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Exploring the Self-Referent Meaning Mechanisms of Terror Management Theory and Socioemotional Selectivity Theory

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Exploring the Self-Referent Meaning Mechanisms of Terror Management Theory and

Socioemotional Selectivity Theory

A Thesis

Presented in

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Requirements for the Degree of

Master of Science

By

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ponder meaning in death if not for the greater meaning they provide in my life.

Biography

The author was born in Orlando, Florida, June 6, 1991. He graduated from Hagerty High School,

received his Bachelor of Science degree in Psychology from the University of Florida in 2013,

and received his Master of Science degree in Psychology from DePaul University in 2016.

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Abstract

Two theories of mortality threat management propose distinct psychological mechanisms to cope with mortality concerns. Terror management theory suggests death prompts existential concern whereas socioemotional selectivity theory suggests a limited lifetime prompts hedonic concerns. Both reminders of the finality of life threaten self-existence, yet only terror management theory research has investigated the capacity for art to reaffirm self-referent meaning compromised by death awareness. In two studies, we explored the potential existential nature within death and limited-lifetime awareness and then examined self-referent meaning reaffirmation through naturalistic and surrealistic art in response to death awareness and limited-lifetime awareness. We found that limited-lifetime awareness does not induct existential concern as in death awareness, but naturalistic art, surrealistic art, and the control condition were evaluated similarly in terms of self-referent meaning across the death awareness, limited-lifetime awareness, and control conditions. These results suggest that although separate mechanisms emerge to cope with death versus limited-lifetime awareness, motivated self-reference is not elicited differently from naturalistic and surrealistic art following mortality awareness of death or a limited lifetime.

Exploring the Self-Referent Meaning Mechanisms of Terror Management Theory and

Socioemotional Selectivity Theory

The end of life is unavoidable. Whether due to accident or genetic dysfunction, in

childhood or old age, life ends for everyone. In spite of (or perhaps because of) its looming

presence, the end of life is an unpopular topic of thought. Thinking about the end during life

would seem counterproductive. And so end-of-life thoughts are avoided. Death is inconceivable.

No living person understands its true experience even for those who have witnessed others' such

experience. However, many cultures have many theories about death and its purpose. And so

death is made to seem comprehensible. Further, mortality is threatening. We avoid thoughts

about it and try to make sense of it (or try to avoid it if we cannot make sense of it) to manage

this threat whether in reference to death or the end of life (i.e., endings). Though endings

generally limit time, the limitation of lifetime is specific to death. With respect to this

comparison, are the threats of death and limited lifetime differentially managed?

Death as a Threat to Self-Continuity

Ernest Becker (1973) argued that at the core of humanity is paralyzing terror of death's

inevitability, which creates an everlasting existential anxiety all motivation attempts to manage.

Though this death anxiety is subconscious, it is managed by beliefs (otherwise known as

worldview) that are central to a person's self-concept. Spirituality, national identity, and political

affiliation, for example, are beliefs that provide meaning to life by securing self-continuity

through symbolic (e.g., a family legacy through reproductive success) or literal (e.g., an afterlife)

continuation past death (Arndt, Greenberg, Pyszczynski, & Solomon, 1997a; Arndt, Greenberg,

Solomon, Pyszczynski, & Solomon, 1997b; Arndt, Greenberg, & Cook, 2002; Burke, Martens, &

Faucher, 2010; Cohen & Solomon, 2011; Du et al., 2013; Florian, Mikulincer, & Hirschberger,

2001; Greenberg et al., 1990; Norenzayan & Hansen, 2006; Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). Terror management theory (TMT) explains this phenomenon by suggesting that culture provides a means to manage existential terror. As awareness of death emerged, TMT posits that the reconceptualization of reality through a cultural belief system was necessary to buffer against the anxiety of such awareness. Content of worldviews vary across cultures and even among individuals within a culture, but all are structured to provide a meaningful interpretation of reality. An individual must believe in the validity of their cultural worldview's value standards and believe they are at least meeting the expectations of those standards to buffer against death anxiety. Thus, a meaningful reality is affirmed through the security of an individual's place their worldview, which must be defended in subsequent, specific threats to meaning (Du et al., 2013; Greenberg et al., 1990; Harmon-Jones et al., 1997; Rosenblatt et al., 1989).

The self is challenged in encounters of discrepant information (such as the finality of one's existence) and is reaffirmed when one secures a meaningful concept of reality. In other words, there is a self-referent context to meaning making (Cicirelli, 1998; Graupmann, Frey, & Streicher, 2013a; Schmeichel & Martens, 2005). To remind a person of their impending death is to provide a meaningless representation of the world and therefore decrease the self-referent meaning of that person. To then remind that person of their worldview or allow them opportunities to reaffirm that worldview is to provide a meaningful representation of the world and therefore increase the self-referent meaning of that person (Landau, Greenberg, Solomon, Pyszczynski, & Martens, 2006; Van Tongeren & Green, 2010). For example, younger adults, who generally attend to negative rather than positive information, focus more on positive information than negative information when exposed to death-related content (DeWall &

Baumeister, 2007; Ito, Larsen, Smith, & Cacioppo, 1998; Klackl, Jonas, & Kronbichler, 2013).

At a deeper level, death threatens self-continuity, or the ability to temporally extend oneself into

the past and the future. The nostalgic extension of oneself into positive experiences of the past,

however, can secure continuity of the self and therefore provide effective terror management

(Graupmann et al., 2013a; Routledge, Arndt, Sedikides, & Wildschut, 2006). Due to the nature

of its finality and irreversibility, death inhibits the continuation of the self and, ultimately, such a

threat is managed following reaffirmation of a meaningful reality via one's sense of self.

Limited Time as a Threat to Self-Continuity

With increasing age, people adopt a greater sense of limited time in life. Socioemotional

selectivity theory (SST) predicts motivational change to affirm meaning as a result of younger

adults' expansive lifetime perspective shrinking to a limited lifetime perspective in older

adulthood. In other words, the anticipation of an ending influences attention away from

knowledge-related, future-oriented goals and toward emotional, present-oriented goals. This

effect is especially true with the anticipation of the end of life, during which such goal

prioritization occurs gradually with increasing age and/or as the end of life nears (Carstensen,

1993; Carstensen, 2006; Carstensen, et al., 2003;). With an expansive future time perspective,

younger adults are motivated to prioritize knowledge-related goals because of the perception that

unrestricted time allows for the pursuit of long-term goals. Older adults, however, are motivated

to prioritize goals related to emotional regulation that can be achieved in the short-term due to

their limited future time perspective (Carstensen, Isaacowitz, & Charles, 1999; Graupmann et al.,

2013b). Further, older adults focus more attention on and have a greater preference for positive

rather than negative information. Whereas younger adults generally show a negativity bias, older

adults display a positivity bias as a result of emotion regulation (Kisley, Wood, & Burrows,

2007; Rehmert & Kisley, 2013; Wood & Kisley, 2006). Though the goal prioritization effect

occurs through psychological development, the perception of time across all ages can be

influenced by the situation to constitute a future time constraint and therefore shift social goals

toward emotion regulation. Considering the release of Hong Kong to the People's Republic of

China in 1997 as a foreseeable end and therefore a constraint on available future time, only older

adults in Hong Kong preferred to interact with familiar (i.e., emotionally close) rather than

unfamiliar partners one year before Hong Kong's release. However, both younger and older

adults preferred to interact with familiar partners two months before the release. One year after

the release of Hong Kong to the People's Republic of China, only older adults again preferred

interaction with familiar partners. This shows some influence of limited future time on the

prioritization of emotional, present-oriented pursuits (Fung, Carstensen, & Lutz, 1999). In

another case, Fung & Carstensen (2006) conducted measurements of socioemotional selectivity

following the priming of a limited-time perspective before the September 11 attacks (in 1998).

Participants were asked to imagine having 30 minutes of free time and to choose to speak with,

within that free time, an author of a book they just read, a recent acquaintance with whom they

seem to have a lot in common, or an immediate family member. As expected, before the

September 11 attacks, older adults (age 36 and older) but not younger adults (age 35 and

younger) preferred interaction with a familiar partner, whereas immediately following the attacks

(about two weeks), participants of all ages preferred interaction with a familiar partner. These

results evidence an age-related difference in motivation (i.e., emotion regulation) that disappears

in limited-time contexts. However, the September 11 attacks likely induced a heightened

limited-time perspective as well as an awareness of mortality. Because self-continuity is

threatened in either case, perhaps there is little difference between the motivation to manage

limited-time threat and death threat. It seems the chronic coping with limited time can buffer

self-continuity threats similarly to those buffered through terror management. Whereas Fung and

Carstensen (2006) refer to awareness of the time-limited ending as effecting motivational

change, TMT suggests such motivational change occurs due to awareness of the unique, death-

related ending (Greenberg et al., 1990; Rosenblatt et al., 1989).

Comparison of Terror Management and Socioemotional Selectivity

TMT and SST predict that awareness of mortality will prompt motivational change.

Though TMT suggests the change occurs following awareness of one's own death, SST argues a

similar change occurs with the adoption of a limited time perspective due to a realization of the

finitude that is specific to life. At the core, both theories suggest an end-of-life related coping

mechanism that manages end-of-life related threats, which we posit are specifically threats to the

continuity of the self. TMT is consistent with the idea that death threatens self-continuity and

requires self-referent coping to reaffirm a meaningful self-concept. Although SST does not

specifically focus on death, it considers future time perspectives that are altered due to a death-

related process: aging. It follows that SST involves the notion of self-continuity, which is

threatened with increasing age (i.e., nearing the end of life) and might necessitate self-referent

coping to reaffirm a meaningful self-concept. Older adults faced with limited time threats

possibly utilize self-referent coping to resolve the dissonance between the desire to engage in

meaningfully positive experiences and the realistic lack of engagement in such experiences. In

other words, perhaps hedonic concern motivates the shifted attention toward positive, present-

oriented pursuits for meaning affirmation (Figure 1). Finally, although death seems to be the

epicenter of existential concern, it is psychologically the finality of life and closely relates to the

concerns of a limited-time perspective. Whether limited-time awareness in fact inducts

existential concerns is beneficial information to evaluate the theoretically distinct processes

between TMT and SST. Thus were the bases of our exploration into the similar mechanisms of

TMT and SST through meaningful stimuli.

TMT: Death thoughts → Mortality awareness → Existential concerns → Worldview defense → Meaning reaffirmation

SST: Limited time thoughts → Mortality awareness → Hedonic concerns → Emotion regulation → Meaning reaffirmation
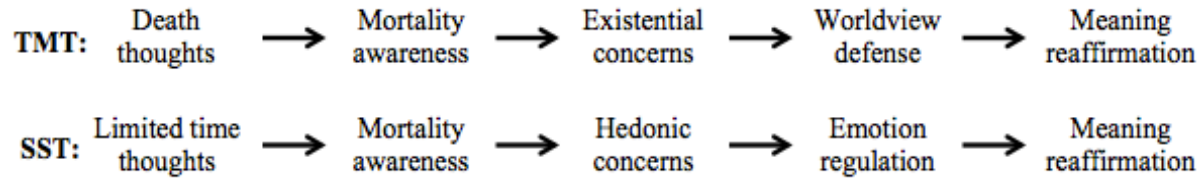
Figure 1.   Mechanisms suggested by TMT and SST to affirm personal meaning

Engagement with Self-Referent Art to Manage Mortality Concerns

Death concerns have been managed in previous research through the reaffirmation of

culture that is represented in art (Silveira et al., 2014). Existential concern prompts a reevaluation

of one's cultural worldview, made meaningless with the additional consideration of death

(Greenberg et al., 1990). However, an element of culture that can provide a meaningful

representation of cultural worldview is art. Art is, in other words, cultural representation in

concrete form and, when compatible with one's worldview, seems best suited to reaffirm such

cultural worldview threatened by death (Goldenberg, Pyszczynski, Johnson, Greenberg, &

Solomon, 1999). When incompatible with one's worldview, art is considered meaningless as

there is no recognizable content to interpret and incorporate into the personal experience of

reality. Modern abstract art, for instance, contains unstructured and non-representational features

that are typically inconsistent with a meaningful reality. Such meaninglessness evaluated from

abstract art is amplified following death awareness, which results from a heightened need for but

absence of available meaning affirmation. However, meaning can be reaffirmed from abstract art

when it is supplanted with interpretable, representational information such as a title (Landau,

Greenberg, Solomon, Pyszczynski, & Martens, 2006).

The management of death concerns through art also extends beyond the abstract style. Naturalistic art, aesthetically normative and immediately sensible, generally allows less need for interpretation and therefore is less complicated to incorporate in a meaningful cultural worldview. But due to its aesthetically unusual qualities that require a heightened need for interpretation, surrealistic art generally complicates the experience of a meaningful cultural worldview. The meaning affirming capacity in surrealistic art increases, however, as a result of a greater need for meaning, and potentially greater openness to meaning in unlikely sources, following death awareness (Silveira et al., 2014). Where modern art such as surrealism can be considered low in structure (i.e., whether the form is coherent with reality) and moderate in representation (i.e., whether the themes are coherent with reality), naturalistic art is high in structure and high in representation. An art style that can then comparably be considered high in structure but low in representation is minimalist art, the impression of which is generally low due to its meaninglessness even following greater need for meaning-making in death awareness (Landau et al., 2006).

Because its evaluation and interpretation is incorporated in the personal experience, art contains an aspect of relation to the self. These aspects, when identified through art of particular genres, affirm self-referent meaning that can be utilized to manage self-related mortality threats (Silveira et al., 2012; Silveira et al., 2014). It follows that the threat to self-continuity as a result of death or limited-lifetime awareness may be managed similarly through art that provides self-referent meaning. But because death concerns are acutely threatening whereas limited-time concerns are chronically so, the self-referent management of death awareness would be theoretically greater than such management of limited-time awareness. Further, it seems naturalistic and surrealistic art, which provide opportunity for self-referent interpretation, may

provide more meaning than minimalist art, which aesthetically does not provide representation, coherent or defiant, from which to affirm such meaning.

Rationale

Research evidence of TMT suggests the role of worldview defense against existential concerns to reaffirm meaning in confrontation with death awareness. However, there is yet no inquiry into meaning reaffirmation and defense against concerns relating to limited lifetime awareness as a result of psychological engagement with visual art. In our exploration of the complementarity between TMT and SST, we intended:

1. To compare mortality threats of death and limited-time as they differ in inducing existential concerns. To do this, we inducted death or limited-time awareness in participants and asked them to create death-related words as a measure of existential awareness.

2. To examine the possibility that SST provides a hedonic life-span context of the self-referent, existential meaning making in TMT. To do so, we inducted death or limited-time awareness in participants and asked them to evaluate an art stimulus on its capacity to provide a sense of personal meaning.

Statement of Hypotheses

We hypothesize:

I. There will be a main effect for mortality awareness such that participants who think about death will create more death-related words compared to participants who think about limited-time because death awareness inducts existential concern whereas limited-time awareness is unrelated to an existential context. Death awareness will be operationalized as typing in response to a questionnaire about thoughts of one's own death, and limited-time awareness will be

operationalized as typing in response to a questionnaire about thoughts of one's life ending. (Study 1)

II.   There will be an interaction effect between death awareness and distraction such that participants will, following death awareness, create more death-related words following a distraction than without a distraction, but that participants in a control condition will create an equal amount of death words, regardless of presence of distraction. We hypothesize this effect because of the temporal distance a distraction allows from immediately suppressed death thoughts but is not required for other thoughts. Distraction will be operationalized as reading a neutral, short story and answering two related questions, and those who do not receive a distraction will not read the story or participate in any distracting task. The control condition will be operationalized as typing in response to a questionnaire about thoughts of a painful dentist visit. (Study 1)

III.   There will be a main effect for limited-time awareness such that participants, following limited-time awareness, will create more time-related words compared to participants in a control condition, regardless of presence of distraction. We hypothesize this effect because of the awareness of time in participants who thought about limited-time and because limited-time thoughts are not acutely threatening to require suppression and rebound and therefore a distraction. This is an exploratory hypothesis. The control condition will be operationalized as not receiving a questionnaire. (Study 1)

IV.   There will be an interaction effect among art stimuli, mortality awareness, and aspects of personal reference such that participants will, following mortality awareness, evaluate meaningful art as high in aspects of personal reference because of meaningful art's capacity to provide self-referent resources to cope with mortality threats. However, we hypothesize that

participants will, following mortality-unrelated awareness, evaluate meaningless art as low in aspects of personal reference. We further hypothesize this difference will be greater following death awareness than limited-time awareness because acute death threats necessitate greater meaning reaffirmation than chronic limited-time threats. Meaningful art will be operationalized as naturalistic and surrealistic art images, whereas the meaningless art will be operationalized as a minimalist art image. Mortality awareness will be operationalized as typing in response to a questionnaire about thoughts of one's own death or limited remaining lifetime, and mortality-unrelated awareness will be operationalized as typing in response to a questionnaire about thoughts of a painful dentist visit or as not receiving a questionnaire about thoughts. (Study 2)

V.   There will be an interaction effect between mortality awareness and art stimuli such that participants, following mortality awareness, will create less target words following meaningful art compared to meaningless art, but that participants will, following mortality-unrelated awareness, create an equal amount of target words, regardless of art stimuli. We hypothesize this effect because of meaningful art's capacity to provide resources to manage and therefore decrease threatening mortality awareness that is not required for other thoughts. Target words will be operationalized as death-related words or time-related words created from word fragments. (Study 2)

VI.   There will be an interaction effect between age and mortality awareness such that without prompting of a limited-time awareness, younger adults will possess an expansive future time perspective whereas older adults will possess a limited future time perspective, but that following consideration of a limited-time awareness, younger and older adults will possess a similarly limited future time perspective. We hypothesize this effect because people more greatly realize the nearing end of life with increasing age or when made aware of limited available future time.

An expansive future time perspective will be operationalized as a high score on a measure of available future time in life whereas a limited time perspective will be operationalized as a low score on the same measure. (Study 2)

Study 1

Overview

Though theoretically distinct, death awareness and limited-lifetime awareness psychologically relate to the same finality-of-life consideration. To distinguish the existential component as being unique to terror management theory (TMT) and separate from the hedonic component in socioemotional selectivity theory (SST), we intended to explore the extent of death thought accessibility following death and limited-time awareness inductions. In addition, to accurately capture this comparison, it was necessary to evaluate an important but debated hypothesis of the death thought accessibility effect.

Death Thought Accessibility

One of the most debated concepts of TMT involves the measure of death thought accessibility (DTA; Hayes, Schimel, Arndt, & Faucher, 2010). TMT suggests death thoughts are constantly avoided, and, once conscious, are immediately suppressed due to their profound meaninglessness. After a period of delay or distraction to allow death awareness to fall just outside of conscious awareness, the suppressed awareness rebounds and becomes more accessible. This is the basic premise of DTA. However, DTA is established in only certain circumstances. For example, in studies of explicit death awareness induction in contrast to neutral awareness induction, DTA is greater following an undemanding distraction task rather than no distraction task because the distraction task allows effective suppression of death thoughts. Further, DTA is greater following an undemanding distraction task rather than a

demanding distraction task because the demanding task prevents effortless suppression of death

thoughts. DTA is also greater without an opportunity to defend one's worldview rather than

following defense of one's worldview. In other words, high DTA may be concurrent with high

need for meaning making. This suggests DTA is required and utilized for successful meaning

affirmation, and therefore, given death awareness induction is achieved, measures of DTA

following meaning affirmation opportunities may indicate the success of those coping

opportunities (Arndt et al., 1997b). Debate surrounds DTA, and some studies have not supported

its hypothesized effects (Trafimow & Hughes, 2012). In the first study, we aimed to evaluate the

suppression-rebound hypothesis of TMT that suppressed death thoughts will rebound following a

simple distraction task rather than no distraction task. The results partially informed our method

in the second study.

Study 1 Hypotheses

I.   We hypothesize that participants who engage in death awareness will create more death-

related words compared to participants who engage in limited-time awareness, because death

awareness, in contrast to limited-time awareness, inducts existential concerns and therefore

greater death accessibility.

II.   We also hypothesize that participants who engage in a distraction task following death

awareness will create more death-related words compared to participants who did not engage in a

distraction following death awareness because a refocusing on death-unrelated information will

allow for a rebound of previously suppressed death awareness.

III.   We finally hypothesize that participants who engage in limited-time awareness will

create more time-related words compared to participants who engage in no awareness induction,

regardless of distraction, because participants who engage in limited-time awareness are more

conscious of those thoughts and because we do not expect a suppression-rebound effect for limited-time thoughts. This is an exploratory hypothesis.

Study 1 Method

Independent variables for this study were the morality awareness variable with four levels (death-related, dental pain control, ending-related, and no-awareness control) and the distraction task variable with two levels (distraction task versus no distraction task). The dependent variables were the thought accessibility for death and limited-time.

Participants. 156 undergraduate students (125 female; mean age 19.94 ± 2.79 years) participated in the study. They were recruited through an undergraduate student participation website at DePaul University, Chicago, Illinois. Participants did not receive a financial reward but did receive partial credit for an Introductory Psychology course.

Materials.

Awareness inductions. To explicitly induct death awareness, participants read and responded to a series of open-ended questions about their own death, which has been used in numerous previous TMT studies (Arndt et al., 1997b; Arndt et al., 2002; Greenberg et al., 1990; Greenberg et al., 1994; Greenberg, Arndt, Simon, Pyszczynski, & Solomon, 2000; Trafimow & Hughes, 2012). The questionnaire included, "Imagine you are dying. In the space below, write a paragraph about what will happen to you as you die. Write, in some detail, about the feelings that the thought of your dying arouses in you." As a control for the death awareness induction, there was a set of open-ended questions related to dental pain, which were similar to the death-related questionnaire in structure and negative valence but did not increase need for meaning making. The questionnaire included, "Imagine you are at the dentist's office. In the space below, write a paragraph about a visit to the dentist where you experience great pain due to a failure of the

anesthetic. Write, in some detail, about the feelings that the thought of your dental pain arouses in you." This questionnaire has also been used in previous TMT studies (Arndt et al., 2002; Rosenblatt et al., 1989). A novel set of open-ended questions was used to induct awareness of a limited-time perspective consistent with SST. It paralleled the death-related questionnaire in structure, and to explicitly induct mortality awareness as in the death-related questionnaire, its content referred to the realization of a limited lifetime. It included, "Imagine your time is limited. In the space below, write a paragraph about what will happen as your life comes to an end. Write, in some detail, about the feelings that the thought of your limited lifetime arouses in you." A novel, exploratory control for the limited-time awareness induction was used in which participants did not receive a questionnaire to induct specific awareness.

Distraction. Various distraction tasks have been used in TMT studies including completing word search puzzles, state emotion measures, or personality measures, and reading literary passages of neutral content (Arndt et al., 2002; Greenberg et al., 1990; Greenberg et al., 1994; Greenberg et al., 2000; Arndt et al., 1997b; Trafimow & Hughes, 2012). To ensure the distraction task was undemanding and did not involve self-related themes, we used a neutral, literary excerpt from *Exile and the Kingdom* (Camus, 1957; Arndt et al., 1997b; Greenberg et al., 1994). Following the story, there was one question each regarding the story's descriptiveness and the narrator's gender. See Appendix A for the full task (passage and related questions), known as "The Growing Stone." Because the purpose of this task was only to temporarily distract the participant, we did not analyze its data.

Thought accessibility. The typical measure of thought accessibility is a word fragment completion task, which has been used in multiple TMT studies (Arndt et al., 1997b; Greenberg et al., 1994; Harmon-Jones et al., 1997; Navarrete, Rurzban, Fessler, & Kirkpatrick, 2004; Simon et

al., 1997; Trafimow & Hughes, 2012). For instance, the word fragment "COFF_ " can be completed with the death-related word "COFFIN" or the neutral word "COFFEE." Under the correct terror management circumstances following death-related though induction, the death-related word is more likely to be created than the neutral word. A word fragment to measure limited-time thought accessibility is "CL_CK," which can be completed with the limited-time word "CLOCK" or the neutral word "CLICK." We measured limited-time thought accessibility as a manipulation check for our limited-time induction. The entire thought accessibility measure included seven word fragments that could be completed to form death-related or neutral words, seven word fragments that could be completed to form limited-time related or neutral words, and 11 word fragments that could be completed to form only neutral words ("B_T_LE" can form "BOTTLE" or "BATTLE"). See Appendix B for the full thought accessibility measure.

Demographics. We asked participants to disclose their age, gender, and ethnicity, though we have no hypotheses regarding that information.

Procedure. Participants, undergraduate students in an Introductory Psychology course, were recruited through SONA, the student research participation website. Informed consent was obtained when the participant, after entering the lab and providing an unidentifiable ID code, read the Adult Consent document and signed in agreement with the terms. Participants read that the experiment intended to first study reactions to imagined situations, then to collect the participant's interpretation of a short story through a few related questions but that some participants may not read the short story, and finally to examine the participant's ability to form complete words from word fragments with missing letters. Participants also read that they would be asked to answer some simple demographic questions. The participants then began the Qualtrics survey on a computer.

First, a set of open-ended questions prompting participants to describe what would happen to them physically as they die (death awareness condition), to describe what would happen to them during a painful dentist visit (death control condition), to describe what would happen to them at the end of their life (limited-time awareness condition), or to continue to the next page (no-awareness control for the limited-time condition) appeared. Participants who received a response prompt were asked to type in the box provided below the prompt. A randomized half of the participants read a neutral, literary excerpt about a man who tries to carry a large stone and were asked to answer one question each about the story's descriptiveness and the narrator's gender. Then those participants continued to the next task. The remaining randomized half of the participants skipped this story and the related questions and proceeded to the next task. Participants completed a word fragment completion task consisting of seven word fragments that could be completed to form death-related (buried, dead, corpse, grave, killed, skull, coffin) or common neutral words, seven word fragments that could be completed to form limited-time related (limit, short, clock, minute, moment, finale, second) or common neutral words, and 11 word fragments that could be completed to form only common neutral words. Then, participants completed one question each about their age, gender, and ethnicity.

Finally, when the participant completed the survey, they were provided with debriefing information about the aims and theoretical background of the study. The survey was designed to randomly present one of the 4 induction questionnaires to each participant and to randomly either present the short story or proceed directly to the word fragment completion task. Therefore, each participant had an equal chance of receiving each prompt as well as receiving or not receiving the short story. So, each participant had an equally random chance of being 'assigned' to each of the eight conditions.

Study 1 Results

There were a total of eight conditions (4 awareness induction x 2 distraction/no distraction) to measure thought accessibility. We excluded four outliers on the dependent measures of death-related words and time-related words. We also excluded two outliers who spent less than 8 seconds on the distraction task, which suggests they were not engaged in the experiment. Data from 150 participants remained for analysis.

Hypothesis I. We expected participants who wrote about their own death would create a greater number of death-related words than participants who wrote about limited time regardless of distraction condition.

Analysis. We conducted a 4x2 ANOVA with mortality awareness (death vs. dental pain control vs. limited-time vs. no-awareness control) and distraction type (distraction vs. no distraction) as the between-participant independent variables and the number of death-related words and time-related words created as the dependent variables. Though the general main effect of mortality awareness on created death-related words was not significant ($F < 1.77, p > .15$), planned comparisons revealed a marginally significant difference of created death-related words between the death awareness condition ($M = 2.56, SD = 1.14$) and limited-time awareness condition ($M = 2.12, SD = 1.21$), $t(78) = 1.88, p = .06$, which suggests participants created more death-related words following death awareness than following limited-time awareness (Figure 2). Planned comparisons also revealed a significant difference of created death-related words between the death awareness condition and dental pain control condition ($M = 2.08, SD = 1.00$), $t(75) = 1.97, p = .05$, such that more death-related words were created when participants thought about death than when participants thought about dental pain ($M = 2.08, SD = 1.11$).
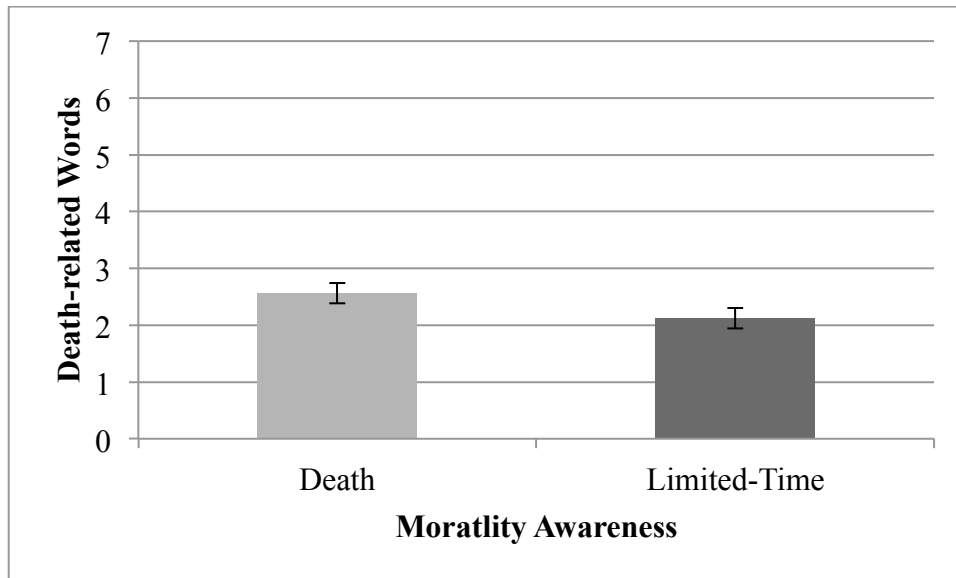
Figure 2.   Death-related words created between mortality awareness
               inductions

Hypothesis II. We expected participants who wrote about their own death and performed the distraction task would create a greater number of death-related words than participants who did not perform the distraction task but that participants who wrote about dental pain would create an equal number of death-related words regardless of presence of distraction. According to DTA, people who think about death immediately suppress those thoughts, which will only reappear (in this case in the thought accessibility measure) after a task that allows time away from those thoughts (Arndt et al., 1997b; Florian et al., 2001; Greenberg et al., 1994; Hayes et al., 2010). We had no expectations for time thought accessibility regarding the distraction task because ending-related awareness is not apparently avoided or suppressed when made conscious.

Analysis. Based on the aforementioned 4x2 ANOVA, and contrary to our hypothesis, there was no significant interaction between morality awareness and distraction type on created death-related words ($F < .81$, $p > .50$; Table 1). The number of death-related words created did not differ depending on presence or absence of a distraction following mortality awareness.

Table 1.   Mean scores and standard deviations for death-related words, Study 1

	No Distraction		Distraction	
	M	*SD*	*M*	*SD*
Dental Pain	1.88	1.11	2.24	0.89
Death	2.56	1.10	2.57	1.21

Hypothesis III. We expected participants who wrote about limited time would create a greater number of time-related words than participants who did not respond to a prompt regardless of distraction. If our limited-time awareness induction was successful, time-related awareness would be more conscious in participants who wrote about a time-related event than those who did not.

Analysis. In reference to the 4x2 ANOVA, there was a significant main effect of mortality awareness on created time-related words, $F(3, 142) = 4.23$, $p = .01$, $\eta^2 = $. However, because there was no difference between the limited-time awareness and no-awareness conditions, our hypothesis was not supported.

Study 1 Discussion

To compare the extent of existential concern between two forms of mortality awareness and to examine the death thought accessibility (DTA) hypothesis that death awareness is immediately suppressed and then rebounds after a distraction, we presented participants with death-related and pain-related open-ended questions followed by an undemanding or no distraction task and measured their accessibility of death-related and time-related thoughts.

Our results suggest that death thoughts are more accessible for people who think about death than for those who think about a limited-time. This would seem an obvious conclusion except that death awareness and limited-time awareness, though theoretically based in different

mortality threats, consider the same psychological construct of life's finality. The finding is consistent with our hypothesis because we expected a difference between the mortality awareness conditions such that limited-time awareness would not induct the existential concerns of death awareness. TMT and SST may share a common theoretical foundation in the threat to life's finality, but distinguishing an underlying motivation by which death threat is differently managed in comparison to limited-time threat also distinguishes the theories as separate. However, although theorized, we did not explore whether hedonic concerns specifically motivated management of limited-time threats. Further investigation of this potential hedonic mechanism in limited-time awareness could strengthen the theoretical basis of SST as it suggests a unique management of the threat to mortality.

In reference to our second hypothesis, and contrary to previous research, death thoughts were equally accessible in the current study following an undemanding distraction task as following no distraction task regardless of awareness induction (Table 1). A possibility for this result could be an unsuccessful death awareness induction. However, the significant main effect of mortality awareness indicates death thoughts were more accessible for participants who were asked to think about death than for those who were asked to think about pain, which suggests the death awareness induction was successful in its intended purpose. One might argue that the modification of the standard thought accessibility measure to include time-related word fragments inhibited participants' ability to access death-related words, but because both conditions included this modified measure of thought accessibility, this would affect both conditions equally. Further, the distraction task as used in the current study, though undemanding, may not have been sufficiently engaging to allow rebound of suppressed death awareness. Greenberg et al. (1994) evaluated "The Growing Stone" (Camus, 1957) as an

effective task in providing a distraction and therefore rebound of death accessibility, but they also included a PANAS measure between death awareness induction and the distraction task. Some studies that discover the hypothesized effects of DTA do not do so as their primary investigation and may include confounding variables (Arndt et al., 2002; Greenberg et al., 2000).

Trafimow and Hughes (2012) performed multiple, direct examinations of DTA and consistently found support against (i.e., significant results in the opposite direction of) the suppression-rebound hypothesis, and Vaes, Heflick, and Goldenberg (2010) discovered that DTA even after a delay lowers as a result of successful terror management. Due to these conflicting results, including our own, we propose that a reconsideration of the suppression-rebound hypothesis as it relates to death thought accessibility and its role in TMT is warranted. Regardless, it is clear in the current study that death thought accessibility is no greater following a distraction than without a distraction, and we used this to inform the design of Study 2. In part to further investigate these results, we also intended to examine whether the inclusion of a potential means of managing mortality-related threats affects thought accessibility.

In our exploration of a novel limited-time awareness induction and the addition of time-related word fragments to the thought accessibility measure, we hypothesized that participants who thought about a limited remaining lifetime, in contrast to those who were not asked to think about anything, would create more time-related words. We found, contrary to our hypothesis, that participants accessed a similar amount of time-related words after thinking about a limited remaining lifetime as without engaging in any particular awareness. There are some possible reasons for this result. First, the novel limited-time awareness task might not have successfully inducted limited-time thoughts. However, the structure of the task paralleled the established death awareness induction and included explicit language about the experience of a nearing end

of life. In other words, the limited-time induction may have been successful as intended, but the thought accessibility measure may not have captured its effects. It is possible that the novel time-related word fragments added to the standard thought accessibility measure, though similar to the death-related words fragments, did not allow for accessibility of previous limited-time thoughts to create time-related words in the way accessibility of death thoughts allows creation of death-related words. Socioemotional selectivity theory, however, does not suggest thought accessibility for limited-time awareness. Whereas death awareness is acutely threatening and, according to TMT, requires management of that threat, time-related thought accessibility may be no greater following limited-time awareness than following no specific awareness because limited-time awareness is, theoretically, a different threat and therefore managed as such. Thus, we further explored the differences between management of death awareness and limited-time awareness in the following study.

We also found, unexpectedly, that time thought accessibility was greater for participants who were asked to think about a painful dentist visit in relation those who were asked to think about death. We did not have a prior assumption that more time-related words would rather be created when participants were asked to think about death. That participants who thought about pain created more time-related words, however, suggests that the pain awareness induction was successful in its intended purpose as a control condition to induct threatening awareness that parallel the death awareness induction in negativity and avoidance, which is typical of psychological responses to pain (Ramírez-Maestre, Esteve, & López-Martínez, 2014). Thoughts of a painful dentist visit inducted increased attention on remaining time in a threatening experience whereas awareness about death does not. This effect further suggests a differentiation of death awareness and limited-lifetime awareness, which we examined in Study 2.

Study 2

Overview

Considering results of Study 1, we assessed mortality threat management without the use of a distraction task. More importantly, to compare the seemingly similar yet distinct threat management mechanisms between death awareness and limited-time awareness, we examined each in response to self-referent meaning affirmation. Naturalistic art generally secures self-referent meaning due to its effortless coherence, and self-referent meaning can be achieved through surrealistic art under the context of a greater need for meaning following death awareness (Silveira et al., 2014). We conducted the current study to evaluate the ways in which meaningful art can provide coping with limited-time awareness differently than the way it provides coping with death awareness.

Study 2 Hypotheses

IV.   We hypothesize that participants who view naturalistic or surrealistic art following death or limited-time awareness will evaluate the art stimuli as higher in aspects of personal reference. We further hypothesize participants who view minimalist art and following dental pain or no specific awareness will evaluate the art stimulus as low in aspects of personal reference because of naturalistic and surrealistic art's capacity to affirm self-referent meaning and manage mortality threats that minimalist art cannot due to its apparent meaningless nature. However, we hypothesize this difference will be greater following death awareness than limited-time awareness because death threats are acute whereas limited-time threats are chronic.

V.   We also hypothesize that participants who think about death or limited-time and view naturalistic or surrealistic art will create less death-related and time-related words, respectively, than participants who think about death or limited-time and view minimalist art, but that

participants who think about dental pain or are not asked to think about anything will create an

equal amount of death-related and time-related words regardless of the art stimuli they view,

because of naturalistic and surrealistic art's capacity to provide self-referent meaning that

decrease mortality threats but have no purpose for other kinds of awareness.

VI.   Finally, we hypothesize that without prompting of limited-time awareness, younger

adults will possess an expansive future time perspective whereas older adults will possess a

limited future time perspective, but that following limited-time awareness, younger and older

adults will possess a similarly limited future time perspective because people more greatly

realize the nearing end of life with increasing age or when made aware of limited available future

time.

Study 2 Method

The first independent variable included four levels of mortality awareness: death-related,

dental pain control, limited-time-related, and no-awareness control. The second independent

variable included three art stimuli levels: surrealistic, naturalistic, and minimalist. The dependent

variables were aspects of personal reference (with levels dependent upon analysis), death-related

and time-related thought accessibility, and general future-time perspective.

Participants. 258 Mechanical Turk (MTurk) workers (133 female; mean age 38.03 ±

11.20 years) participated in the study. We expected the use of MTurk would broaden the

participant demographics, specifically to include a greater range of age. They were recruited

through Amazon's MTurk website, a crowdsourcing Internet marketplace for the completion of

Human Intelligence Tasks (HITs) such as photograph classification, information verification, and

social science research. Participants were screened through an automatic qualification system to

ensure high quality responses. The necessary qualifications included a HIT approval rate (i.e.,

percentage of tasks accepted for completion and accuracy) greater than or equal to 97%, the

number of HITs greater than or equal to 1000, a United States location, and a Master's

Qualification assigned by Amazon based on high performance accuracy. Participants were

compensated $1.80 for the 15-minute study, which is equivalent to the national minimum wage

of $7.25 per hour.

Materials.

Awareness inductions. We provided the same awareness induction questionnaires about

death, limited-time, and dental pain as implemented in the first study as well as the condition in

which no awareness questionnaire was presented.

Art Stimuli. To examine the tendency to cope with mortality threats through exposure to

meaning-making stimuli, we presented participants with images of a naturalistic or surrealistic

painting. The naturalistic painting, "Summertime" by Edward Hopper, and surrealistic painting,

"Heavenly Fruits" by Vladimir Kush, have been used previously in a similar study of the effects

of art to buffer existential threat and were chosen due to their matched valence and arousal as

well as low familiarity (Silveira et al., 2014). Due to the simple and diminished form of

minimalism in comparison to naturalistic and surrealistic art, we presented participants with the

minimalist painting "Taupe" by Justin Page Wood. See Appendix C to view the paintings.

Aspects of personal reference. We adopted a previously used measure of personal

reference that explores the capacity of presented stimuli to buffer death threats (Silveira et al.,

2014). We posited that this measure, as it is self-related, explores more generally the capacity of

stimuli to buffer self-related threats, which includes the threat to self-continuity found in terror

management theory (TMT) and socioemotional selectivity theory (SST). The measure contains a

list of 18 commonly used terms related to psychological threats and the coping with those

threats. There are terms related to certainty and uncertainty ("certainty," "uncertainty,"

"security," "insecurity," and "affirmation"), anxiety and loss of control ("anxiety," "consolation,"

"reassurance," "encouragement," and "discouragement"), meaning maintenance ("meaning,"

"clarity," "confusion," and "comprehension"), connection with something larger than one's self

("loneliness" and "identification"), and the beauty and transcendence of existence through art

("creativity" and "inspiration"). To provide a socioemotional context, we added terms related

more specifically to ending threats and ending threat resolution ("exploration," "balance,"

"connectedness," and "presentness"). Following the prompt, "The image elicits a sense of

[aspect] in me," all 22 terms (aspects) were listed with the scale 1 (not at all) to 7 (very much)

for each term.

Thought accessibility. The death-related, ending-related, and neutral thought

accessibility measure was the same as used in the first study.

General future-time perspective. Because SST does not suggest ending-related

awareness is avoided, it is possible that expectation of available future time can be adopted as

limited or expansive at any age. And although older adults regulate emotions to a greater degree

than younger adults, it has not been directly determined whether older adults generally have a

limited future time perspective and younger adults generally have an expansive future time

perspective. To capture age differences in general future time perspective, we included the

"Future Time Perspective Scale" (Lang & Carstensen, 2002). The measure asked participants,

"In order to indicate your agreement with the items, please use the following scale:" from 1 (very

untrue) to 7 (very true). An example of one of the ten items is, "My future seems infinite to me."

After items 8, 9, and 10 were reverse coded, a higher score (maximum 70) indicated an

expansive future time perspective whereas a lower score (minimum 10) indicated a limited future time perspective.

Demographics. Used in the first study, the three demographic questions related to age, gender, and ethnicity were also used in this study.

Procedure. Participants, Amazon Mechanical Turk Workers, were recruited through the MTurk Human Intelligence Test listings website. Because this was an online study, informed consent was obtained when the participant read the Adult Consent document, clicked a button in agreement with the terms, and began the experiment. In the Adult Consent document, participants read that the experiment would involve a series of mini-studies that intended to first study reactions to imagined situations, to collect the participant's interpretation of a short story through a few related questions, to measure responses to briefly-presented painting images, to examine the participant's ability to form complete words from word fragments with missing letters, and finally to answer questions related to their perspective on a topic. Participants also read that they would be asked to answer some simple demographic questions. The participants then began the Qualtrics survey online through the MTurk website.

First, a set of open-ended questions prompting participants to describe what would happen to them physically as they die (death awareness condition), to describe what would happen due to the realization of their limited lifetime (limited-time awareness condition), or to describe what would happen to them during a painful dentist visit (control condition) appeared. Participants were asked to type in the box provided below the prompt. Some participants were instead not asked to describe any scenario but were immediately presented with the next task. The participants were then informed that one image would appear for 15 seconds, that they must allow the image to remain for 15 seconds and then automatically disappear, and that immediately

following would be a list of items to be evaluated in reference to the image. Next, participants

viewed one naturalistic, surrealistic, or minimalist painting image for 15 seconds. The presented

art category (naturalistic, surrealistic, or minimalist) was randomized across all participants.

Then, participants were asked to evaluate 22 aspects related to the way in which the image

evoked a sense of each aspect in them.

All participants then completed a word fragment completion task consisting of seven

word fragments that could be completed to form death-related (buried, dead, corpse, grave,

killed, skull, coffin) or common neutral words, seven word fragments that could be completed to

form time-related (limit, short, clock, minute, moment, finale, second) or common neutral words,

and 11 word fragments that could be completed to form only common neutral words. Following

this task, all participants were asked to respond to ten questions about their sense of available

future time remaining in life.

Then, participants completed one question each about their age, gender, and ethnicity.

Finally, when the participant completed the survey, they were provided with debriefing

information about the aims and theoretical background of the study as well as a unique code to

provide on MTurk and receive compensation.

Study 2 Results

There were a total of 12 conditions (4 awareness inductions x 3 art stimuli) to measure

thought accessibility, aspects of personal-referent meaning, and future time perspective. We

excluded thirty-five outliers who viewed the image for less than the automated 15 seconds

(cutoff value of 14.5 seconds) because they manually and prematurely advanced to the next page.

Because an extremely great amount of time in a task can indicate lack of engagement, we also

excluded five participants who spent more than 506 seconds on the awareness induction questionnaire. Data from 218 participants remained for analysis.

Hypothesis IV. Toward the comparison between meaning-making processes of terror management and socioemotional selectivity, we expected participants aware of death or limited-time would evaluate naturalistic or surrealistic art as high in aspects of personal reference but that participants in the control conditions would evaluate minimalist art as low in aspects of personal reference. We expected this difference to be greater following death awareness than limited-time awareness.

Preliminary analysis. First, we computed the mean value of each aspect of personal reference evaluated on the image stimuli for each participant. Following the analysis performed by Silveira et al. (2014), we then conducted an exploratory factor analysis (EFA) using principal axis factoring with varimax rotation on the 22 aspects of personal reference to retain factors that had eigenvalues greater than 1, each explained at least 5% of the total variance, and combined explained at least 50% of the total variance. The EFA revealed three factors explaining 65% of the total variance (see Table 2 for item loadings, eigenvalues, individual and cumulative variance explained, and factor correlations) and determined three components onto which the aspects load. An item was considered representative of a particular factor when its factor loading was greater than .50. The first factor, reassurance, consisted of the items certainty, security, affirmation, consolation, reassurance, encouragement, meaning, clarity, comprehension, identification, inspiration, balance, connectedness, and presentness. The second factor, insecurity, comprised the items uncertainty, insecurity, anxiety, discouragement, confusion, and loneliness. The third and final factor, exploration, included the items creativity, inspiration, and

Table 2. Item loadings, eigenvalues, individual and cumulative variance explained, and factor correlations, Study 2

| | *Factor* | | |
	Reassurance	**Insecurity**	**Exploration**
Item			
Certainty	**0.83**	-0.16	-0.18
Uncertainty	-0.20	**0.66**	0.36
Security	**0.79**	-0.15	0.05
Insecurity	-0.10	**0.82**	0.12
Affirmation	**0.82**	0.04	0.20
Anxiety	0.06	**0.80**	-0.05
Consolation	**0.69**	0.03	0.26
Reassurance	**0.81**	-0.14	0.28
Encouragement	**0.69**	-0.21	0.48
Discouragement	-0.01	**0.78**	-0.18
Meaning	**0.73**	0.08	0.40
Clarity	**0.87**	-0.10	0.14
Confusion	-0.27	**0.60**	0.03
Comprehension	**0.75**	0.00	0.19
Loneliness	0.12	**0.61**	-0.07
Identification	**0.68**	0.12	0.22
Creativity	0.45	0.04	**0.67**
Inspiration	**0.61**	-0.03	**0.66**
Exploration	0.46	0.05	**0.71**
Balance	**0.78**	-0.16	0.25
Connectedness	**0.76**	-0.09	0.37
Presentness	**0.70**	-0.03	0.35
Percent of Variance Explained	0.59	0.23	0.18
Cumulative % of Variance Explained	0.59	0.82	1.00
Factor Correlations			
Reassurance	1.00		
Insecurity	-0.16	1.00	
Exploration	0.76	-0.02	1.00

exploration. We then computed the mean of each factor's respective items (i.e., aspects of personal reference) for each participant.

Main analysis. For our central analysis, we conducted a 4x3x3 mixed ANOVA with

mortality awareness (death vs. dental pain control vs. limited-time vs. no-awareness control) and

art stimuli (naturalistic vs. surrealistic vs. minimalist) as between-participant independent

variables and repeated measures on aspects of personal reference (reassurance, insecurity, and

exploration) based on the EFA factors. Sphericity was not assumed for this analysis, X^2 (2, N =

218) = 110.53, $p < .001$, $\varepsilon = .71$, so our report includes the corrected Huynh-Feldt *F*-values.

There was a significant main effect for art stimuli, $F(2, 206) = 18.41$, $p < .001$, $\eta^2 = .15$, such that

general evaluation of the aspects of personal reference was greater for surrealistic art (*M* = 3.70,

SD = 1.04) and naturalistic art (*M* = 3.48, *SD* = .90) than for minimalist art (*M* = 2.70, *SD* =

1.06). There was also a significant main effect for aspects of personal reference, $F(1.49, 307.85)$

$= 32.74$, $p < .001$, $\eta^2 = .14$. Planned comparisons clarified that mean values of reassurance were

generally greater than those of insecurity, $F(1, 206) = 12.14$, $p < .001$, $\eta^2 = .06$, and mean values

of exploration were generally greater than those of reassurance, $F(1, 206) = 47.17$, $p < .001$, $\eta^2 =$

.19, and insecurity, $F(1, 206) = 49.38$, $p < .001$, $\eta^2 = .19$. Further, there was a significant

interaction between aspects of personal reference and art stimuli, $F(2.99, 307.85) = 22.96$, $p <$

.001, $\eta^2 = .18$. To examine this interaction, we conducted a one-way ANOVA with art stimuli

(naturalistic vs. surrealistic vs. minimalist) as a between-participant independent variable and

aspects of personal reference (reassurance, insecurity, and exploration) as separate dependent

variables. Naturalistic (*M* = 3.76, *SD* = 1.28) and surrealistic art (*M* = 3.50, *SD* = 1.46) were

evaluated as eliciting greater reassurance than was minimalist art (*M* = 2.59, *SD* = 1.35), $F(2,$

215) = 14.27, $p < .001$, $\eta^2 = .12$. In addition, surrealistic (*M* = 4.72, *SD* = 1.66) and naturalistic

art (*M* = 4.19, *SD* = 1.52) were evaluated as eliciting greater exploration than was minimalist art

$(M = 2.49, SD = 1.54)$, $F(2, 215) = 39.52$, $p < .001$, $\eta^2 = .27$ (Figure 4). There were no

differences regarding the aspect insecurity.

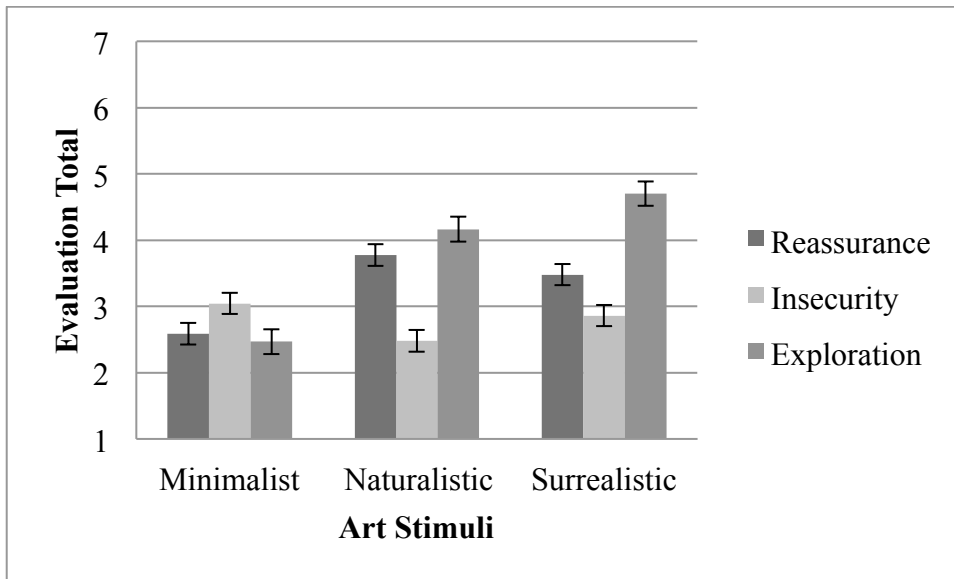Figure 3.   Evaluations of art stimuli on reassurance, insecurity, and
                   exploration

Our hypothesis that differences would emerge among art stimuli, mortality awareness,

and aspects of personal reference was not supported ($F < 1.00$, $p > .48$; Figure 5).
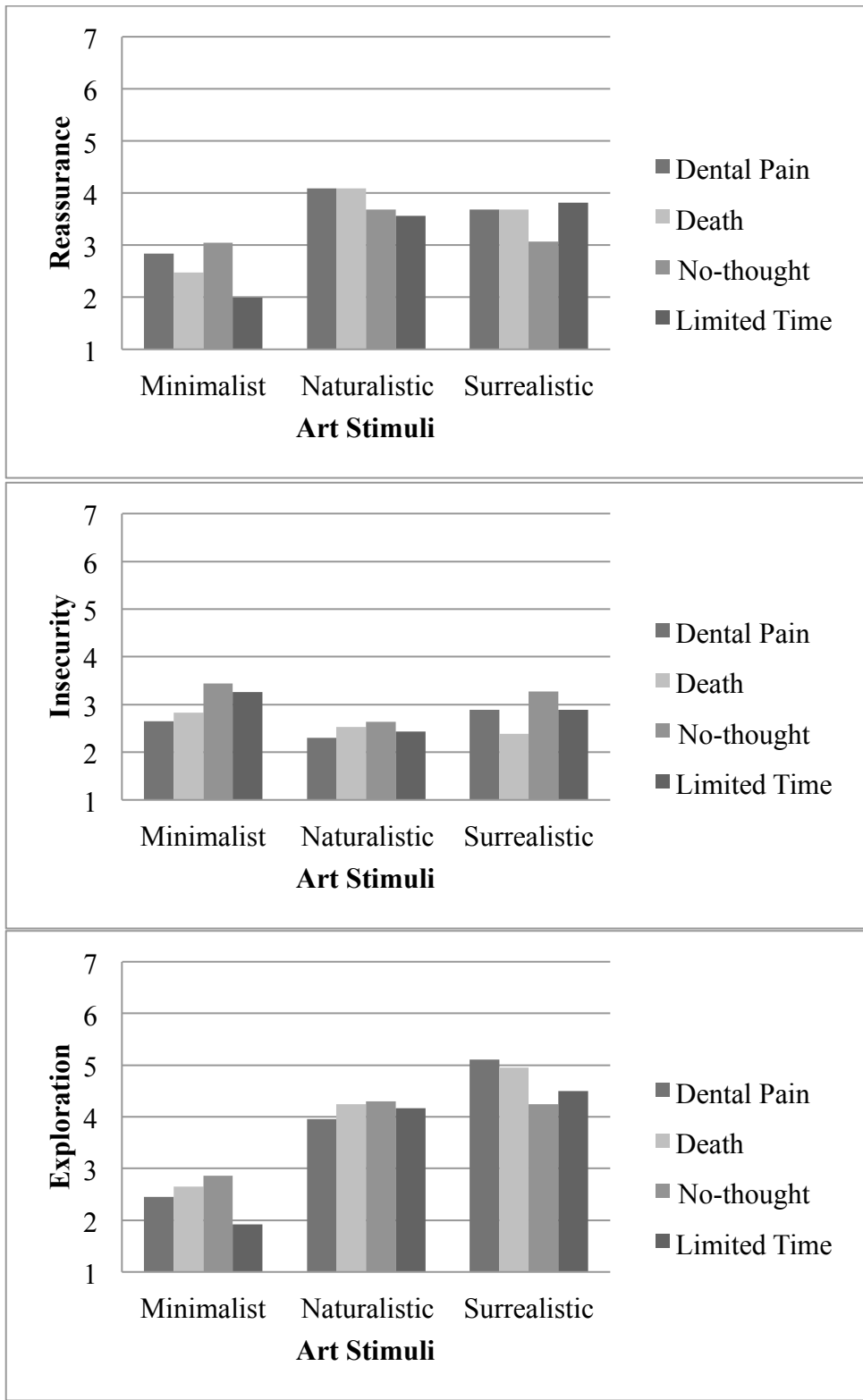
Figure 4.   Mean evaluations of art stimuli following awareness
inductions on reassurance, insecurity, and exploration,
separately; trends

Hypothesis V. We expected that participants who wrote about death or a limited lifetime and who viewed naturalistic or surrealistic art would create less death-related and time-related words, respectively, than participants who wrote about similar situations but viewed minimalist art, but that participants who wrote about a painful dentist visit or did not write about anything would create a similar number of death-related and time-related words independent of the art stimulus presented. Death thought accessibility (DTA) decreases following engagement with a meaningful stimulus, and in consideration of the results from Study 1, we expected management of a limited-time threat would affect accessibility of limited-time thoughts following meaningful stimuli as well (Arndt et al., 1997b).

Analysis. To determine an effect on thought accessibility due to the added art stimuli to buffer self-related threat, we performed similar analyses to Study 1. After we excluded seven outliers on the dependent measure of created time-related words, we conducted a 4x3 ANOVA with mortality awareness (death vs. dental pain control vs. limited-time vs. no-awareness control) and art stimuli (naturalistic vs. surrealistic vs. minimalist) as between-participant independent variables and the number of created death-related words and time-related words as the dependent variables. There was no significant interaction between mortality awareness and art stimuli on created death-related words ($F < 1.12$, $p > .35$), and there was no significant interaction between mortality awareness and art stimuli on created time-related words ($F < .65$, $p > .69$).

Hypothesis VI. Lastly, in agreement with socioemotional selectivity theory (SST), we expected that the perspective of available future time would decrease with increasing age except for participants who thought about limited-time for which the perspective of available future time would decrease in contrast to those who engaged in any other awareness induction.

Analysis. We first conducted a 4x3 ANOVA with mortality awareness (death vs. dental pain vs. limited-time vs. no-awareness) and art stimuli (naturalistic vs. surrealistic vs. minimalist) as between-participant independent variables and "Future Time Perspective Scale" (Lang & Carstensen, 2002) score as the dependent variable. There was no significant effect of mortality awareness on future time perspective ($F < .44$, $p > .64$). Because future time perspective did not vary according to experimental thought induction, we calculated a linear regression to predict general future time perspective based on age. A significant regression equation was found such that age ($M = 38.31$, $SD = 10.96$), when measured in years, predicts future time perspective ($M = 44.16$, $SD = 14.34$), $F(1, 216) = 11.87$, $\beta = -.30$, 95% CI [-.47, -.13], $p < .001$, $R^2_{Adjusted} = .05$, which suggests that future time perspective decreases as age increases.

Study 2 Discussion

We presented participants with an opportunity to evaluate self-referent aspects of meaningful art as an exploration into the common coping mechanisms between management of two notions of mortality. Three aspects emerged as comprising the management of such threat: reassurance and exploration as threat resolution (i.e., positive aspects of personal reference), and insecurity as threat experience (i.e., negative aspects of personal reference). The positive aspects of personal reference were of greater relation to the meaning affirming art in the current study, which parallels the findings of Silveira et al. (2014) and their discovered relation between positive aspects of personal reference and meaningful art. Specifically, whereas insecurity was elicited from all art stimuli similarly, that naturalistic and surrealistic art were evaluated greater in reassurance and exploration than in insecurity generally supports the stimuli employed in engaging self-referent aspects of meaning affirmation. The current study also suggests that

minimalist art, because it was evaluated low in all aspects of personal reference, is an effective control for naturalistic and surrealistic art stimuli in regards to representational coherence.

We expected that mortality awareness would interact with art stimuli and aspects of personal reference such that death awareness and limited-time awareness, in contrast to the control conditions, would result in greater evaluation of reassurance and exploration for naturalistic and specifically surrealistic art. Instead, evaluation of reassurance, insecurity, and exploration for surrealistic, naturalistic, and minimalist art were not definitively different after death, limited-time, dental pain, or no awareness. Due to the multiple variables and levels, there are multiple possibilities for this unexpected effect. One possibility could be an ineffective death awareness induction. However, as this is an established awareness induction and was successful in Study 1 to induct greater death thought accessibility than in the control condition, it is possible that the induction effects are not effective outside of a laboratory environment. MTurk workers may not engage in the task to the same extent of students in a campus laboratory setting. The novel limited-time awareness induction could also benefit from further examination as an effective induction for threatening limited-time awareness. Additionally, perhaps minimalist art provided a similar sense of self-referent meaning to naturalistic and surrealistic art. As minimalist art is not entirely devoid of substance and may affect people based on familiarity, especially in the more general public, future inquiry could benefit from establishing a sense of participants' familiarity with and simple evaluation of this art genre as Silveira et al. (2014) conducted for the naturalistic and surrealistic art images.

Though we cannot propose definitive conclusions regarding this finding as it interacts with mortality awareness, we observed trends in the current study. In regards to reassurance, naturalistic and surrealistic art seem to have been perceived as sources of that aspect to similarly

great degrees within the death awareness and limited-time awareness conditions whereas

minimalist art seems to have been perceived as a source of that aspect to the least degree among

all awareness induction conditions but even less so for participants who thought about death or

limited future time. This would suggest that naturalistic and surrealistic art fulfilled their purpose

in providing a sense of reassurance overall but especially after mortality concerns in contrast to

the way minimalist art generally, but specifically following motivated management of mortality

concerns, did not elicit reassurance. An interesting trend for insecurity lies in surrealistic art. The

seemingly incoherent surrealistic art elicited a lesser sense of insecurity for participants who

thought about mortality than for those who did not. The trend for the final aspect further suggests

that exploration was generally sensed in surrealistic art but to the greatest degree following

awareness of death and dental pain, and it was least often sensed in minimalist art overall and

even less after limited-time awareness. Surrealistic art did not provide a sense of threat resolution

on the surface, but it did so as well as naturalistic art following motivated management of

mortality threats (Landau et al., 2006; Silveira et al., 2014). Based on this trend, it seems that

part of the threat resolution through surrealistic art included a greater self-referent aspect of

exploration and lesser self-referent aspect of insecurity following mortality awareness. Routledge

and Arndt (2002) similarly found that when participants' notion of valued creativity was

bolstered, worldview exploration heightened following death awareness. Finally, a necessary

consideration in the results of this central analysis is, again, the use of participants out of a

controlled laboratory setting. Though convenient for large samples and fast collection, online

participation in a personal environment can adversely affect concentration, timeliness, and in the

case of the current study, availability of meaning-affirming stimuli. Further exploration of

mortality threat management and meaning affirmation would benefit from consideration of these concerns.

In extension of the Study 1 results that participants created more death-related words after thinking about death than thinking about dental pain, we expected that participants in the current study who thought about death and viewed naturalistic or surrealistic art would create less death-related words than participants who thought about death and viewed minimalist art but that there would be no difference in amount of created death-related words for participants who thought about dental pain. In other words, in agreement with Vaes et al. (2010), we expected the opportunity to affirm self-referent meaning (e.g., observation of naturalistic or surrealistic art) would result in decreased death thought accessibility (i.e., death threat management) than following an opportunity apparently devoid of meaning. Contrary to our expectations, death thought accessibility was no greater following minimalist art than naturalistic or surrealistic art, which suggests that mortality threats in contrast to mortality-unrelated threats were not managed to a greater extent following theoretically meaningful stimuli than following stimuli theoretically devoid of meaning. Because there was no difference of time-related words between limited-time awareness and the control condition as they interacted with art stimulus, thought accessibility does not seem applicable to limited-time awareness as it is to death awareness. This finding further emphasizes the notion that management of limited-time awareness is different than that of death awareness, such that death awareness may remain conscious for a longer time than awareness of limited-time.

General future time perspective is important in consideration of the threat to limited future time and of socioemotional selectivity theory (SST), and we sought to examine the premise that the expectation of available future time (i.e., future time perspective) decreases with

increasing age (Carstensen et al., 1999). Lang and Carstensen (2002) discovered support of that

correlation, and we replicated that finding although to a lesser degree. In the current study,

overall, there was a weak, but significant, negative correlation between participants' future time

perspective and age. Increases in age were correlated with decreases in future time perspective,

which suggests an awareness of limited available future time for older adults. However, there

was no significant difference in future time perspective between participants who thought about

limited-time and those who did not engage in an awareness induction. At first glance, this would

indicate an unsuccessful limited-time awareness induction. However, because future time

perspective score was collected at the end of the study, it is possible that the amount of time

passed and/or the evaluation of meaningful stimuli contributed to this effect. Further study could

focus on the comparison between presence and absence of meaning-reaffirming stimuli

following limited-time awareness to investigate efficacy of the novel limited-time awareness

induction.

General Discussion

We investigated different forms of mortality awareness in relation to self-threat and

meaning affirmation. In the exploration of self-referent meaning making between two forms of

mortality awareness, there were no differences between the management of acute death concerns

suggested in terror management theory (TMT; Greenberg et al., 1990; Rosenblatt et al., 1989)

and the management of chronic limited-time concerns suggested in socioemotional selectivity

theory (SST; Carstensen et al., 1999). However, we did distinguish that existential concern is

specific to death awareness whereas limited-time awareness prompts a different concern. Though

death threat and limited-time threat were not differentially managed, the unique existential

concern of death threat maintains the theoretical separation of terror management and

socioemotional selectivity. The current study suggests limited-time awareness relies on a

different means of mortality threat management. Specifically, SST suggests that the concern

related to a limited lifetime is hedonic with a motivation to optimize positivity in the present

moment. Future exploration of this unique mechanism could provide greater insight to compare

death awareness and limited-time awareness more effectively.

       Death thought accessibility (DTA) is emphasized as a principal component of TMT, and

considering recent contradictory evidence, we sought to evaluate its effects to strengthen our

methodology. In the current study, we did not find support for the suppression-rebound

hypothesis of death thought accessibility because death thought accessibility was no greater

following a distraction than without a distraction. This suggests, at the least, that suppression-

rebound of death thought accessibility does not occur in all circumstances. Throughout TMT

research, studies have reinforced findings that death thoughts are immediately suppressed but

rebound, and are more accessible, following a period delay or a distraction task rather than

immediately following death awareness. Heightened death thought accessibility theoretically

confirms successful induction of death awareness (Greenberg et al., 1994). However, there are

many conditions to this hypothesized effect: a demanding distraction task may not allow for

rebound of death thoughts, implicit death awareness does not require a distraction for heightened

accessibility, and meaning affirmation manages the threat that motivates suppression and

therefore decreases DTA (Arndt et al., 1997b; Florian et al., 2001; Greenberg et al., 1994; Hayes

et al., 2010). Unexpectedly low DTA could reveal an unsuccessful explicit induction, but it could

also indicate a distraction task was too demanding, that meaning was reaffirmed in the period

before measure of accessibility, or that a control condition was unsuccessful in its intended effect

for comparison. That DTA was not supported even following the standard death awareness

induction and standard undemanding distraction task in Study 1, and in consideration of potential

meaning reaffirmation in Study 2, perhaps suppression-rebound of death thoughts and/or DTA

does not occur the way theory suggests. Modification of the standard thought accessibility

measure to include time-related word fragments would seem to be a potential source of the

unexpected results. However, the word fragments were intended to allow for unguided

expression of words based on accessibility, and the novel time-related fragments also allowed

expression of neutral alternatives. The issue may not have presented the simple addition of these

novel fragments but in their yet unmeasured difficulty relative to the fragments of the standard

measure, and future use of this measure would necessitate such consideration. The results of our

study, especially as they are not significant even in the opposite direction, warrant further

exploration of the suppression-rebound/DTA hypothesis as it pertains to TMT rather than a

comprehensive reconsideration of the theory.

SST does not suggest suppression-rebound of limited-time thoughts because limited-time

is a chronic threat in contrast to the acute threat of death. However, we expected that limited-

time thoughts would generally be more accessible following such awareness than following

death awareness, dental pain awareness, or no awareness. Limited-time awareness, however, was

most accessible after thoughts about dental pain. This further suggests that limited-time concerns

induct threat management differently than other mortality concerns. Future study could more

accurately investigate the role of hedonic concerns in such management and evaluate whether

limited-time awareness prompts hedonic-related thought accessibility rather than time-related

thought accessibility. Additionally, because the threat of limited-time is chronic, the addition to

the limited-lifetime awareness induction of a specifically finite remaining lifetime, for instance,

may result in a more effective induction, and an induction of an expansive perspective of future

remaining lifetime may prove to be a more effective control for comparison.

According to theories of mortality threat management, the realization of mortality

threatens the concept of a continued existence. Self-threats inducted by death awareness, as TMT

suggests, produce existential concerns that can be managed in a meaningful concept of reality.

For instance, arguing on behalf of one's worldview can reestablish a sense of self in that

worldview, and viewing coherent art can bolster aspects of the self that were threatened by the

inherent discontinuity of mortality (Rosenblatt et al., 1989; Schimel et al., 1999; Silveira et al.,

2014). SST theorizes effects of a similar mortality threat: limited future lifetime. Expectations of

available future time in life diminish in older adulthood particularly as the end of life nears.

Whereas younger adults possess expansive future time perspectives yet uncompromised by the

ultimate finality of life, older adults capitalize on their limited time to focus on positivity,

emotional pursuits, and familiar interactions (Carstensen, 1993; Carstensen, 2006; Carstensen et

al., 2003; Fung et al., 1999; Kisley et al., 2007; Rehmert & Kisley, 2013; Wood & Kisley, 2006).

Notably, we did not intend to study the yet uninvestigated influence of limited-time on these

effects but instead to explore the threat to and management of the self-concept following limited

future lifetime awareness. The threat of death is acute and of a singular event whereas the threat

of limited time is chronic and progressive with advancing age, but the realization of a finite

existence through either mortality threat seems to deny a central aspect of self-preservation. One

management technique against this threat is by way of art that elicits self-referent aspects (i.e.,

meaningful aspects of coping toward self-reaffirmation; Landau et al., 2006; Silveira et al.,

2014).

We explored the comparison of death awareness and limited-time awareness in consideration of self-referent reaffirmation specifically through meaning-providing art, such as naturalistic and surrealistic art. In the current study, naturalistic art and surrealistic art generally elicited positive aspects of personal reference. Contrary to our expectation, however, surrealistic art did not elicit those positive aspects of personal reference following mortality awareness in contrast to dental pain awareness. Surrealistic art was not unique in providing self-referent affirmation against the existential threat of death, although this effect was observed in a previous study (Silveira et al., 2014). A potential complication of this comparison is the dental pain control, which is used throughout the TMT literature as an awareness paradigm of a terrifying event that does not threaten the self-concept (Arndt et al., 1997a; Arndt et al., 2002; DeWall & Baumeister, 2007; Norenzayan & Hansen, 2006; Routledge et al., 2006; Silveira et al., 2014; Trafimow & Hughes, 2012). We have had no success with this awareness induction as a control for death awareness, and in some instances it produced effects that were expected of death awareness. It seems, considering the multitude of evidence in support of the dental pain control recently and historically, the best future direction would be toward replicating this study in a controlled environment. Further, as the limited-time awareness and its no-awareness control were both novel, they are better suited for criticism and modification for future study. On the other hand, limited-time awareness, as it occurs gradually with increasing age, is a more chronic terror that, in addition to its effects, is perhaps not captured accurately through the immediacy of a limited-time awareness induction. Without further investigation of the self-threats that a limited-time perspective theoretically generates and the motivated management to reaffirm the self as a result of those threats, we cannot propose definitive arguments regarding this relation. However, evidence of this study has further supported naturalistic and surrealistic art as vehicles

of self-referential meaning affirmation and established that minimalist art is an appropriate art genre control apparently limited in aspects of personal reference.

Further exploratory comparison of TMT and SST can aid in the identification of their possible self-referent commonalities. In relation to data collected in the current study, we can explore the themes expressed during mortality awareness to qualitatively evaluate the concepts of such awareness as theorized by TMT and SST. Resulting thematic commonalities and differences can strengthen psychotherapeutic understanding of two theoretically separate mortality concerns and provide insight into the approach of existential therapy to consider awareness of limited-time in addition to that of death. Future study of the similar yet distinct mechanisms of self-threat management between two separate theories could further support the shared hypothesis that motivation changes in recognition of mortality and the finitude of life. To evaluate effective coping processes following realization of life's fragility could be greatly beneficial in healthcare contexts. For instance, because naturalistic and surrealistic images can reaffirm self-related aspects that bolster the diminished self-concept, perhaps psychotherapeutic strategies can incorporate the presentation of such art into intervention for adults who experience a threatened self-concepts due to existential crisis or otherwise. Furthermore, continued progress in the domain of SST and its relation of a limited-time perspective with concentrated positivity has great potential. In empirical pursuit to gather more information about SST and end-of-life threats, we could next investigate the mortality concern and meaning-making mechanism of limited-time awareness only in comparison to its control. And in application, the indirect adoption of a less expansive future-time perspective in clinical contexts may usefully abate depression (i.e., the focus on a dismal future) and anxiety disorders (i.e., the overwhelming concern about the future) to focus attention toward present-oriented, emotionally meaningful

goals. Of course it would be imperative to ensure the security of one's self-concept and prevent further existential crisis, and art observation may provide self-preservation in conjunction.

Mortality is a fact of life. Death occurs. The end of life nears. Every being conscious of existence knows of, but does not know, its finality. Perhaps it is not the knowing of, but instead the lack of knowing that produces existential terror. In the future, limited-time awareness in itself could be examined as a unique coping mechanism. The benefit to embrace a limited-time perspective is that coping with limited-time mortality awareness would theoretically exclude the potentially disadvantageous effects of worldview threat that occur with death awareness and instead promote meaningful engagement with positivity in the present existence.

References

Arndt, J., Greenberg, J., Pyszczynski, T., & Solomon, S. (1997a). Subliminal exposure to death-related stimuli increases defense of the cultural worldview. *Psychological Science, 8*(5), 379-385.

Arndt, J., Greenberg, J., Solomon, S., Pyszczynski, T., & Simon, L. (1997b). Suppression, accessibility of death-related thoughts, and cultural worldview defense: Exploring the psychodynamics of terror management. *Journal of Personality and Social Psychology, 73*(1), 5-18.

Arndt, J., Greenberg, J., & Cook, A. (2002). Mortality salience and the spreading activation of worldview-relevant constructs: Exploring the cognitive architecture of terror management. *Journal of Experimental Psychology, 131*(3), 307-324.

Becker, E. (1973). *The Denial of Death*. New York: Simon & Schuster.

Burke, B. L., Martens, A., Faucher, E. H. (2010). Two decades of terror management theory: A meta-analysis of mortality salience research. *Personality and Social Psychology Review, 14*(2), 155-195.

Camus, A. (1957). Exile and the kingdom. New York: Vintage Books.

Carstensen, L. L. (1993). Motivation for social contact across the life span: A theory of socioemotional selectivity. In J. E. Jacobs (Ed.) *Nebraska Symposium on Motivation, 40*, 209-254.

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

Carstensen, L. L., Fung, H. H., & Charles, S. T. (2003). Socioemotional selectivity theory and

the regulation of emotion in the second half of life. *Motivation and Emotion, 27*(2), 103-

123.

Carstensen, L. L., Isaacowitz, D. M. & Charles, S. T. (1999). Taking time seriously: A theory of

socioemotional selectivity. *American Psychologist, 54*(3), 165-181.

Cicirelli, V. G. (1998). Personal meanings of death in relation to fear of death. *Death Studies,

22*(8), 713-733.

Cohen, F., & Solomon, S. (2011). The politics of mortal terror. *Current Directions in

Psychological Science, 20*(5), 316-320.

Corbett, L., & Milton, M. (2011). Existential therapy: A useful approach to trauma? *Counseling

Psychology Review, 26*(1), 62-74.

DeWall, N. C., & Baumeister, R. F. (2007). From terror to joy: Automatic tuning to positive

affective information following mortality salience. *Psychological Science. 18*(11), 984-

990.

Du, H., Jonas, E., Klackl, J., Agroskin, D., Hui, E. K. P., & Ma, L. (2013). Cultural influences on

terror management: Independent and interdependent self-esteem as anxiety buffers.

Journal of Experimental and Social Psychology, 49, 1002-1011.

Florian, V., Mikulincer, M., & Hirschberger, G. (2001). An existential view on mortality salience

effects: Personal hardiness, death-thought accessibility, and cultural worldview defence.

British Journal of Social Psychology, 40, 437-453.

Fung, H. H., & Carstensen, L. L. (2006). Goals change when life's fragility is primed: Lessons

learned from older adults, the September 11 attacks, and SARS. *Social Cognition, 24*(3),

248-278.

Fung, H. H., Carstensen, L. L., & Lutz, A. M. (1999). Influence of time on social preferences: Implications for life-space development. *Psychology and Aging, 14*(4), 595-604.

Goldenberg, J. L., Pyszczynski, T., Johnson, K. D., Greenberg, J., & Solomon, S. (1999). The appeal of tragedy: A terror management perspective. *Media Psychology, 1*(4), 313-329.

Graupmann, V., Frey, D., & Streicher, B. (2013a). The self-fortress: Motivational responses to threats to the self. In B. O. Hunter, & T. J. Romero (Eds.). *Psychology of Threat*, 1-29. New York: Nova Science Publishers.

Graupmann, V., Peres, I., Michaely, T., Meindl, T, Frey, D., Reiser, M., Pöppel, E., Fehse, K., & Gutyrchik, E. (2013b). Culture and its neurofunctional correlates when death is in mind. *Neuroscience Letters*, *548*, 239-243.

Greenberg, J., Pyszczynski, T., Solomon, S., Rosenblatt, A., Veeder, M., Kirkland, S., & Lyon, D. (1990). Evidence for terror management theory II: The effects of mortality salience on reactions to those who threaten or bolster the cultural worldview. *Journal of Personality and Social Psychology, 58*(2), 308-318.

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*(4), 627-637.

Greenberg, J., Arndt, J., Simon, L., Pyszczynski, T., & Solomon, S. (2000). Proximal and distal defenses in response to reminders of one's mortality: Evidence of a temporal sequence. *Personality and Social Psychology Bulletin, 26*(1), 91-99.

Harmon-Jones, E., Simon, L., Greenberg, J., Pyszczynski, T., Solomon, S., & McGregor, H. (1997). Terror management theory and self-esteem: Evidence that increased self-esteem

reduces mortality salience effects. *Journal of Personality and Social Psychology, 72*(1), 24-36.

Hayes, J., Schimel, J., Arndt, J., & Faucher, E. H. (2010). A theoretical and empirical review of the death-thought accessibility concept in terror management research. *Psychological Bulletin, 136*(5), 699-739.

Ito, T. A., Larsen, J. T., Smith, N. K., & Cacioppo, J. T. (1998b). Negative information weighs more heavily on the brain: The negativity bias in evaluative categorizations. *Journal of Personality and Social Psychology, 75*(4), 887-900.

Kisley, M. A., Wood, S., & Burrows, C. L. (2007). Looking at the sunny side of life: Age-related change in an event-related potential measure of the negativity bias. *Psychological Science, 18*(9), 838-843.

Klackl, J., Jonas, E., & Kronbichler, M. (2013). Existential neuroscience: Neurophysiological correlates of proximal defenses against death-related thoughts. *SCAN, 8*, 333-340.

Landau, M. J., Greenberg, J., Solomon, S. Pyszczynski, T., & Martens, A. (2006). Windows into nothingness: Terror Management, meaninglessness, and negative reactions to modern art. *Journal of Personality and Social Psychology, 90*(6), 879-892.

Lang, F. R. & Carstensen, L. L. (2002). Time counts: Future time perspective, goals, and social relationships. *Psychology and Aging, 17*(1), 125-139.

Navarette, C. D., Kurzban, R., Fessler, D. M. T., & Kirkpatrick, L. A. (2004). Anxiety and intergroup bias: Terror management or coalitional psychology? *Group Processes & Intergroup Relations, 7*(4), 370-397.

Norenzayan, A., & Hansen, I. G. (2006). Belief in supernatural agents in the face of death. *Personality and Social Psychology Bulletin, 32*(2), 174-187.

Ramírez-Maestre, C., Esteve, R., & López-Martínez, A. (2014). Fear-avoidance, pain

    acceptance, and adjustment to chronic pain: A cross-sectional study on a sample of 686

    patients with chronic spinal pain. *Annals of Behavioral Medicine, 48*, 402-410.

Rehmert, A. E., & Kisley, M. A. (2013). Can older adults resist the positivity effect in neural

    responding? The impact of verbal framing on event-related brain potentials elicited by

    emotional images. *Emotion, 13*(5), 949-959.

Rosenblatt, A., Greenberg, J., Solomon, S., Pyszczynski, T., & Lyon, D. (1989). Evidence for

    terror management theory: I. The effects of mortality salience on reactions to those who

    violate or uphold cultural values. *Journal of Personality and Social Psychology, 57*(4),

    681-690.

Routledge, C., & Arndt, J. (2002). Creative terror management: Creativity as a facilitator of

    cultural exploration after mortality salience. *Personality and Social Psychology, 35*(4),

    493-505.

Routledge, C., Arndt, J., Sedikides, C., & Wildschut, T. (2006). A blast from the past: The terror

    management function of nostalgia. *Journal of Experimental Social Psychology, 44*, 132-

    140.

Schimel, J., Simon, L., Greenberg, J., Pyszczynski, T., Solomon, S., Waxmonsky, J., & Arndt, J.

    (1999). Stereotypes and terror management: Evidence that mortality salience enhances

    stereotypic thinking and preferences. *Journal of Personality and Social Psychology,

    77*(5), 905-926.

Schmeichel, B. J., & Martens, A. (2005). Self-affirmation and mortality salience: Affirming

    values reduces worldview defense and death-thought accessibility. *Personality and Social

    Psychology Bulletin, 31*(5), 658-667.

Silveira, S., Graupmann, V., Frey, D., Blautzik, J., Meindl, T., Reiser, M., Chen, C., Wang, Y.,

Bao, Y., Pöppel, E., & Gutyrchik, E. (2012). Matching reality in the arts: Self-referential

neural processing of naturalistic compared to surrealistic images. *Perception, 41*(5), 569-

576.

Silveira, S., Gutyrchik, E., Wetherell, G., Bao, Y., Pöppel, E., Blautzik, J., Reiser, M., Frey, D.,

& Graupmann, V. (2014). Ceci n'est pas la mort: Evidence for the recruitment of self-

reference from surrealistic art under mortality salience. *European Journal of Social*

Psychology. http://dx.doi.org/10.1002/ejsp.2076.

Simon, L., Greenberg, J., Harmon-Jones, E., Solomon, S., Pyszczynski, T., Arndt, T., & Abend,

T. (1997). Terror management and cognitive-experiential self-theory: Evidence that terror

management occurs in the experiential system. *Journal of Personality and Social*

Psychology, 72(5), 1132-1146.

Trafimow, D., & Hughes, J. S. (2012). Testing the death thought suppression and rebound

hypothesis: Death thought accessibility following mortality salience decreases during a

delay. *Social Psychological and Personality Science, 3*(5), 622-629.

Vaes, J., Heflick, N. A., & Goldenberg, J. L. (2010). We are people: Ingroup humanization as an

existential defense. *Journal of Personality and Social Psychology, 98*(5), 750-760.

Van Tongeren, D. R., & Green, J. D. (2010). Combating meaninglessness: On the automatic

defense of meaning. *Personality and Social Psychology Bulletin, 36*(10), 1372-1384.

Wood, S., & Kisley, M. A. (2006). The negativity bias is eliminated in older adults: age-related

reduction in event-related brain potentials associated with evaluative categorization.

Psychology and Aging, 21(4), 815-820.

Appendix A: "The Growing Stone" Distraction Task

"The Growing Stone" (Camus, 1957) distraction task:

Please read the following short passage from a novel and answer the questions below it.

The automobile swung clumsily around the curve in the red sandstone trail, now a mass of mud. The headlights suddenly picked out in the night—first on one side of the road, then on the other—two wooden huts with sheet metal roofs. On the right near the second one, a tower of coarse beams could be made out in the light fog. From the top of the tower a metal cable, invisible at its starting-point, shone as it sloped down into the light from the car before disappearing behind the embankment that blocked the road. The car slowed down and stopped a few yards from the huts.

The man who emerged from the seat to the right of the driver labored to extricate himself from the car. As he stood up, his huge, broad frame lurched a little. In the shadow beside the car, solidly planted on the ground and weighed down by fatigue, he seemed to be listening to the idling motor. Then he walked in the direction of the embankment and entered the cone of light from the headlights. He stopped at the top of the slope, his broad back outlined against the darkness. After a moment he turned around. In the light from the dashboard he could see the chauffeur's black face, smiling. The man signaled and the chauffeur turned off the motor. At once a vast cool silence fell over the trail and the forest. Then the sound of the water could be heard.

The man looked at the river below him, visible solely as a broad dark motion flecked with occasional shimmers. A denser motionless darkness, far beyond, must be the other bank. By looking fixedly, however, one could see on that still bank a yellowish light like an oil lamp in the distance. The big man turned back toward the car and nodded. The chauffeur switched off the lights, turned them on again, then blinked them regularly. On the embankment the man appeared and disappeared, taller and more massive each time he came back to life. Suddenly, on the other bank of the river, a lantern held up by an invisible arm back and forth several times. At a final signal from the lookout, the man disappeared into the night. With the lights out, the river was shining intermittently. On each side of the road, the dark masses of forest foliage stood out against the sky and seemed very near. The fine rain that had soaked the trail an hour earlier was still hovering in the warm air, intensifying the silence and immobility of this broad clearing in the virgin forest. In the black sky misty stars flickered.

How do you feel about the overall descriptive qualities of the story?

    1   2   3   4   5   6   7   8   9

not at all   somewhat   very

descriptive   descriptive   descriptive

Do you think the author of this story is male or female?

_____ male   _____ female

Appendix B: Thought Accessibility Measure

Thought accessibility measure:

We are simply pre-testing this questionnaire for future studies. Please fill letters in the blanks to create the first complete word that comes to mind, and type this complete word in the space provided below each word fragment. Some words may be plural, and all letters are capitalized.

BUR _ _ D   CHA _ _

_ I _ UTE   KI _ _ ED

_ _ OK   FI _ _ _ E

L _ M _ _   TAB _ _

DE _ _   C _ _ CK

MU _ _   SK _ _ L

SH _ RT   TR _ _

B _ T _ LE   P _ P _ R

CO _ _ SE   COFF _ _

P _ _ TURE   _ O _ SE

SEC _ _ _   _ O _ ENT

GRA _ _   M _ _ N

K _ _ GS

Appendix C: Art Images

Naturalistic Painting:
"Summertime" by
Edward Hopper

Surrealistic Painting:
"Heavenly Fruits" by
Vladimir Kush

Minimalist Painting:
"Taupe" by
Justin Page Wood