or not at all, 2 = *a little*, 3 = *moderately*, 4 = *quite a bit*, and 5 = *extremely*). This

questionnaire was used in this study to evaluate participants' positive and negative affect

after completing the picture-caption task. The PANAS has been used in other mortality

salience priming studies to assess mood (i.e., DeWall & Baumeister, 2007).

Life Orientation Test. The Life Orientation Test Revised (Scheier, Carver, &

Bridges, 1994; see Appendix E) was used to assess participants' optimism and

pessimism. This scale consists of 10 items - four of which are filler items and six of

which capture optimism and pessimism. The scale itself can be separated into three

optimistic items (Cronbach's alpha = .66) and three pessimistic items (Cronbach's alpha

= .76), or the pessimistic items can be reverse scored and added to the optimistic items to

create an overall optimism score (Cronbach's alpha = .79; Scheier et al., 1994). In the

current study, optimism and pessimism were assessed separately, and had internal

consistencies of.68 and .75, respectively. The optimistic items include: "*In uncertain*

times, I usually expect the best", "*I'm always optimistic about my future*", and "*Overall, I*

expect more good things to happen to me than bad". The pessimistic items include: "*If*

something can go wrong for me, it will", "*I hardly ever expect things to go my way*", and

"*I rarely count on good things happening to me*". Participants responded to each item

using 0 to 4 Likert rating scale to indicate the extent to which they agreed with each

statement, where 0 = *I strongly disagree*, 1 = *I disagree*, 2 = *I neither agree nor disagree*, 3 = *I agree*, and 4 = *I strongly agree*.

Time Scale (a.k.a. Future Time Perspective Scale). The Time Scale (Lang & Carstensen, 2002; see Appendix F) is a 10-item scale that assesses how much time a person feels that they have left in life. Participants used a 1 to 7 Likert rating scale to indicate the extent to which they agree with each statement (1 = *strongly disagree* to 7 = *strongly agree*). Sample statements include: "*There is plenty of time left in my life to make new plans*", "*My future is filled with possibilities*", and "*My future seems infinite to me*". Past research (Lang & Carstensen, 2002) has demonstrated that this measure has excellent internal consistency (Cronbach's alpha = .92), and a similar high level of internal consistency was found in the current study (Cronbach's alpha = .89).

Advanced Vocabulary Test. The Advanced Vocabulary Test is an 18-item abbreviated measure of verbal ability from the Kit of Factor Referenced Tests (Ekstrom, French, Harman, & Derman, 1976; see Appendix G). Participants have four minutes to identify which one word for each item is most similar in meaning to a target word.

Letter Sets Test. The Letter Sets Test is a 15-item abbreviated measure of inductive reasoning ability from the Kit of Factor Referenced Tests (Ekstrom et al., 1976; see Appendix H). Within each item, participants were presented with five sets of letters with four letters in each set. Four of the sets of letters are alike in some way, and the participant must identify the pattern that holds four of the five sets together so that they can eliminate the odd set of letters. Participants have seven minutes to complete the test.

Religiosity Scale. The Religiosity Scale (Rohrbaugh & Jessor, 1975; see Appendix I) is a 9-item multiple choice measure to assess various aspects of religious

15

involvement, such as ritual religiosity, consequential religiosity, ideological religiosity, and experiential religiosity. Sample items include: *"How often have you attended religious services in the past year?"*, *"When you have a serious personal problem how often do you take religious advice or teaching into consideration?"*, and *"How much of an influence would you say that religion has on the way that you choose to act and the way you choose to spend your time each day?"*. Research (Rohrbaugh & Jessor, 1975) has shown that this measure has high internal consistency (Cronbach's alpha >.90) and a similar high level of internal consistency was found in this study (Cronbach's alpha = .93).

Trail Making Test. The Trail Making Test (Reitan, 1955; see Appendix J) is a cognitive measure of task switching ability and visual attention. It consists of two versions. Version A contains 25 numbered circles (1 through 25) and requires participants to sequentially connect the circles as fast and accurately as possible. Version B contains 13 numbered circles (1 through 13) and 12 lettered circles (A through L). Participants are instructed to connect the circles by alternating between numbers and letters in a sequential order. Participants were timed for both versions of the tests. The difference in time it takes a participant to successfully complete version A and version B is taken as an indicator of the participant's ability to switch tasks.

Procedure

First, participants were greeted and directed to an individual testing room within the laboratory. Participants were given an informed consent form (see Appendix K) that outlined basic information regarding the study and was approved by Western Kentucky University's Human Subjects Review Board (HSRB; HS10-168). After signing the

consent form, the experimenter briefly explained the purpose of the study: to examine some everyday thought processes of people. The study was presented as a series of unrelated cognitive or everyday tasks.

The first group of cognitive tasks consisted of the Advanced Vocabulary Test and the Letter Sets Test. After completing these two tests, participants were presented with the word searches. Prior to completing the manipulation word searches, all participants completed a neutral word search that contained 20 words related to birds. After completing this word search, participants were randomly assigned to the manipulation condition (death prime or negative prime condition). All word searches had a five-minute time limit, ensuring that participants did not find all the words. This was intended to enhance participants' perception that the goal to complete the word search was unaccomplished, thereby increasing goal adherence (Koo & Fishbach, 2008).

After the word search tasks, the experimenter opened the file containing the picture-caption task on the computer. These instructions for the task appeared on the screen for participants to read:

> *For this portion of the session, you are going to be presented with some photographs. Last year, participants were asked to write down one possible interpretation of the contents of each of 300 photographs.*
>
> *Today, you will see 24 of these photographs. The photographs will be randomly chosen from the 300 that are available. For each photo, please indicate to what extent each caption fits the photo provided, or how well the photo and caption match.*
>
> *When making your judgment, please use the 1 to 5 rating scale that is available to you at the bottom of the screen. Please indicate your responses using the number buttons on the keyboard.*

17

Participants then completed a series of questionnaires containing the PANAS, the Life Orientation Test, the Time Scale, the Religiosity Scale and a demographics questionnaire (see Appendix L). Finally, the Trail Making Test was administered and afterwards participants completed a manipulation check on the computer in which they rated the pleasantness and unpleasantness of the pictures and captions used earlier. The experimenter then fully debriefed participants. After completing all tasks, participants were thanked and dismissed.

Hypotheses

It was hypothesized that defenses would be exhibited through (a) the way participants responded via their suitability ratings in the picture-caption task and (b) the amount of time it took participants to provide their rating for each picture and caption pairing in the picture-caption task. More specifically, a defense to a prime would be indicated when participants provided higher suitability ratings to positive captions (positive tuning, or embracing/approaching positivity) and provided lower suitability ratings to the negative captions (avoiding or rejecting negativity). In terms of reaction times, a defense to a prime would be indicated when participants respond quicker to positive captions (automatic positive tuning, or embracing positivity) and slower to negative captions (indicative of an uncertain decision). Taken together, both the suitability ratings and response times indicated whether or not a defense was exhibited for each condition.

Based on terror management theory, it was hypothesized that both younger and older adults in the death prime condition would unconsciously defend against thoughts of death. Therefore, both younger and older adults in the death prime condition should

provide higher suitability ratings and display quicker reaction times for the positive captions in the picture-caption task relative to neutral. Further evidence of a defense should be exhibited through lower suitability ratings and longer reaction times for negative captions relative to neutral.

For older adults in the negative prime condition, a similar defensive posture was hypothesized for stimuli encountered in the picture-caption task. Older adults, who are more adept at regulating their emotions (Blanchard-Fields, 2007), should rate positive captions as being more suitable while displaying shorter reaction times for positive captions relative to neutral. This defense should also be evidenced by older adults' lower suitability ratings and longer reaction times for negative captions relative to neutral. On the other hand, younger adults in the negative prime condition were hypothesized to display a pattern of embracing negativity. That is, younger adults were expected to rate negative captions as being more suitable than neutral captions and were expected to require less time to respond to negative captions than to neutral captions.

Results

Before examining the impact of the primes on dependent variables, analyses were conducted to ensure that the stimuli used in the picture-caption task were correctly categorized as neutral, positive, or negative. Next, age differences were examined in regards to the cognitive and personality measures. Overall analyses were then conducted to investigate how each priming manipulation impacted participants' suitability ratings as well as response times to the picture-caption task. Exploratory analyses were then conducted to examine differences between responses and reaction times both early and late in the picture-caption task. Finally, exploratory correlational analyses were

conducted to investigate whether the strength of the prime affected participants'
responses on other dependent measures.

Picture Caption Task

The picture-caption task consisted of 24 trials in which the participant indicated
the extent to which a given caption matched a picture that appeared above it. Half of the
trials included neutral captions and half included emotional caption (6 positive and 6
negative). Response times for the trials were examined for outliers. Trials were omitted
from analyses if they represented response times that exceeded 2.5 times the standard
deviation of the participant's overall mean reaction time. In total, 56 trials were dropped
of the 2,610 trials, or 2.15% of all trials for all participants.

Picture-Caption Task Manipulation Check. To ensure that the pictures used in
the picture-caption task were correctly categorized as being neutral and to ensure that the
captions were correctly categorized into negative, neutral, and positive categories,
participants were asked to rate how pleasant and unpleasant they thought the pictures and
captions were. Ratings ranged from 1 (not at all pleasant/unpleasant) to 5 (extremely
pleasant/unpleasant). A repeated measures ANOVA yielded a main effect of caption type
for pleasant ratings, $F(2, 220) = 454.47$, $p < .001$, $\eta_p^2 = .81$. Paired samples t-tests
showed that participants considered the positive captions to be significantly more
pleasant than the neutral captions, $t(110) = 13.80$, $p < .001$, and considered neutral
captions to be significantly more pleasant than negative captions, $t(110) = 17.97$, $p <$
.001. Positive captions were also rated significantly more pleasant than negative captions,
$t(110) = 27.39$, $p < .001$. For unpleasant ratings, a repeated measures ANOVA also
yielded a main effect of caption type, $F(2, 220) = 629.42$, $p < .001$, $\eta_p^2 = .85$. Paired

samples t-tests showed that the negative captions were considered significantly more unpleasant than were the neutral captions, t (110) = 27.28, $p < .001$, and the neutral captions were considered more unpleasant than were the positive captions, t (110) = 5.38, $p < .001$. In addition, the negative captions were rated as significantly more unpleasant than were the positive captions, t (110) = 26.96, $p < .001$.

Overall, participants rated the positive captions as mostly pleasant (M = 3.75, SD = .73) and not at all unpleasant (M = 1.30, SD = .51). The negative captions were rated as mostly unpleasant (M = 3.88, SD =.75) and not at all pleasant (M = 1.38, SD = .56). Participants rated the neutral captions as somewhat pleasant (M = 2.71, SD = .71) and slightly unpleasant (M = 1.59, SD = .59). Participants rated the neutral pictures used in the picture-caption task as slightly pleasant (M = 2.38, SD = .56) and slightly unpleasant (M = 2.05, SD = .58) (See Appendix M).

Age Differences in Personality and Cognitive Measures

Independent samples t-tests were conducted to investigate whether age differences existed for the various cognitive and personality measures that were administered to participants. Younger adults (Letter Sets: M = 10.15, SD = 2.97; Trails Making: M = 33.92 sec, SD = 21.18) significantly outperformed older adults (Letter Sets: M = 8.02, SD = 3.29; Trails Making: M = 63.37, SD = 41.18) on both the Letter Sets Test, t (108) = 3.57, p = .001, as well as the Trail Making Test, t (108) = 4.81, $p < .001$. This finding indicated that the younger adult sample was more adept at problem solving, pattern finding, and task switching than were older adults. However, older adults (M = 9.23, SD = 3.25) significantly outperformed younger adults (M = 7.24, SD = 2.32) on the

Vocabulary Test, t (109) = 3.75, p < .001, indicating the typical pattern that older adults generally have more acquired knowledge than do younger adults.

Younger adults (M = 5.67, SD = .84) reported higher levels of future time perspective than did older adults (M = 4.35, SD = 1.10), t (109) = 3.75, p <.001. This finding was not surprising, as older adults are naturally closer to the end of their life than are younger adults. Younger adults (Pessimism: M = 1.76, SD = .72; Negative Affect: M = 1.59, SD = .49) also reported higher levels of both pessimism, t (107) = 4.25, p < .001, and negative affect, t (109) = 3.88, p < .001, than did older adults (Pessimism: M = 1.18, SD = .69; Negative Affect: M = 1.28, SD = .32). Older adults (Optimism: M = 2.90, SD = .57; Positive Affect: M = 3.58, SD = .69) reported higher levels of both optimism, t (106) = 2.08, p = .04, and positive affect, t (109) = 4.61, p < .001, than did younger adults (Optimism: M = 2.64, SD = .71; Positive Affect: M = 3.03, SD = .57). Taken together, these findings indicate that older adults were generally more positive than were younger adults. Older adults (M = 3.99, SD = 1.04) also reported marginally higher levels of religiosity than did younger adults (M = 3.63, SD = .99), t (105) = 1.86, p = .07. Means for the cognitive and personality measures are depicted in Appendix N.

Suitability Ratings

A 2 (Condition: death or negative prime) × 2 (Age: younger or older) × 3 (Caption Type: negative, neutral, and positive) mixed model ANOVA was conducted on participant suitability ratings in order to determine whether participants exhibited defenses to the different primes. Overall, there was a significant main effect of caption type, F (2, 214) = 11.00, p < .001, η_p^2 = .09, such that participants provided higher

suitability ratings for neutral captions (M = 3.27, SE = .07) and positive captions (M = 3.28, SE = .08) than for negative captions (M = 3.03, SE = .08).

A marginal interaction of Caption Type × Condition was also found, F (2, 214) = 2.09, p = .13, η_p^2 = .02. To explore this marginal interaction, separate paired-samples t-tests were conducted to compare the responses to the different captions types for each condition (refer to Figure 1 and Appendix O for depictions of these means). Participants in the death prime condition rated neutral captions as being significantly more suitable than the negative captions, t (53) = 3.87, p < .001. In addition, positive captions were rated as significantly more suitable than the negative captions, t (53) = 2.62, p = .01. The suitability ratings for positive captions were no different than those for neutral, t (53) = 1.35, p = .18. Participants in the negative prime condition provided significantly higher suitability ratings when responding to the positive captions than when responding to the negative captions, t (56) = 2.76, p = .01. The suitability ratings for neutral captions did not differ from those for negative, t (56) = 1.60, p = .12, or positive captions, t (56) = 1.45, p = .15.

Contrary to predictions, age did not interact with caption type and/or condition, suggesting that young and older adults offered similar suitability ratings for the captions in the picture-caption task after the priming manipulation. Overall, these analyses indicate that, regardless of age, participants in the death prime condition were more likely to embrace both neutral and positive captions than the negative captions whereas those primed with negativity were more likely to embrace positivity.
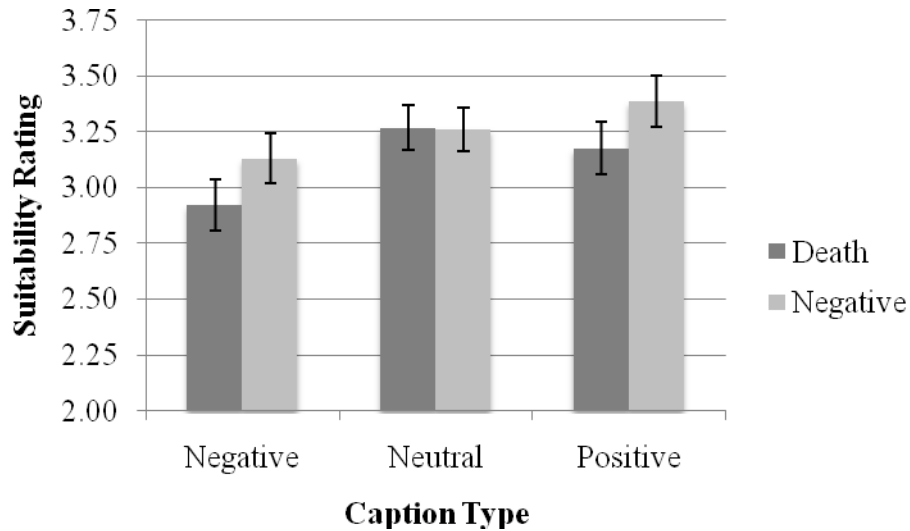
Figure 1. Participant suitability ratings for each caption type by condition.

Reaction Times

In order to investigate defenses in terms of reaction times, a 2 (Condition: death or negative prime) × 2 (Age: younger or older) × 3 (Caption type: negative, neutral, and positive) mixed model ANOVA was conducted on the amount of time it took participants to respond to each stimulus in the picture-caption task. Overall, A main effect for age was also found, F (1, 107) = 81.62, $p < .001$, $\eta_p^2 = .43$, such that older adults displayed longer reaction times overall ($M = 11434$ msec, $SE = 386$) than did younger adults (6644 msec, $SE = 362$). Also, a significant main effect of caption type was found, F (2, 214) = 5.11, $p = .01$, $\eta_p^2 = .05$. A paired samples t-test showed that, overall, participants responded faster to positive captions ($M = 8570$ msec, $SD = 3959$) than to negative ($M = 9116$ msec, $SD = 3929$), t (110) = 2.73, $p = .01$, or neutral captions ($M = 9006$ msec, $SD = 3587$), t (110) = 2.38, $p = .02$. The response times to negative and neutral captions were no different, t (110) = .64, $p = .52$.

There was also a marginal Caption Type × Age × Condition three-way interaction, $F (2, 214) = 2.12$, $p = .12$, $\eta_p^2 = .02$. To interpret this three-way interaction, three separate 2 (Condition) × 2 (Age) one-way ANOVAs were conducted; a separate ANOVA was conducted for each caption type. When responding to negative captions, there was a marginal Age × Condition interaction, $F (1, 107) = 2.17$, $p = .14$, $\eta_p^2 = .02$, such that older adults took longer to respond in the death condition than in the negative condition, whereas younger adults took longer to respond in the negative condition than in the death condition (see Figure 2 and Appendix O for depictions of these means).
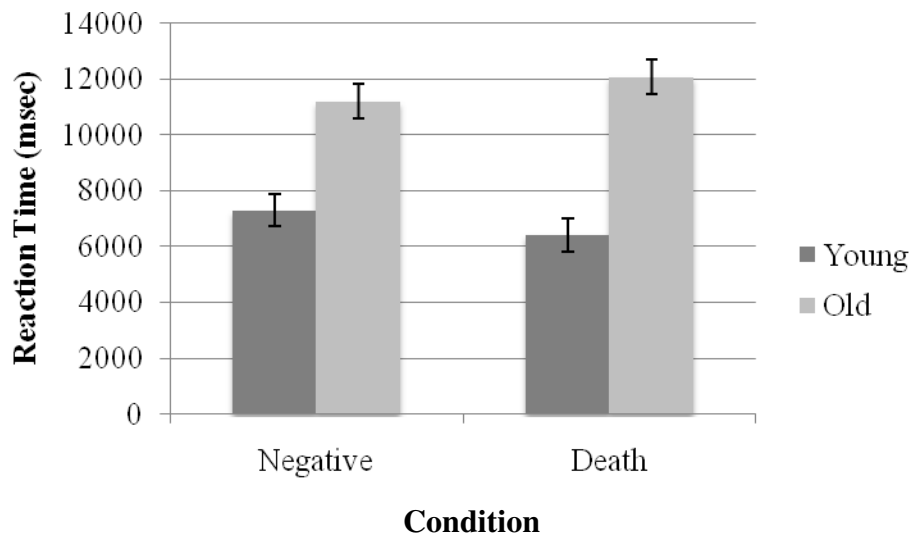
Figure 2. Pariticipant reaction times to negative captions for each condition as a function of age.

For positive captions, a marginal Age × Condition interaction was observed, $F (1, 107) = 2.19$, $p = .14$. $\eta_p^2 = .02$, such that older adults took longer to respond in the death condition than in the negative condition, whereas younger adults took more time to respond in the negative condition than in the death condition (see Figure 3 and Appendix

O for depictions of these means). Although not significant at $\alpha = .05$, this mean trend is notable because it signifies a possible age difference in the nature of young and older adults' defenses to unconsciously activated thoughts about death and negativity.
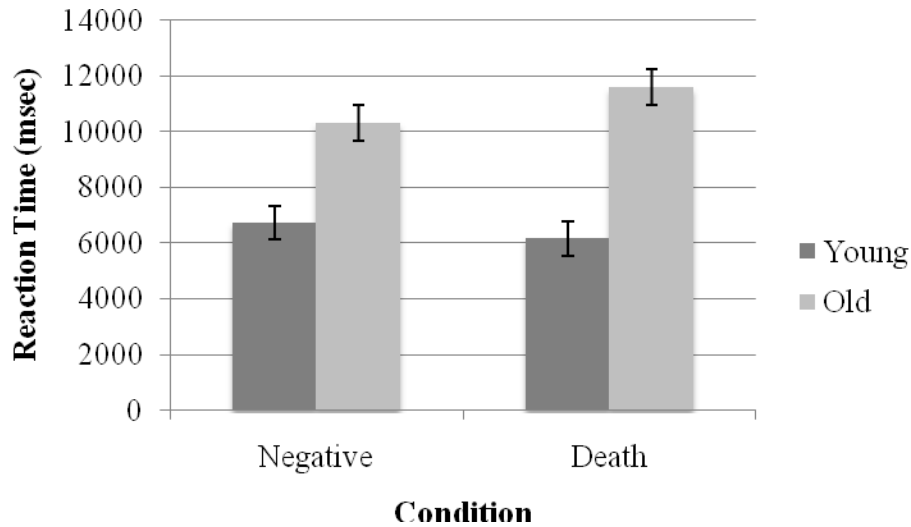
Figure 3. Participant reaction times to positive captions for each condition as a function of age.

No interactions were observed for the neutral captions (see Figure 4 and Appendix O). Therefore, older adults primed with death and younger adults primed with negativity took longer than their peers in the alternative condition to rate emotional captions.

Taken together, participant suitability ratings as well as reaction times to the picture-caption task indicate specific effects of the unconscious death and negative primes. Younger adults in the death condition were more likely to reject negative captions and accept neutral and positive captions. At the same time, these participants took less time to reject negative caption than did young adults in the negative prime
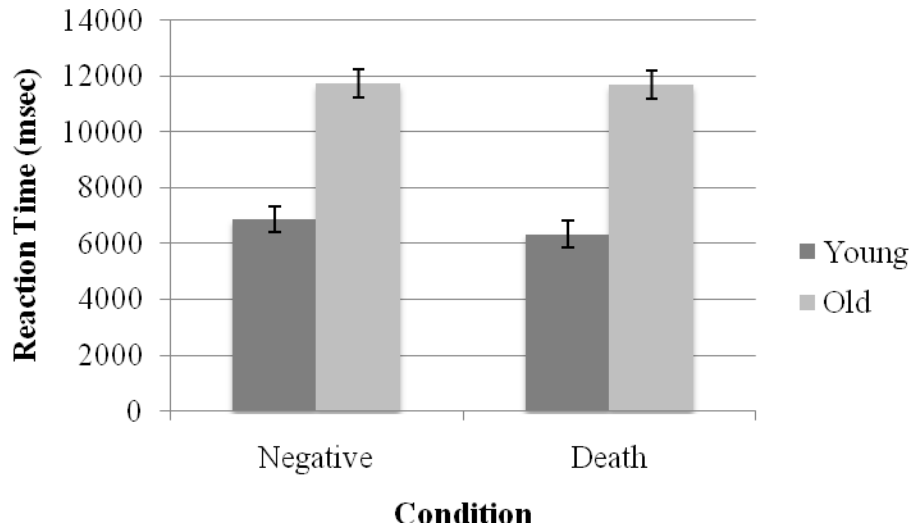
Figure 4. Participant reaction times to neutral captions for each condition as a function of age.

condition. Younger adults who were primed with negativity were more also likely to embrace positivity by rating positive captions as more suitable than either neutral or negative captions. However, younger adults took more time to rate positive captions in the negative condition than in the death condition. Similar to younger adults, older adults were also more likely to reject negative captions after being primed with death. However, older adults in the negative condition displayed faster reaction times to the emotional captions than did those in the death condition. This may suggest that older adults are less prone to investing resources to defend against thoughts of death than they are to regulate their emotions when primed with negativity.

Early/Late Defense

In order to explore possible differences in defense mechanisms implemented by participants in response to the priming manipulation, responses and reaction times were both calculated for early and late segments of the picture-caption task. Separate 2

27

(Timing: early or late) × 3 (Caption Type: negative, neutral, and positive) × 2 (Age: younger or older) mixed model ANOVAs were conducted for each condition to determine if the results reported above were impacted by timing of the picture-caption task trials.

Responses. No significant main effects or interactions of timing on participants' responses were observed in either the death prime or negative conditions. Overall, the findings reported above did not differ as a function of trial timing.

Reaction Times. For participants in the death prime condition, there was a significant main effect of timing, $F (1, 52) = 35.75$, $p = .00$, $\eta_p^2 = .41$, such that participants displayed significantly faster reaction times later in the sequence of trials ($M = 8156$, $SE = 358$) than earlier in the sequence ($M = 9953$, $SE = 481$). Participants in the negative prime condition also showed significantly faster times later in the sequence of trials ($M = 8329$, $SE = 368$) when compared to response times from earlier half of the trials ($M = 9757$, $SE = 377$), $F (1, 55) = 30.59$, $p = .00$, $\eta_p^2 = .36$.

For the negative prime condition, a marginal Time × Age interaction was found, $F (1, 55) = 3.26$, $p = .08$, $\eta_p^2 = .06$. Older adults showed a slightly larger improvement in response time with practice than did younger adults. Finally, a significant interaction of Caption Type × Time was observed in the negative prime condition, $F (2, 110) = 3.12$, $p = .05$, $\eta_p^2 = .05$. Paired samples t-tests showed that early on, participants displayed significantly longer reaction times to the neutral captions ($M = 10098$. $SD = 4009$) than to the positive captions ($M = 8879$, $SD = 4303$), $t (56) = 2.91$, $p = .01$. Later on in the sequence, participants displayed longer reaction times to negative captions ($M = 8537$. $SD = 3700$) than to positive captions ($M = 7877$, $SD = 3794$), $t (56) = 2.19$, $p = .03$.

28

The overall main effect of timing suggested that all participants reacted faster to the stimuli as they progressed through the picture-caption task as a result of practice effects. However, for participants in the negative prime condition, older adults showed a larger improvement in time between early and late trials when compared to younger adults. This suggested that older adults might be more effective than younger adults at regulating their emotional responses after being primed with negativity.

Exploratory Analyses: Potential Relationships between Performance during Priming Manipulation and Performance during the Picture-Caption Task

It was assumed that participants who found more words in the manipulation word searches were more invested in the task, and therefore more impacted by the prime than if they found fewer words. Therefore, the more words that were found for either the death or negative prime word searches, the stronger the effect of the prime. Overall, an independent samples t-test indicated that for the neutral (birds) word search that all participants completed, younger adults found significantly more words ($M = 9.10$, $SD = 2.66$) than did older adults ($M = 6.67$, $SD = 1.9$), $t(109) = 5.46$, $p < .001$. This suggested that overall, younger adults were more successful at this type of task than were older adults.

A 2 (Age) × 2 (Condition) ANOVA for the manipulation word searches yielded a significant main effect of age, $F(1, 107) = 45.76$, $p < .001$, $\eta_p^2 = .30$, such that younger adults found more words ($M = 7.02$, $SE = .34$) than did older adults ($M = 3.65$, $SD = .36$). In addition, a significant main effect of condition emerged, $F(1, 107) = 26.92$, $p < .001$, $\eta_p^2 = .20$, such that participants in the negative condition found more words ($M = 6.62$, $SE = .35$) overall than did those in the death condition ($M = 4.05$, $SE = .36$).

Correlations between the number of words found for the manipulation word searches and other measures were conducted separately for each condition and age group as to avoid age group and condition as confound variables. Younger participants in the negative prime condition who found more words in the manipulation word search were less likely to report negative affect ($r = -.388$). This suggested that the stronger the unconscious negative prime, younger adult participants were less likely to report conscious negative affect. Younger adults primed with death who found more words in the manipulation word search were less likely to provide high suitability ratings for positive captions ($r = -.465$). This indicated that strong unconscious death primes might make it less likely that younger adults would engage in positive tuning.

Discussion

The current study extends research in the area of mortality salience by investigating age differences in participants' reactions to emotional and neutral captions paired with neutral pictures when unconsciously primed with death or negativity. As compared to previous mortality salience research, this study investigated the effects of more subtle primes by asking participants to complete word searches that included words related to death or negativity. The participants' defenses were also operationalized in a way that differs from past research. Instead of asking participants to make worldview judgments, participants were asked to consider the appropriateness of emotional and neutral captions as descriptions of neutral images. In this way, defenses were captured via these emotion-related judgments made by participants after having been primed. More specifically, the participants' responses to emotional stimuli were examined for evidence

of the emotion regulation processes often assumed to underlie the defense to threats of death proposed by terror management theorists.

Age Differences in Response Patterns after Priming

Based on terror management theory, it was expected that both younger and older adults would exhibit a defense against death primes. After being subconsciously primed via a word search filled with death words, both younger and older adults were expected to provide high suitability ratings to positive captions, while providing lower suitability ratings for negative captions. In addition, it was expected that both younger and older adults would provide faster response times to positive captions than for negative captions, indicating automatic positive tuning after being primed with death. Overall, these predictions were only partly supported. With respect to the death prime condition, participants appeared to approach or embrace neutral captions when paired with neutral images while rejecting negative captions. Participants displayed some approach-like behaviors toward positive captions, but less than expected given the positive tuning noted in prior research (DeWall & Baumeister, 2007). Interestingly, participants did appear to engage in a partial defense to threats of death by rejecting the negative captions that were paired with the neutral images. It is important to note that this interpretation is qualified by a difference in the timing of the younger and older adults' responses. Specifically, young adults not only rejected negative captions after being primed with death, but their judgments were faster than when they were primed with negativity. The pattern of response times displayed by older adults was opposite that of young adults, with more time needed to reject the negative captions after being primed with death-related words than when primed with negative words.

31

At least two possible explanations may account for this difference. First, as noted in prior aging research on terror management theory, older adults may not attempt to defend themselves from threats of death with the same urgency as younger adults (Maxfield et al., 2007). Given their stage in life, older adults are believed to consider their limited time left in life on a daily basis. As mentioned earlier in reference to socioemotional selectivity theory, this limit on future time has many implications for the decisions that older adults make in their personal and social lives (Birditt & Fingerman, 2005; Blanchard-Fields, 2007; Carstensen, 2006). Second, when confronted with emotional stimuli in their environment, older adults are just as likely as young adults to direct their attention to these stimuli (Mather & Knight, 2006). When primed with death-related words, older adults' spontaneous defenses may be working toward a different outcome than when they are primed with negative words. Consequently, in the death prime condition, older adults are acting to suppress mainly negativity, whereas, in the negative prime condition, older adults' activated emotion regulatory schema may drive them to approach positivity. Such an approach has been called the "positivity effect" in the aging literature, and it has been suggested to be the default operating state of older adults (Mather & Carstensen, 2005).

Just as with the death prime condition, mixed support emerged for the original prediction from younger and older adults' reactions to stimuli after being primed with negativity. Both younger and older adults embraced positive captions after being primed with negativity. This finding is consistent with socioemotional selectivity theory and the prediction that older adults may defend against any negativity that is unconsciously activated through negative primes. However, this finding is not consistent with how

younger adults should react to negativity in their environment. When examining younger samples' reactivity to positive and negative stimuli, researchers typically find that young adults attend more to and remember negative stimuli (Compton, 2003). In the current study, younger adults embraced positive emotional captions but not negative after being primed with negativity. One possible explanation for this is that, when not conscious of a negative threat, negative stimuli encountered in one's environment naturally trigger one's emotion regulation system to seek positivity. Doing so would require some acceptance of positive feelings to offset any potential negativity. Just as older adults were less reactive to death primes than young adults, young adults appeared to be less strongly influenced by negative primes than older adults. This interpretation stems from the divergence in the patterns of response times exhibited by younger and older adults in the negative and death prime conditions. Interestingly, older adults in the negative prime condition not only embraced positive captions, but also embraced positivity more quickly than older adults in the death prime condition.

Unconscious Primes Might Impact the Process of Defending

It is possible that the subtle nature of the present death manipulation led to findings that differed from those noted in past work. In the past, researchers have induced mortality salience by explicitly asking participants to think about their own death and to write about what they think will happen when they die (e.g., DeWall & Baumeister, 2007; Maxfield et al., 2007). Unlike much of the existing mortality salience literature, the current study attempted to induce mortality salience in an unconscious manner, such that participants remained unaware that they were being led to think about death. Therefore,

the subconscious induction to think about death may have led participants to avoid emotional extremes, and instead embrace the neutral captions.

Outcomes from Maxfield et al. (2007) indicated that younger and older adults responded to mortality salience according to their age group, regardless of whether the mortality salience induction was subtle or not. In both mortality salience conditions, younger adults exhibited harsher judgments of moral transgressions, whereas older adults exhibited more lenient judgments. The authors attributed this age difference to a shift in the way individuals cope with the problem of death throughout the lifespan. Older adults, who are naturally closer to the end of life than are younger adults, have developed coping strategies that mirror their overall default goal pursuit: to increase positive emotionally meaningful experiences. Younger adults, on the other hand, did not attempt to increase positivity and instead coped with the threat of death by exhibiting the typical worldview defense and made harsher judgments for moral transgressions. Overall, Maxfield and colleagues' findings were consistent with socioemotional selectivity theory.

In the current study, younger adults exhibited a stronger defensive reaction in the death prime condition than in the negative prime condition, whereas older adults produced a stronger defensive reaction in the negative prime condition than in the death prime condition. More specifically, the specific defenses elicited from participants did not suggest automatic positive tuning, as has been demonstrated through the use of more conscious death primes (e.g., DeWall & Baumeister, 2007). Instead, the more unconscious priming methods appeared to yield an avoidance of negativity. This finding suggests that different types of priming (conscious or unconscious) may lead to the activation of different types of defenses. Whereas explicit mortality salience inductions

lead individuals to defend their worldview and attune to positive information, unconscious death primes appear to drive individuals to behave in a rational way and regulate their emotional reactions. After being unconsciously led to think about death, the focus for participants is to avoid negative information in the environment.

Previous research on implicit goal priming indicates that these subtle-type manipulations unconsciously activate schemas, which lead participants to behave in ways that mirror the prime itself (e.g., Bargh et al., 1996; Hassin et al., 2009). However, research in the realm of terror management theory contends that thinking about death leads to specific behavioral defenses, which do not mirror the mortality salience induction. Instead, participants attempt to avert terror and reduce thoughts of death by focusing on positivity. As stated before, much of the support for terror management theory has arisen from literature that has used more explicit, or conscious methods of inducing mortality salience. Outcomes from the present study indicate that different and possibly more global behavioral defenses may spontaneously arise depending on whether mortality salience is induced via conscious or nonconscious methods.

Early and Late Defenses?

One important recent finding in the realm of terror management theory is the dual-process model. According to terror management theorists, two types of defenses occur in response to mortality salience: a proximal defense and a distal defense (Pyszczynski et al., 1999). Immediately after being primed with death, participants first attempt to reduce negative thoughts related to death. As the threat continues, the individual works to replace these negative thoughts with positive information, which involves emphasizing the meaningful place one holds in the world (Pyszczynski et al.,

1999). In light of this finding, participants' responses and reaction times were examined in the current study to see if they differed early on and later after being primed with death. Outcomes from this study suggest that proximal and distal defenses may not play a role when subtle death primes are utilized. Additional support for these findings was evidenced in other studies which subliminally primed participants with death. In these studies, participants displayed defenses immediately after the prime and these defenses were maintained throughout the entire experimental tasks (Arndt et al., 2001; Hirschberger et al., 2010). Therefore, as the threat of death forms over time, participants exhibit specific predictable behaviors early and late after being consciously primed with death. However, when unconscious, subtle primes are used, participants display homogenous emotion-regulatory mechanisms throughout the manipulation.

Limitations

The current study has a number of limitations that temper the strength of the conclusions that can be drawn about the findings that have been reported. First, since participants in both conditions were primed with death or negativity, it is unclear what participants' default responses to the picture caption task might look like. It is difficult to assume that participants, older adults especially, would not provide higher suitability ratings for the positive captions by default. In order to better draw conclusions regarding the effects of the primes, researchers should utilize a no-prime condition in future studies. Without this additional control condition, it is difficult to be completely certain that the two prime conditions produced the desired effects.

Another methodological limitation of this study was the absence of a manipulation check. Although word searches have been used as a priming tool in past

research (e.g., Hassin et al., 2009), they have never been used to induce mortality salience. Therefore, to ensure that the word searches produce the desired priming effects, some type of manipulation check, such as a memory test for the words, could be used in future studies in this area to ensure that the appropriate schema are being activated. Participants who more deeply process the prime words and are more engaged in the word search should be more strongly affected by the prime, and therefore should perform better on a subsequent memory test.

Unlike past research, the current study did not demonstrate positive tuning after being exposed to a death prime. Instead, participants provided higher suitability ratings for both neutral and positive captions after an unconscious mortality salience induction. Additionally, in the picture-caption manipulation check, participants rated neutral captions as being more pleasant than unpleasant. Therefore, the failure to find clear evidence of positive tuning may have resulted from the fact that participants viewed the neutral captions as being fairly pleasant instead of neutral.

Finally, it is important to note that many of the analyses in this study were underpowered. Many of the reported outcomes relied on within-subjects analyses because more participants were needed to conduct between-subjects tests that directly compare participants' suitability ratings for each type of caption for each of the two prime conditions. In future studies of this type, researchers could avoid this limitation and increase statistical power by increasing the number of participants in each cell.

Conclusion

Overall, the results were partly consistent with terror management theory, such that death appears to present a threat to individuals of all ages. Participants who were

37

primed with death did exhibit an avoidance of negative information. However, the unconscious nature of inducing mortality salience in the current study led to disparate findings as compared to previous research. Specifically, the expected type of emotional defense, or positive tuning, in the face of a death threat, did not emerge as a result of the subtle manipulation. Socioemotional selectivity theory, which posits that, younger and older adults pursue different types of goals based on their time perspective, was also partly supported. In the face of negative information, both younger and older adults embraced positivity, but the urgency in older adults' responding was greater, confirming a possible greater inclination on the part of older adults to monitor the world for negativity so as to be prepared to avoid it.

References

Arndt, J., Allen, J. J. B., & Greenberg, J. (2001). Traces of terror: Subliminal death primes and facial electromyographic indices of affect. *Motivation and Emotion, 25*, 253-277.

Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology, 71*, 230-244.

Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trotschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology, 81*, 1014-1027.

Bassili, J. N. (1993). Response latency versus certainty as indexes of the strength of voting intentions in a CATI survey. *Public Opinion Quarterly, 57*, 54-61.

Birditt, K. S., & Fingerman, K. L. (2005). Do we get better at picking our battles? Age differences in descriptions of behavioral reactions to interpersonal tensions. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 60*, P121-P128.

Blanchard-Fields, F. (2007). Everyday problem solving and emotion: An adult developmental perspective. *Current Directions in Psychological Science, 16*, 26-31.

Bradley, M. M., & Lang, P. J. (1999). Affective norms for English words (ANEW): Stimuli, instruction manual and affective ratings. Technical report C-1,

Gainesville, FL. The Center for Research in Psychophysiology, University of Florida.

Carstensen, L. L. (2006). The influence of a sense of time on human development. *Science, 312*, 1913-1915.

Carstensen, L. L., Isaacowitz, D. & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist, 54*, 165-181.

Compton, R. J. (2003). The interface between emotion and attention: A review of evidence from psychology and neuroscience. *Behavioral and Cognitive Neuroscience Reviews, 2*, 115-129.

DeWall, C. N., & Baumeister, R. F. (2007). From terror to joy: Automatic tuning to positive affective information following mortality salience. *Psychological Science, 18*, 984-990.

Dijksterhuis, A. & Aarts, H. (2010). Goals, attention, and (un)consciousness. *Annual Review of Psychology, 61*, 467-490.

Dijksterhuis, A., Spears, R., Postmes, T., Stapel, D. A., Koomen, W., van Knippenberg, A., & Scheepers, D. (1998). Seeing one thing and doing another: Contrast effects in automatic behavior. *Journal of Personality and Social Psychology, 75*, 862- 871.

Dijksterhuis, A., & van Knippenberg, A. (1998). The relation between perception and behavior or how to win a game of Trivial Pursuit. *Journal of Personality and Social Psychology, 74*, 865-877.

Ekstrom, R. B., French, J. W., Harman, H., & Derman, D. (1976). *Kit of factor-referenced cognitive tests* (rev. ed.). Princeton, NJ: Educational Testing Service.

Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and avoidance achievement goals

    and intrinsic motivation: A mediational analysis. *Journal of Personality and*

    Social Psychology, 70, 461-475.

Fitzsimons, G. M., & Bargh, J. A. (2003). Thinking of you: Nonconscious pursuit of

    interpersonal goals associated with relationship partners. *Journal of Personality*

    and Social Psychology, 84, 148-164.

Fredrickson, B. L., & Carstensen, L. L. (1990). Choosing social partners: How old age

    and anticipated endings make people more selective. *Psychology and Aging, 5*,

    335- 347.

Gollwitzer, P. M., & Brandstatter, V. (1997). Implementation intentions and effective

    goal pursuit. *Journal of Personality and Social Psychology, 73*, 186-199.

Greenberg, J., Pyszczynski, T., Solomon, S., Simon, L., & Breus, M. (1994). Role of

    consciousness and accessibility of death-related thoughts in mortality salience

    effects. *Journal of Personality and Social Psychology, 67*, 627-637.

Hassin, R. R., Bargh, J. A., & Zimerman, S. (2009). Automatic and flexible: The case of

    nonconscious goal pursuit. *Social Cognition, 27*, 20-36.

Hirschberger, G., Ein-Dor, T., Arzouan, Y., & Zivotofsky, A. Z. (2010). Looking away

    from death: Defensive attention as a form of terror management. *Journal of*

    Experimental Social Psychology, 46, 172-178.

Koo, M., & Fishbach, A. (2008). Dynamics of self-regulation: How (un)accomplished

    goal actions affect motivation. *Journal of Personality and Social Psychology, 94*,

    183-195.

41

Lang, F. R., & Carstensen, L. L. (2002). Time counts: Future time perspective, goals, and
social relationships. *Psychology and Aging, 17*, 125-139.

Lang, P. J., Bradley, M., M., & Cuthbert, B. N. (2008). International affective picture
system (IAPS): Affective ratings of pictures and instruction manual. Technical
Report A-8. University of Florida, Gainesville, FL.

Mather, M. & Carstensen, L. L. (2005). Aging and motivated cognition: The positivity
effect in attention and memory. *Trends in Cognitive Sciences, 9*, 496-502.

Mather, M., & Knight, M. R. (2006). Angry faces get noticed quickly: Threat detection is
not impaired among older adults. *Journals of Gerontology Series B:
Psychological Sciences and Social Sciences, 61*, P54-P57.

Maxfield, M., Pyszczynski, T., Kluck, B., Cox, C. R., Greenberg, J., Solomon, S., Weise,
D. (2007). Age-related differences in responses to thoughts of one's own death:
Mortality salience and judgments of moral transgressions. *Psychology and Aging,
22*, 341-353.

McAdams, D. P., de St. Aubin, E., & Logan, R. L. (1993). Generativity among young,
midlife, and older adults. *Psychology and Aging, 8*, 221-230.

Pyszczynski, T., Greenberg, J., & Solomon, S. (1999). A dual-process model of defense
against conscious and unconscious death-related thoughts: An extension of Terror
Management Theory. *Psychological Review, 106*, 835-845.

Reitan, R. M. (1955). The relation of the trail making test to organic brain damage.
Journal of Consulting Psychology, 19, 393-394.

Rohrbarugh, J., & Jessor, R. (1975). Religiosity in youth: A personal control against
deviant behavior. *Journal of Personality, 43*, 136-155.

Scheier, M. F., Carver, C. S., & Bridges, M. W., (1994). Distinguishing optimism from

    neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of

    the Life Orientation Test. *Journal of Personality and Social Psychology, 67*,

    1063-1078.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief

    measures of positive and negative affect: The PANAS scales. *Journal of*

    Personality and Social Psychology, 54, 1063-1070.

APPENDIX A

The End is Near

E G L S R Z A F H Q V V O U S B E F Y J

V R X U P E L O U H N H H C J A H R F D

A J O G I N K E N O T S B M O T G A E G

R W P A K R V A N O I T A M E R C A N M

G A G H W J H C T M E M O R I A L I X A

X K Y P R V M N Y R C P O X A O M V F U

Y E W O N U C S I K E Y E E H L K U B S

S W S C D W T H T Z W D V R A B N U H O

A C X R Y R A U T I B O N B M E R C C L

R L B A C D M O T A V Y M U R I P M U E

Z L M S F R S Y A V R E Y A A S O B K U

T R D L F T E T J F Q U L L M R N H Y M

N I F F O C S L A R H Y A O G M A S H F

E G M R C V R Q S T O Q R U E S K T W D

U H K J X Y A T P P P T E P H U V Z Q F

I V H Y A H E P G P I B B E V F L N B W

F I G V J E H D G C B R S G Y V X O G K

Y R E T E M E C I K O H U J P C V T G Q

K O V Y I P M A R A Z C A R W G E J H Y

O P C F U D N E M A V I P F N B L U D T

ASHES	BURIAL	CEMETERY	COFFIN	CREMATION
EMBALMING	EULOGY	FUNERAL	GRAVE	HEARSE
MAUSOLEUM	MEMORIAL	MORGUE	MORTICIAN	OBITUARY
SARCOPHAGUS	TOMBSTONE	UNDERTAKER	URN	WAKE

APPENDIX B

Having a Bad Day

```
D  P  I  D  D  M  K  Z  P  K  F  C  C  D  O  O  A  W  C  B
L  E  I  W  N  I  B  E  E  R  Q  R  E  E  A  T  O  K  P  E
E  O  P  H  Z  U  J  N  A  J  X  N  R  B  S  Z  Y  N  D  T
U  R  B  R  S  X  J  U  F  O  T  J  Z  Y  K  X  B  B  I  R
R  S  A  D  E  D  D  E  T  N  E  M  H  S  I  N  U  P  S  A
C  M  U  P  R  S  R  H  V  E  O  U  W  L  W  Z  F  W  L  Y
M  R  S  X  O  Y  S  A  Y  Y  L  L  G  C  T  M  L  W  O  T
W  T  X  U  R  L  S  E  H  T  P  U  R  R  O  C  I  R  Y  L
D  P  Z  E  U  T  L  P  D  H  U  M  I  L  I  A  T  E  A  F
F  E  S  S  R  D  O  U  S  K  E  Q  Q  M  U  Z  P  W  L  Y
O  I  T  E  A  V  P  W  T  Q  L  M  E  D  W  U  C  E  L  C
M  V  S  A  E  C  R  Q  Y  E  X  G  K  J  N  T  A  M  U  I
K  S  I  R  E  K  M  F  F  I  C  O  Y  Q  G  W  S  I  R  S
D  K  T  N  C  F  M  F  R  N  A  A  B  C  Y  Q  F  W  M  W
G  Y  W  I  V  T  E  H  O  S  W  Z  C  X  W  T  N  C  S  Q
Y  L  I  B  J  Z  T  D  Y  U  K  Y  Y  M  I  B  Q  I  B  S
N  M  Z  J  Z  N  U  O  V  L  X  A  U  M  S  W  N  P  A  U
O  P  V  I  T  K  L  R  I  T  V  A  O  P  Q  B  H  G  Y  P
G  T  O  J  U  X  I  W  E  A  F  V  T  E  Q  Y  Z  M  A  B
A  F  A  I  L  U  R  E  Z  R  C  D  E  I  R  B  T  P  V  V
```

AGONY	BETRAY	CORRUPT	CRUEL	DEFEATED
DEPRESSED	DISLOYAL	FAILURE	FRAUD	HARDSHIP
HUMILIATE	INSULT	MISERY	PAIN	POLLUTE
POVERTY	PUNISHMENT	SAD	STRESS	VOMIT

Birds of a Feather

```
C  A  R  D  I  N  A  L  O  R  K  O  E  U  V  N  L  N  W  K
H  N  N  D  K  J  R  W  A  R  M  P  C  N  O  I  O  R  O  F
M  A  N  A  D  T  H  K  Q  O  I  Z  P  Y  A  C  W  X  R  E
E  V  O  D  N  M  H  U  C  P  U  O  H  F  L  R  Y  N  C  U
L  W  Y  T  T  J  T  K  M  Z  L  L  L  A  E  V  C  U  Z  B
I  W  W  H  W  S  I  S  S  M  R  H  F  E  K  V  E  L  D  L
A  G  T  W  E  N  J  E  A  T  I  X  A  N  G  P  H  S  Z  U
U  C  U  T  G  H  A  W  K  X  Q  N  Q  C  N  F  X  I  Q  M
Q  G  A  B  T  A  P  O  R  X  A  B  G  C  B  P  Q  O  B  N
D  S  I  B  L  U  E  B  I  R  D  H  T  B  I  J  K  N  A  Q
C  R  R  O  B  I  N  D  U  C  K  B  F  G  I  W  Y  C  M  I
D  P  Y  B  C  C  E  D  T  T  N  T  E  M  G  R  I  N  Q  I
H  V  L  U  L  K  O  S  A  M  C  O  E  S  K  L  D  W  Y  Q
L  L  K  A  G  R  W  P  F  N  N  L  M  P  E  H  D  M  O  T
Y  L  M  V  M  A  L  A  Y  F  G  G  N  P  E  P  X  L  Y  B
U  M  I  R  Y  L  Z  R  E  A  R  W  Z  L  Y  J  Y  S  Y  W
B  K  U  X  N  L  Q  R  E  U  A  C  U  I  L  T  B  A  B  E
H  D  M  U  E  L  D  O  L  J  R  F  D  V  W  H  I  I  J  T
E  K  O  E  H  I  L  T  Z  O  K  T  P  I  R  G  H  U  S  E
F  I  N  C  H  A  Q  O  Y  W  U  G  K  B  V  I  U  H  E  O
```

BLUEBIRD	CARDINAL	CRANE	CROW	DOVE
DUCK	EAGLE	FALCON	FINCH	HAWK
HUMMINGBIRD	LARK	MOCKINGBIRD	ORIOLE	OWL
PARROT	PELICAN	PIGEON	QUAIL	ROBIN

Instructions: This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Please provide a response for EACH and EVERY feeling. Please indicate to what extent you feel this way *right now at the present moment*. Use the following scale to indicate your answers for **each** feeling.

1 (very slightly or not at all)
2 (a little)
3 (moderately)
4 (quite a bit)
5 (extremely)

_____	interested	_____ irritable
_____	distressed	_____ alert
_____	excited	_____ ashamed
_____	upset	_____ inspired
_____	happy	_____ angry
_____	strong	_____ nervous
_____	guilty	_____ determined
_____	scared	_____ threatened
_____	disgusted	_____ attentive
_____	secure	_____ sad
_____	hostile	_____ jittery
_____	calm	_____ contented
_____	enthusiastic	_____ active
_____	anxious	_____ joyful
_____	proud	_____ afraid

Below are some questions that will help us to assess your own personal style. Please answer as honestly and accurately as possible. Try not to let your response to one statement influence your responses to other statements. There are no "correct" or "incorrect" answers. Please respond to each statement according to your own feelings.

Please indicate the extent to which you agree or disagree with each statement <u>by circling the number</u> (0 – 4) that best reflects your response:

A.   In uncertain times, I usually expect the best.

I strongly disagree	I disagree	I neither agree nor disagree	I agree	I strongly agree
0	1	2	3	4

B.   It's easy for me to relax.

I strongly disagree	I disagree	I neither agree nor disagree	I agree	I strongly agree
0	1	2	3	4

C.   If something can go wrong for me, it will.

I strongly disagree	I disagree	I neither agree nor disagree	I agree	I strongly agree
0	1	2	3	4

D.   I'm always optimistic about my future.

I strongly disagree	I disagree	I neither agree nor disagree	I agree	I strongly agree
0	1	2	3	4

E. I enjoy my friends a lot.

I strongly disagree	I disagree	I neither agree nor disagree	I agree	I strongly agree
0	1	2	3	4

F. It's important for me to keep busy.

I strongly disagree	I disagree	I neither agree nor disagree	I agree	I strongly agree
0	1	2	3	4

G. I hardly ever expect things to go my way.

I strongly disagree	I disagree	I neither agree nor disagree	I agree	I strongly agree
0	1	2	3	4

H. I don't get upset too easily.

I strongly disagree	I disagree	I neither agree nor disagree	I agree	I strongly agree
0	1	2	3	4

I. I rarely count on good things happening to me.

I strongly disagree	I disagree	I neither agree nor disagree	I agree	I strongly agree
0	1	2	3	4

J. Overall, I expect more good things to happen to me than bad.

I strongly disagree	I disagree	I neither agree nor disagree	I agree	I strongly agree
0	1	2	3	4

Time Scale

Instructions: Please use the following rating scale (from 1 to 7) to indicate how much you **agree** with each of the ten statements found below. Please indicate your response by *writing a number in the space next to each statement*.

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree

_____   1. Many opportunities await me in the future.

_____   2. I expect that I will set many new goals in the future.

_____   3. My future is filled with possibilities.

_____   4. Most of my life lies ahead of me.

_____   5. My future seems infinite to me.

_____   6. I could do anything that I want in the future.

_____   7. There is plenty of time left in my life to make new plans.

_____   8. I have the sense that time is running out.

_____   9. There are only limited possibilities in my future.

_____   10. As I get older, my time feels more limited.

1. mumble

    1 – speak indistinctly
    2 – complain
    3 – handle awkwardly
    4 - fall over something
    5 – tear apart

2. perspire

    1 – struggle
    2 – sweat
    3 – happen
    4 – penetrate
    5 – submit

3. gush

    1 – giggle
    2 – spout
    3 – sprinkle
    4 – hurry
    5 – cry

4. massive

    1 – strong and muscular
    2 – thickly populated
    3 – ugly and awkward
    4 – huge and solid
    5 – everlasting

5. feign

    1 – pretend
    2 – prefer
    3 – wear
    4 – be cautious
    5 – surrender

6. unwary

    1 – unusual
    2 – deserted
    3 – incautious
    4 – sudden
    5 – tireless

7. veer

    1 – change direction
    2 – hesitate
    3 – catch sight of
    4 – cover with a thin layer
    5 – slide

8. orthodox

    1 – conventional
    2 – straight
    3 – surgical
    4 – right-angled
    5 – religious

9. stripling

    1- stream
    2- narrow path
    3 – engraving
    4 – lad
    5 – beginner

10. salubrious

    1 – mirthful
    2 – indecent
    3 – salty
    4 – mournful
    5 – healthful

11. limpid

    1 – lazy
    2 – crippled
    3 – clear
    4 – hot
    5 – slippery

12. procreate

    1 – sketch
    2 – inhabit
    3 – imitate
    4 – beget
    5 – encourage

13. replete

    1 – full
    2 – elderly
    3 – resentful
    4 – discredited
    5 – restful

14. frieze

    1 – fringe of curls on the
       forehead
    2 – stature
    3 – ornamental band
    4 – embroidery
    5 – sherbet

15. treacle

    1 – sewing machine
    2 – framework
    3 – leak
    4 – apple butter
    5 – molasses

16. ignominious

    1 – inflammable
    2 – elflike
    3 – unintelligent
    4 – disgraceful
    5 – mysterious

17. abjure

    1 – make certain
    2 – arrest
    3 – renounce
    4 – abuse
    5 – lose

18. duress

    1 – period of time
    2 – distaste
    3 – courage
    4 – hardiness
    5 – compulsion

1.	QPPQ	HGHH	TTTU	DDDE	MLMM
2.	BCDE	FGHI	JKLM	PRST	VWXY
3.	BVZC	FVZG	JVZK	PWXQ	SVZT
4.	BCEF	FGIJ	STWX	CDFG	PQST
5.	BCCB	GFFG	LMML	QRRQ	WXXW
6.	AAPP	CCRR	QQBB	EETT	DDSS
7.	ABDC	EGFH	IJLK	OPRQ	UVXW
8.	CERT	KMTV	FHXZ	BODQ	HJPR
9.	PABQ	SEFT	VIJW	COPD	FUZG
10.	CFCR	JCVC	CGCS	CLXC	KCWC
11.	XDBK	TNLL	VEGV	PFCC	ZAGZ
12.	CAEZ	CEIZ	CIOZ	CGVZ	CAUZ
13.	VEBT	XGDV	ZIFX	KXVH	MZXJ
14.	AFBG	EJFK	GKHM	PSQT	RWSX
15.	KGDB	DFIM	KIFB	HJMQ	LHEC

Instructions: The questions below will ask you about your religious life and your thought about religion as it relates to you.

1. Please indicate how often have you attended religious services during the past year?

_____ times in the past year (please enter a number)

2. Which of the following best describes your practice of prayer? (please circle only one letter)

(a) Prayer is a regular part of my daily life.

(b) I usually pray in times of stress or need but rarely at any other time.

(c) I pray only during formal ceremonies.

(d) Prayer has little importance in my life.

(e) I never pray.

3. When you have a serious personal problem how often do you take religious advice or teaching into consideration? (please circle only one letter)

(a) Almost always.

(b) Usually.

(c) I pray only during formal ceremonies.

(d) Rarely.

(e) Never.

4. How much of an influence would you say that religion has on the way that you choose to act and the way you choose to spend your time each day? (please circle only one letter)

(a) No influence.

(b) A small influence.

(c) Some influence.

(d) A fair amount of influence.

(e) A large amount of influence.

5. Which of the following statements come closest to your belief about God? (please circle only one letter)

(a) I am sure that God really exists and that He is active in my life.

(b) Although I sometimes question His existence, I do believe in God and believe He knows of me as a person.

(c) I don't know if there is a personal God, but I do believe in a higher power.

(d) I don't know if there is a God or a higher power of some kind, and I don't know if I will ever know.

(e) I don't believe in a personal God or in a higher power.

6. Which of the following statements comes closest to your belief about life after death (immortality)? (please circle only one letter)

(a) I believe in a personal life after death, a soul existing as a specific individual.

(b) I believe in a soul existing after death as a universal spirit.

(c) I believe in a life after death of some kind, but I really don't know what it would be like.

(d) I don't know whether there is any kind of life after death, and I don't know if I will ever know.

(e) I don't believe in any kind of life after death.

7. During the past year how often have you experienced a feeling of religious reverence or devotion? (please circle only one letter)

(a) Almost daily.

(b) Frequently.

(c) Sometimes.

(d) Rarely.

(e) Never.

8. Do you agree with the following statement:"Religion gives me a great amount of comfort and security in life." (please circle only one letter)

(a) Strongly Disagree.

(b) Disagree.

(c) Uncertain.

(d) Agree.

(e) Strongly agree.

9. If you have attended a religious service in the past two weeks, please briefly describe what was discussed by the individual leading the service (e.g., sermon, homily, etc.)

_____

_____

_____

APPENDIX J

TRAIL MAKING
PARTA
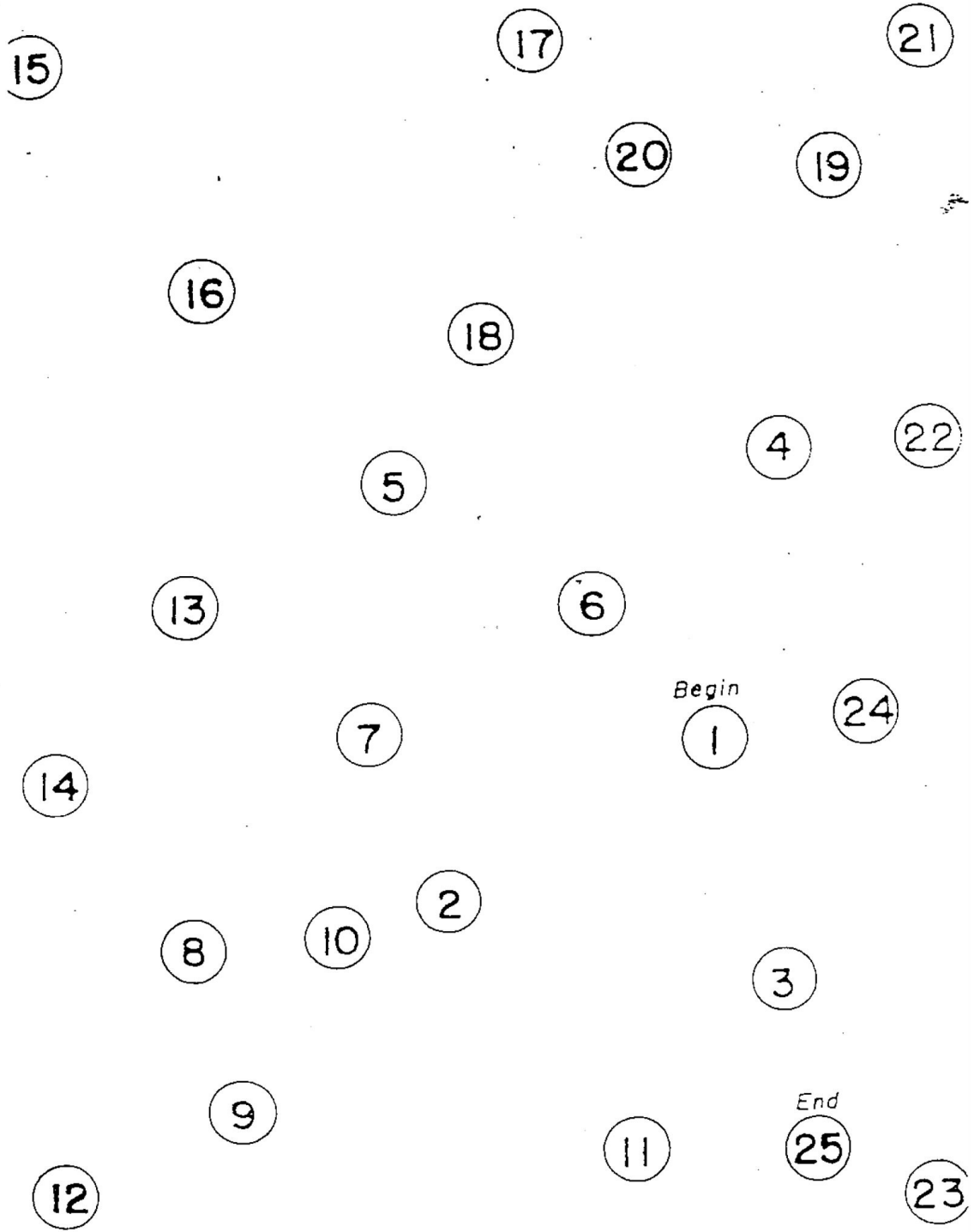
End

(13)

(8)   (9)   (1)   (D)   (10)

                         (B)   (4)

                         (3)

Begin

(7)   (1)

                                        (5)

(H)

                              (C)

(12)

(G)

                    (A)   (J)

(2)   (6)

(L)

                                        (E)

(F)

(K)   (11)
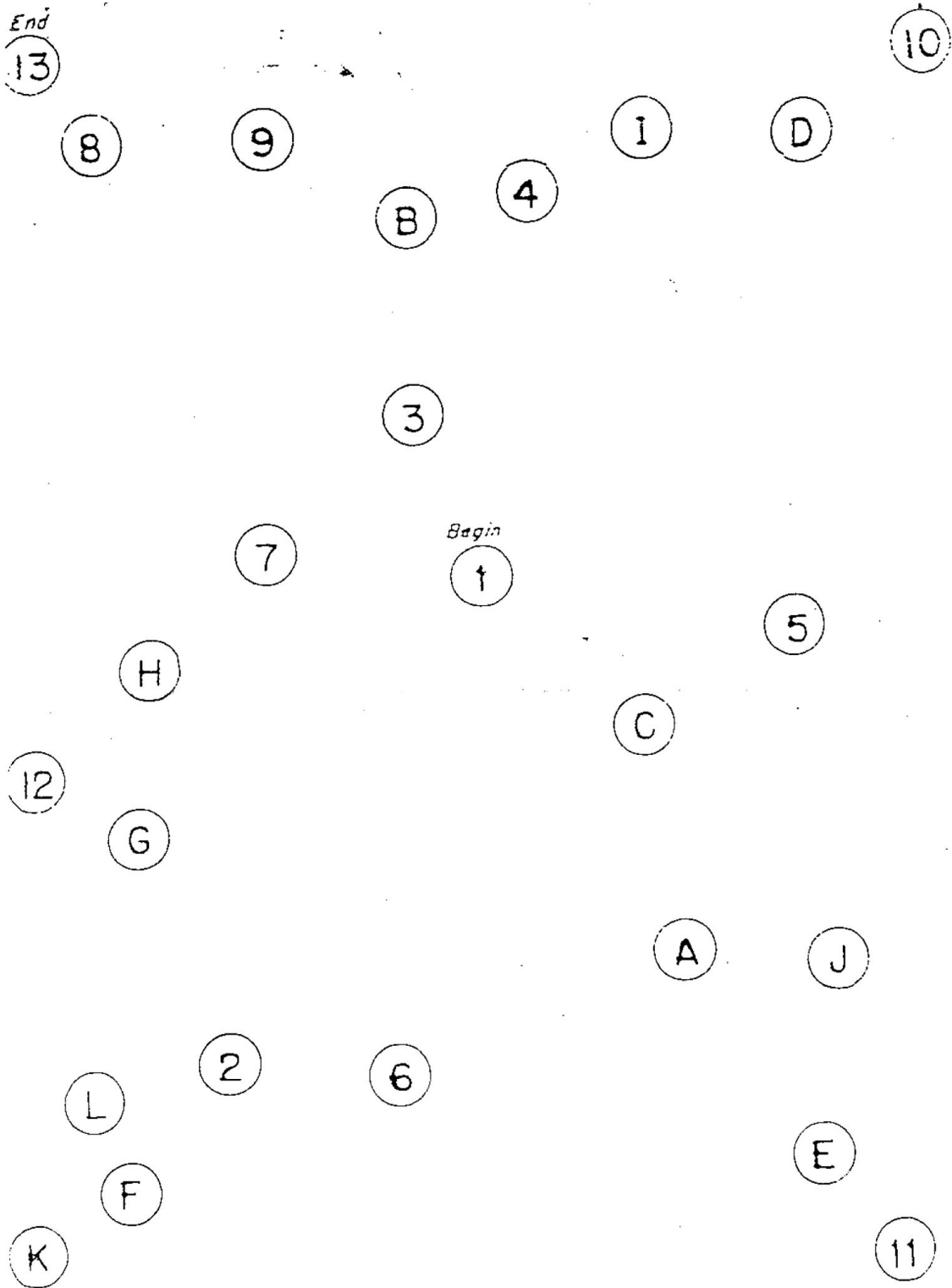
INFORMED CONSENT DOCUMENT

Project Title: Cognition in Everyday Life (community)

Investigator: Dr. Andrew Mienaltowski - WKU Psychology Department. Phone: (270) 745-2353

You are being asked to participate in a project conducted through Western Kentucky University. The University requires that you give your signed agreement to participate in this project.

The investigator will explain to you in detail the purpose of the project, the procedures to be used, and the potential benefits and the possible risks of participation. You are welcome to ask any questions that you might have to help improve your understanding of the project. A basic explanation of the project is written below. Please read this explanation and discuss any questions that you might have with the researcher.

If you decide to participate in the project, please sign on the last page of this form in the presence of the person who explained the project to you. You should be given a copy of this form to keep.

1. **Nature and Purpose of the Project:**

    This project looks at the everyday thought processes of people of all ages. More specifically, we are interested in examining your performance in finding words in a word search.

2. **Explanation of Procedures:**

    You will be asked to complete as much of a word search as you can in a set period of time. This task requires you to locate words hidden in a grid of letters. You will also be asked to complete a few other tests that examine your thought processes. One test will ask you to think about other people's impressions of photos. Another test will ask you to follow paths of successive numbers and letters, as in "connect the dots." A different test will test your knowledge of verbal meanings by asking you to identify which of four words is similar to a target word. You will also be asked to tell us a little about your personal background and personality.

3. **Discomfort and Risks:**

    There are no known risks associated with participation in these experiments. However, should you become tired, you are free to quit at any time.

4. **Benefits:**

    Your participation will help to further understand everyday cognition and how multiple forms of thinking may or may not be related to one another.

5. **Confidentiality:**

    During this study, you will be asked for some personal information (name, age, gender, etc.). This information will be confidential and will only be used by the experimenter. The data that is collected about you will be kept private. To protect your privacy, your records will be kept under a code number rather than by name. Your records will be kept in locked files and only study staff will be allowed to look at them. We are only interested in group

information. The reporting of the experimental results will only contain group mean results and will contain NO personal information about individual participants, including performance during the experiment. Your name and any other fact that might point to you will not appear when results of this study are presented or published. To make sure that this research is being carried out in the proper way, the Western Kentucky University Human Subjects Review Board will review study records.

6.   **Compensation for Participation:**

You will receive $10 per hour of study participation.

7.   **Costs to You:**

Other than your time there are no costs to you to participate in this study.

8.   **In Case of Harm or Injury:**

Reports of injury or reaction should be made to Andrew Mienaltowski, by phone at (270) 745-2353 or by e-mail at andrew.mienaltowski@wku.edu . Neither Western Kentucky University nor the principal investigator has made provision for payment of costs associated with any injury resulting from taking part in this study.

9.   **Questions about the Study:**

If you have questions about the study, please contact Andrew Mienaltowski at WKU's campus at (270) 745-2353.

10.   **Refusal/Withdrawal:**

Refusal to participate in this study will have no effect on any future services that you may be entitled to from the University. Anyone who agrees to participate in this study is free to withdraw from the study at any time and with no penalty.

You understand also that it is not possible to identify all potential risks in an experimental procedure, and you believe that reasonable safeguards have been taken to minimize both the known and potential but unknown risks.

_____   _____
Signature of Participant   Date

_____   _____
Witness   Date

THE DATED APPROVAL ON THIS CONSENT FORM INDICATES THAT
THIS PROJECT HAS BEEN REVIEWED AND APPROVED BY
THE WESTERN KENTUCKY UNIVERSITY HUMAN SUBJECTS REVIEW BOARD
Paul Mooney, Compliance Coordinator
TELEPHONE: (270) 745-4652

INFORMED CONSENT DOCUMENT

Project Title: Cognition in Everyday Life (student)

Investigator: Dr. Andrew Mienaltowski - WKU Psychology Department. Phone: (270) 745-2353

You are being asked to participate in a project conducted through Western Kentucky University. The University requires that you give your signed agreement to participate in this project.

The investigator will explain to you in detail the purpose of the project, the procedures to be used, and the potential benefits and the possible risks of participation. You are welcome to ask any questions that you might have to help improve your understanding of the project. A basic explanation of the project is written below. Please read this explanation and discuss any questions that you might have with the researcher.

If you decide to participate in the project, please sign on the last page of this form in the presence of the person who explained the project to you. You should be given a copy of this form to keep.

1. **Nature and Purpose of the Project:**

   This project looks at the everyday thought processes of people of all ages. More specifically, we are interested in examining your performance in finding words in a word search.

2. **Explanation of Procedures:**

   You will be asked to complete as much of a word search as you can in a set period of time. This task requires you to locate words hidden in a grid of letters. You will also be asked to complete a few other tests that examine your thought processes. One test will ask you to think about other people's impressions of photos. Another test will ask you to follow paths of successive numbers and letters, as in "connect the dots." A different test will test your knowledge of verbal meanings by asking you to identify which of four words is similar to a target word. You will also be asked to tell us a little about your personal background and personality.

3. **Discomfort and Risks:**

   There are no known risks associated with participation in these experiments. However, should you become tired, you are free to quit at any time.

4. **Benefits:**

   Your participation will help to further understand everyday cognition and how multiple forms of thinking may or may not be related to one another.

5. **Confidentiality:**

   During this study, you will be asked for some personal information (name, age, gender, etc.). This information will be confidential and will only be used by the experimenter. The data that is collected about you will be kept private. To protect your privacy, your records will be kept under a code number rather than by name. Your records will be kept in locked files and only study staff will be allowed to look at them. We are only interested in group

59

information. The reporting of the experimental results will only contain group mean results and will contain NO personal information about individual participants, including performance during the experiment. Your name and any other fact that might point to you will not appear when results of this study are presented or published. To make sure that this research is being carried out in the proper way, the Western Kentucky University Human Subjects Review Board will review study records.

6.   **Compensation for Participation:**

You will receive 1 credit on Study Board per 30 minutes of study participation.

7.   **Costs to You:**

Other than your time there are no costs to you to participate in this study.

8.   **In Case of Harm or Injury:**

Reports of injury or reaction should be made to Andrew Mienaltowski, by phone at (270) 745-2353 or by e-mail at andrew.mienaltowski@wku.edu . Neither Western Kentucky University nor the principal investigator has made provision for payment of costs associated with any injury resulting from taking part in this study.

9.   **Questions about the Study:**

If you have questions about the study, please contact Andrew Mienaltowski at WKU's campus at (270) 745-2353.

10.   **Refusal/Withdrawal:**

Refusal to participate in this study will have no effect on any future services that you may be entitled to from the University. Anyone who agrees to participate in this study is free to withdraw from the study at any time and with no penalty.

You understand also that it is not possible to identify all potential risks in an experimental procedure, and you believe that reasonable safeguards have been taken to minimize both the known and potential but unknown risks.

_____   _____

Signature of Participant   Date

_____   _____

Witness   Date

THE DATED APPROVAL ON THIS CONSENT FORM INDICATES THAT
THIS PROJECT HAS BEEN REVIEWED AND APPROVED BY
THE WESTERN KENTUCKY UNIVERSITY HUMAN SUBJECTS REVIEW BOARD
Paul Mooney, Compliance Coordinator
TELEPHONE: (270) 745-4652

APPENDIX L

Lab Demographics Questionnaire

<u>Instructions:</u> The items in this questionnaire ask you for personal information that we can use to get a sense for how similar our group of volunteers is to those who participate in research at other institutions in the United States. All information that we collect from individuals will not be linked back to their identities. However, if you are uncomfortable providing a response for any of the following items, please do not respond to them. For the remaining items, please *fill in the blank spaces* or *circle the response* which best describes you.

1. **Please indicate your gender:**   1. Female   2. Male

2. **Please indicate your marital status:**   1. Single
                                                2. Married
                                                3. Domestic Partnership
                                                4. Divorced
                                                5. Widowed
                                                6. Other (specify) _____

3. **Please indicate how many children you have raised or are currently raising.** _____

4. **Date of birth:** _____/_____/_____   and current age: _____ years

5. **Do you consider yourself to be Hispanic or Latino?**   1. YES   2. NO

6. **Please indicate your racial background:**
                                                1. American Indian/ Alaska Native
                                                2. Asian
                                                3. Native Hawaiian or Other Pacific Islander
                                                4. Black or African American
                                                5. Caucasian
                                                6. More than one race (specify) _____
                                                7. Other (specify) _____

6. **Is English your native language?**   1. Yes   2. No

7. **Please indicate your religious faith:**   1. Christian (Protestant or Catholic)
                                                 2. Jewish
                                                 3. Hindu
                                                 4. Muslim
                                                 5. Buddhist
                                                 6. None (e.g., atheist)
                                                 7. Other (specify) _____

8. **Are you a student?**   1. Yes - full time   2. Yes - part time   3. No

9. **If you are a student, please indicate your academic major:**
                                 1. Arts   (specify) _____
                                 2. Business   (specify) _____
                                 3. Engineering   (specify) _____
                                 4. Humanities   (specify) _____
                                 5. Science   (specify) _____
                                 6. Health   (specify) _____
                                 7. Education   (specify) _____
                                 8. Other   (specify) _____

Lab Demographics Questionnaire

10. What is your highest level of formal education (circle the highest level <u>completed</u>):
    A. Less than 12 years (How many of years completed? _____ years)
    B. GED (Age when you completed your GED: _____)
    C. High school diploma
    D. Technical/ Vocational/ Trade school diploma or certificate
    E. College Freshman
    F. College Sophomore
    G. College Junior
    H. Associate's Degree
    I. Bachelor's degree
    J. Master's degree
    K. J.D., M.D., or Ph.D.

11. Are you presently employed: 1. Yes - full time   2. Yes - part time   3. No

12. Are you presently retired?   1. Yes   2. No

13. If you are currently or have recently been employed, what field is your job in?

_____

14. If you are currently or have recently been employed, please describe the duties of your job?

_____

_____

15. In the past 5 years, have you engaged in volunteer activities to assist or instruct young adults (i.e., individuals aged 18-30)?   1. Yes   2. No

16. To what extent do you interact with young adults throughout the course of a typical week (including time spent at work, in classes, and/or during volunteer or extracurricular activities)?
      1. Rarely or none of the time (less than one day)
      2. Some or a little of the time (1 - 2 days)
      3. Occasionally or a moderate amount of time (3 - 4 days)
      4. Most or all of the time (5 - 7 days)

17. How would you rate your overall health at the present time? (please circle one rating)
    1. Poor   2. Fair   3. Good   4. Very Good   5. Excellent

18. How much do health problems stand in your way of doing things that you want to do? (please circle one rating)   1. Not at all   2. A little   3. Moderately   4. Quite a bit   5. A great deal

19. Are you presently seeking psychological or psychiatric consultation and/or receiving therapy?
          1. Yes   2. No
    If <u>yes</u>…
    a. Are you currently being treated for depression? 1. Yes   2. No
    b. Are you currently being treated for excessive anxiety or nervousness? 1. Yes   2. No

20. Do you currently have any noticeable difficulty with vision for which correction, such as eyeglasses, has <u>NOT</u> been made?   1. Yes   2. No

29. Do you currently have any noticeable difficulty with hearing for which a correction, such as a hearing aide, has <u>NOT</u> been made?   1. Yes   2. No

30. Do you currently have any difficulty with writing? 1. Yes   2. No

APPENDIX M

Participant Pleasant/Unpleasant Ratings for Photographs in the Picture-Caption Task
Manipulation Check

Photograph Type	Pleasant Rating	Unpleasant Rating
Positive	4.1 (0.6)	1.3 (0.5)
Negative	1.2 (0.3)	4.3 (0.8)
Neutral	2.4 (0.6)	2.1 (0.6)

Note. The picture-caption task manipulation check included the 24 neutral photographs
from the IAPS (Lang, Bradley, & Cuthbert, 2008) and Google Images. This task also
included 24 emotional (12 negative and 12 positive) images from the IAPS that were not
included in the picture-caption task. Participants provided two separate ratings for each
photograph (pleasant and unpleasant) on a scale of 1 (not at all pleasant/unpleasant) to 5
(completely pleasant/unpleasant)

APPENDIX N

Means and Standard Deviations for Personality and Cognitive Measures for Older and
Younger Adults

Measure	Older Adults	Younger Adults
Vocabulary Test	9.2 (3.3)	7.2 (2.3)
Letter Sets Test	8.0 (3.3)	10.2 (3.0)
Trail Making Test	63.4 s (41.2)	33.9 s (21.2)
Time Scale	4.4 (1.1)	5.7 (0.8)
PANAS Positive Affect	3.6 (0.7)	3.0 (0.6)
PANAS Negative Affect	1.3 (0.3)	1.6 (0.5)
LOT Optimism	2.9 (0.6)	2.6 (0.7)
LOT Pessimism	1.2 (0.7)	1.8 (0.7)
Religiosity	4.0 (1.0)	3.6 (1.0)

APPENDIX O

Means and Standard Errors Depicted in Figures 1 through 4

Condition	Caption Type	Suitability Rating	Standard Error
Negative	Negative	3.13	0.11
	Neutral	3.26	0.10
	Positive	3.39	0.11
Death	Negative	2.92	0.12
	Neutral	3.27	0.10
	Positive	3.18	0.12

Caption Type	Age Group	Condition	Reaction Time (in msec)	Standard Error (in msec)
Negative	Young	Negative	7299	563
		Death	6428	592
	Old	Negative	11203	615
		Death	12089	615

Caption Type	Age Group	Condition	Reaction Time (in msec)	Standard Error (in msec)
Positive	Young	Negative	6739	587
		Death	6177	618
	Old	Negative	10310	641
		Death	11590	641

Caption Type	Age Group	Condition	Reaction Time (in msec)	Standard Error (in msec)
Neutral	Young	Negative	6878	458
		Death	6346	482
	Old	Negative	11728	501
		Death	11686	501