

Terror Management Theory and Entrepreneurship Fear and Decision Making

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ABSTRACT

Terror management theory is a macropsychological theory that investigates the cognitive processes of individuals exposed to their own mortality. The perspective suggests that terror management theory could explain a number of decision-making behaviors in entrepreneurs. In this study, we propose that entrepreneurs respond similarly to firm-failure salience as they would to mortality salience, and, in particular, would make more risk-averse decisions. Secondly, we test whether the moderating effect posited by terror management theory—that of self-esteem between mortality salience and a more risk-averse culture worldview—parallels with entrepreneurial self-efficacy as a moderator in the relationship between firm-failure salience and risk-averse attitudes.

Keywords: Terror management theory; cognitive bias; entrepreneurship

JEL Codes: L26, G41

Introduction

While the United States economy is cyclical, the magnitude of negative GDP 2008–2009 has not been seen since the Great Depression of the 1930s (The Financial Forecast Center, 2012). Business bankruptcies experienced a 52% increase from 2008 to 2009, equating to over 60,000 businesses (American Bankruptcy Institute, 2012). Since 2009, more businesses have closed than have started up annually—for the first time in 35 years (Clifton, 2015). Given such an economic environment, our current study investigates the question, “To what extent might environmental cues trigger cognitive biases and influence key business-related decisions?” We examine this issue via entrepreneurs—key players in growing the economy.

This research focuses on biases encountered in threat management, particularly in entrepreneurial decision making. Entrepreneurs were selected as the focus of the study due to (a) their inherent and intimate bonds to their entrepreneurial firm, (b) their unique decision-making capabilities, and (c) the importance of entrepreneurial firms to the economy. Importantly, there continue to be different views on whether threats to survival are likely to prompt greater risk or inertia (Holland & Shepherd, 2013) by entrepreneurs. Combining prospect and behavioral theory, recent work (Wennberg, Delmar & McKelvie, 2016) has indicated that for very new firms, emphases on survival reference points lead to greater exit behavior by entrepreneurs. In this paper, we add insights from terror management theory (TMT) in psychology to expand upon explanations for changes in risk behavior by entrepreneurs.

Our study bridges management fields and expands on the importance of behavioral strategy (cf. December 2011 special issue of *Strategic Management Journal*) by examining the salience of firm failures to prompting risk-averse decision responses. As indicated by Powell, Lovullo, and Fox, (2011), behavioral strategy merges cognitive and social psychology to strengthen the empirical integrity and practical usefulness of strategy theory. Additionally, behavioral strategy grounds strategic management in realistic assumptions about human cognition, emotion, and social interaction (Powell et al. 2011).

The use of psychology is not new in studies of strategic management. As identified by Powell et al. (2011), many perspectives draw from this discipline: behavioral decision research, the behavioral theory of the firm, attention and the attention-based view, hubris, corporate entrepreneurship at the firm level, and top management teams.

We examine the idea that the unique threat of “death awareness”—a concept covered abundantly in psychology under the umbrella of “terror management theory” and which pertains to the death of persons—may have its own analog, as well as similar behavioral consequences, when applied to the entrepreneurial context. In the following sections we provide background on the phenomenon, theory, and develop hypotheses. We then discuss our methods, provide results and offer our perspective on their implication in our discussion and conclusion.

Background

Cognition, Threat, and Decision Making

Bounded-rationality theory (Simon, 1947) asserts that in rational decision-making, an individual’s rationality is limited by the availability of information, cognitive limitations, and a finite amount of time. A more traditional interpretation (Simon, 1955) suggests that an individual’s limited resources (i.e., time and cognitive load) in problem solving will lead to decisions that deviate from those calculated under rational criteria and with complete information. Bounded-rationality theory is a major deviation from reigning decision-making theory; it is welcome, however, because it both improves theorizing and highlights the shortcomings of assumptions from “unbounded” rationality that are actually ineffective (Mullainathan & Thaler, 2000).

Consequently, multiple lines of research seek out predictable shortcomings (e.g., Baron, 2000; Simon, Houghton & Aquino, 2000), and more recently, the advantages (Artinger, Petersen, Gigerenzer & Weibler, 2014) of bounded decision making. Of special note related to the entrepreneurial context, is the wide range of cognitive biases that can affect the decision to take a risk, notably elucidated by

Tversky and Kahneman (1981). For instance, both assumed probabilities, and their impact on loss or gain strongly impact entrepreneurial risk taking (Block, Sandner & Spiegel, 2013). Accordingly, the role of heuristics and biases in decision-making processes hold a central place in Sheperd, Williams and Patzelt's (2015) extensive review and model of the research agenda for entrepreneurial decision making.

Additionally, a considerable body of research indicates that threats existing in the business environment may alter decision-making behaviors. Staw, Sandelands, and Dutton (1981) introduced the idea of "threat rigidity" to management research drawing comprehensively from various fields (e.g., psychology, sociology, management), and applications at different levels of analysis. Threat rigidity refers to the likely decision-making consequences when organizations are under threat or in crisis; in particular, it denotes inclinations to more firmly focus on the one capability they do well, and curtail other new, or ancillary initiatives (Staw et al., 1981). Theoretically, such decision-making responses were considered analogous to how individuals in a threatening situation produce the most well-learned or dominant response (Staw et al., 1981). While some of the constructs associated with threat rigidity (Staw et al., 1981) are similar to constructs in terror management literature—including a definition of crisis (Staw et al., 1981, p. 511) as a "major threat to system survival"—TMT focuses on the 'why' of behavior using a framework dominant after 1981.

We argue TMT provides a unique addition to threat rigidity insights, as its tenets suggest that risk-averse behaviors can be induced in environments where *other* firms are under the pressure or threat of possibly failing. By including the terror management perspective as a cognitive bias, this research hypothesizes that potentially irrelevant economic environmental information can systematically influence decisions to veer away from tenets of rational choice. Below, we expand on this perspective in psychology.

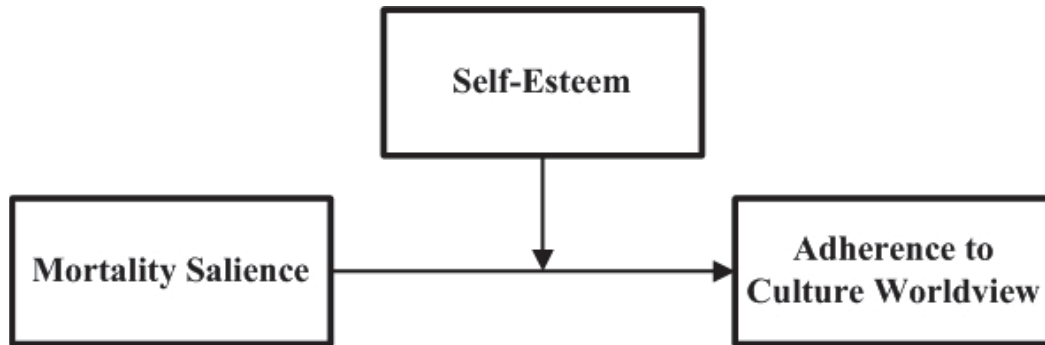
Terror Management Theory

Terror management theory (Greenberg, Pyszczynski, & Solomon, 1986) is a macro psychological theory that unifies what was a highly-fragmented set of social psychology theories into an overarching framework. Drawing heavily from Becker's work, Pyszczynski (2004) stated that:

“What fascinated us about these [Becker's] books was that Becker had some ideas about why some of the motives that we social psychologists took for granted exist—what they do for us, what functions they serve. So we took Becker's ideas and combined them with the ideas that had been coming out of experimental laboratories in social, cognitive, clinical, and developmental psychology and brought in a good measure of the newly emerging field of evolutionary psychology. We then came up with what we referred to as Terror Management Theory. “ (p. 828)

Central to TMT (Greenberg et al., 1986) is the fact that humans can fathom their own eventual mortality. Furthermore, humans can anticipate the future, and imagine dying in old age when their bodies fail. This awareness of the inevitability of death is a complex type of knowledge of life and reality (Pyszczynski, Greenberg, Solomon, and Maxfield 2006; Pyszczynski, Solomon & Greenberg, 2015). As a consequence, people fight mortality by attempting to live as long as possible—this need is thought to lead to a paralyzing, or “existential terror”—hence, the label “terror management theory” (Pyszczynski et al., 2006, 2015). Fundamentally, TMT posits conscious thoughts of death cause cognitive distress which, in turn, produce unbearable terror. Contrary to a “fight or flight” response to immediate danger, individuals are hypothesized to respond consistent with (1) the mortality-salience hypothesis and (2) the anxiety-buffer hypothesis (see Figure 1).

Figure 1 *Terror Management Theory Model*



Mortality salience promotes adherence to a more conservative worldview (Greenberg et al., 1986), spurring lower scores on cognition tasks pertaining to creativity (Routledge, Arndt, Vess, & Sheldon, 2008). Notably, Grant and Wade-Benzoni (2009) applied mortality awareness to the arena of organizational work-related behaviors and argued that mortality salience drives both stress-related withdrawal behaviors and prosocial generative behaviors. Past literature has indicated that organizational decline (Latham & Braun, 2009) and downsizing (Mellahi & Wilkinson, 2008) can have a stifling effect on innovation. In the current study, we examine the consequences to entrepreneurship if a similar type of salience—based on the mortality “of businesses”—leads an entrepreneur to biased thoughts and actions aimed toward taking less risky business decisions.

The Mortality-Salience Hypothesis

Mortality salience describes the awareness of an individual’s eventual death (Greenberg et al., 1986). Terror management theory hypothesizes that as death is made salient, individuals increasingly value their own cultural worldview (Pyszczynski, 2004, p. 828). Experiments tend to manipulate mortality salience with supraliminal priming using two short, open-ended questions which raise respondents’ awareness of eventual death (Arndt, Greenberg, & Cook, 2002a). In fact, by 2002, over 90 studies had employed the effects of the supraliminal priming method (Arndt et al., 2002a).

Greater adherence to one's own cultural worldview in the face of mortality salience is thought to provide purpose, structure, and meaning to what may be perceived as a chaotic and uncertain existence. Pyszczynski, Greenburg, Solomon, Arndt, and Schimel, (2004) argued that TMT explores two internal questions: (1) What is the validity of the individual's cultural worldview; and (2) Is the individual living up to the standards that are part of that worldview?

In sum, during periods of increased mortality salience, individuals increase their need for cultural structure. This can be termed as a tendency to engage in more "conservative" behaviors, (not to be confused with political ideologies) described as "tending or disposed to maintain existing views, conditions, or institutions; marked by or relating to traditional norms of taste, elegance, style, or manners" (Merriam-Webster, 2010). Consequently, primed individuals are less likely to take risks, so as to conform with existing views and institutions, as individuals do not want to deviate from culturally predominant worldviews. Indeed, individuals primed with mortality salience that then deviate from cultural norms experience higher feelings of guilt (Arndt, Greenberg, Solomon, Pyszczynski, & Schimel, 1999). Interestingly, recent neural research further supports that existential threat priming appears to activate the part of the cortex associated with behavioral inhibitions (Klackl, Jonas & Fritsche, 2018).

Conversely, high mortality salience leads to unusually positive reactions to stimuli supporting the cultural worldview, while prompting unusually negative reactions to culture-threatening stimuli (Mandel & Heine, 1999). Empirically supported across a wide range of settings, studies find that individuals violating cultural worldviews in periods of mortality salience are more harshly judged, more aggressively treated, and pushed to socially conform (Arndt et al., 1999). Individuals experiencing anxiety from mortality salience also generate fewer varied choices in decision situations, theoretically due to their desire for stability (Huang & Wyer, 2015).

Importantly, "cultural worldview" is defined subjectively, and thus mortality-salient responses align idiosyncratically to a respondent's cultural worldview. When examined based on the level of

analysis of national culture, for instance, a Mexican American would revert to a belief system consistent with Mexican culture, while a Canadian would show more patriotic or nationalistic beliefs reflective of Canadian culture (Arndt, Greenberg, Schimel, Pyszczynski, & Solomon, 2002b). Similarly, both the psychology and strategy literature have empirical findings suggesting that group-focused emotions can elicit identification with one's salient social identities (Huy, 2011).

While mortality salience is the central trigger for terror management responses, a key theoretical feature is the reasoning that anxiety is induced by the existential reflection on one's own mortality. As a result, studies have sought to discover just what mechanisms might serve to cushion this anxiety, which leads to the second tenet of terror management.

The Anxiety-Buffer Hypothesis

The anxiety-buffer hypothesis poses that self-esteem, i.e. individuals' personal beliefs about themselves, acts as a short-term buffer which insulates individuals from the fear associated with mortality salience (Pyszczynski, 2004). Self-esteem assessments encompass variables relating to one's self-worth, beliefs, emotions, skills, abilities, social relationships, and future outcomes (Baumeister, 1998; Coopersmith, 1967). By enhancing their self-esteem, individuals are thought more capable of reaching their long-term goals and protecting themselves against the fear of mortality (Pyszczynski, 2004).

Consequently, strengthening self-esteem should make an individual less prone to exhibit anxiety or anxiety-related behavior in response to threats (Schmeichel & Martens, 2005), while weakened self-esteem makes an individual more prone to anxiety-related behaviors in the face of threat (Harmon-Jones, Simon, Greenberg, Pyszczynski, Solomon, & McGregor, 1997). Studies have confirmed that the effects of anxiety are lowered when self-esteem is boosted by giving positive feedback on a personality test (Greenberg, et al., 1992), or by contemplating the ability to pursue work (Yaakobi, 2015).

Additionally, there is evidence that high levels of self-esteem reduce anxiety and the associated defensive behaviors (Pyszczynski et al., 2004).

Hypothesis Development

In contrast to substantial evidence from the threat-rigidity literature which identifies how direct threats to an organization can affect decision-making, less is known as to whether the dawning awareness of a type of mortality salience of other organizations might similarly affect decision-making consistent with TMT. Insights and progress from behavioral strategy signal continued interest in elaborating how risk and choices play out in decision making (Hu, Blettner, & Bettis, 2011), and here we consider whether the cued mortality of other firms could elicit similar responses to that of threat rigidity (for the focal firm). We consider several constructs as analogs for this investigation: a prime for the behavior (salience of firm deaths), precise behavioral changes that might be predicted (risk-averse decisions), and a moderator for the behavior (some form of self-esteem). Importantly, this perspective highlights that risk-averse responses based on firm-mortality salience may not be correlated with *actual* risk. As economies respond to negative shocks, a terror management perspective suggests the repercussions could be long lasting and more pervasive than indicated by actual bankruptcies (or firm “deaths”) due to their impact on the surviving organizations.

Entrepreneurial Firm Identification

The comparison of mortality salience to entrepreneurial behavioral responses reflects the tendency for entrepreneurs to ascribe personal, anthropomorphic, and intimate relationships to their firms. A search of the terms “my business is my baby” via the search engine Google in 2018, results in over 91,000 articles containing this exact phrase. As one small-business advisor explained, “I find that many owners have a hard time making the shift to thinking of their business as an asset, rather than as their ‘baby’” (Taylor, 2010, p. 1).

Examining potential anthropomorphizing is not new for strategy literature. The anthropomorphic quality of threat rigidity is central to the macro-level propositions of Staw et al. (1981), where they drew from threat research based on individuals and groups. They also suggested that anthropomorphism may result from the fact that organizational actions are often initiated by individual and group forces, such that social and psychological effects at these levels of analysis indirectly influence organization-level phenomena (Staw et al., 1981, p. 501).

Similarly, organizational identification has been a prominent construct for over two decades in the organizational-behavior literature, affecting both individual satisfaction and organizational effectiveness (Bauer, Bodner, Erdogan, Truxillo, & Tucker, 2007). This incorporation of a firm into one's self-identification conforms to social identity theory (Ashforth & Mael, 1989). Van Knippenberg and van Schie (2000) similarly indicated that a significant portion of an individual's identity derives from their employment; employment can give an individual their key personal identity (Warr, 1982). Indeed, when individuals strongly identify with an organization, the attributes they use to define the organization also defines them (Dutton, Dukerich, & Harquail, 1994). Accordingly, work identity plays a central role in individuals' identification, and can impact self-esteem (Reitzes & Mutran, 2002). The impact of identity may be especially prominent for understanding entrepreneurial behavior (Gruber & MacMillan, 2017).

Entrepreneurial Firm Failure and Threat Management: Risk-Averse Tactics

Unfortunately, it is in poor economic climates that firm failures are most salient, yet it is precisely these environments which are in most need of entrepreneurial creativity and innovation. The current study suggests in the face of publicized bankruptcies, entrepreneurs will tend to conform to the conservative, risk-averse consensus and become more likely to adopt industry norms or best practices. By definition, best practices represent industry standards that should only generate competitive parity as competitors replicate practices across organizations, however. Moore (1993) indeed argued against this model when addressing issues of necessary co-evolution: an organization figures out how to self-

renew, or it can expect death. As Moore (1993) stated, “The only truly sustainable advantage comes from out-innovating the competition” (p. 75).

The “death” analog is especially compelling for business, as the term “death” is often used to describe the unwanted demise of a business (Box, 2008). Terror management theory connects the entrepreneurial parallel of mortality with business death. To the extent that business failure leads to a type of analogical effect of mortality salience for entrepreneurs, an entrepreneur’s decision-making behavior is likely to shift from risky to excessively conservative.

Drawing from TMT, then, our model predicts that environments which advertise, or make salient, the occurrence of firm bankruptcies and closures (or “deaths”) will affect the responses of entrepreneurs to risk, and change their decision making. Specifically, entrepreneurs facing increased mortality salience of other firms (i.e., firm-failure salience) are likely to increase their risk-averse behaviors. The model is depicted in Figure 2.

Figure 2 Proposed Firm Failure, Risk-Averse Attitudes, and Self-Efficacy Model



We test this proposition with the following hypotheses:

Hypothesis 1a (Firm-failure and innovation): Entrepreneurs that experience firm-failure salience will have a greater drop in scores on the innovation scale than entrepreneurs that do not experience firm-failure salience.

Creativity is often defined as a new or novel idea; conversely, innovation references the action taken on the new or novel idea (Amabile, 1998). In other words, innovation acts more as ‘applied creativity.’ To understand whether mortality salience only affects intended behaviors, or whether it actually impacts mental processes related to creativity, we also explore:

Hypothesis 1b (Firm-failure and creativity): Entrepreneurs that experience firm-failure salience will have a greater drop in their change scores on the creativity scale than entrepreneurs that do not experience firm-failure salience.

Entrepreneurial Self-Efficacy as a Moderator of Firm-Failure Salience

Self-efficacy, a construct related to self-esteem, provides a compelling analog for testing the second aspect of the anxiety-buffer hypothesis. Whereas self-esteem is an individual’s overall personal beliefs about him/herself, self-efficacy is the measure of one’s own competence to complete particular tasks and reach goals (Bandura, 1977). Entrepreneurial self-efficacy, in particular, taps an individual’s beliefs that they can successfully pursue entrepreneurial behavior (Boyd and Vozikis, 1994). Elaborating earlier work by Robinson, Stimpson, Huefner, and Hunt (1991), the entrepreneurial self-efficacy construct has been established repeatedly as a predictor of entrepreneurial intent and activity (McGee, Peterson, Mueller, & Sequeira, 2009). Extending the anxiety buffer logic, we argue that entrepreneurial self-efficacy may offer a moderating effect on firm-failure salience responses, similar to the role of self-esteem for mortality salience. As we do not have a priori reasons for believing self-efficacy will differ across our variable, we propose the following two hypotheses:

Hypothesis 2a: Entrepreneurial self-efficacy moderates the relationship between firm-failure salience and risk-averse attitudes such that entrepreneurs with greater entrepreneurial self-efficacy will score higher on the innovation scale than entrepreneurs that have lower entrepreneurial self-efficacy.

Hypothesis 2b: Entrepreneurial self-efficacy moderates the relationship between firm-failure salience and risk-averse attitudes such that entrepreneurs with greater entrepreneurial self-efficacy will score higher on the creativity scale than entrepreneurs who have lower entrepreneurial self-efficacy.

Next, we describe the methods and analyses, followed with our findings and discussion.

Methodology

Details of the Study Participant Sample

Entrepreneurs were recruited from various outlets—including conferences, entrepreneurship-assistance organizations, word of mouth, and online social networks. A total of 189 respondents participated during the data-collection phase, and were required to self-identify as entrepreneurs, with seven or fewer years of entrepreneurial experience. Reynolds (2006, p.85) argues that businesses still in the start-up process after seven years have approached the firm-creation process as “casual hobbyists—not pursuing a new firm as a serious career option.” Of the 186 study participants, 77 (41.4%) were dropped due to responses that did not meet the status or time conditions, leaving 109 (58.6%) participants: 52 participants were in the firm failure salient group and 57 in the control group.

Measures

Survey instrument design. The survey used an online platform and experimental design methodology to control for differences between experiment groups. Respondents logged onto a survey website and were randomly assigned to either the control or experimental group, allowing us to evaluate within population effects. The current study was designed to be completed in 15 minutes or less, thus we prioritized decreasing survey response time. To make the survey easier wherever possible, all questions were converted to a 7-point Likert-type scale. The final set of questionnaires were pilot tested on a different sample. The aim was to eliminate questions which had the least reduction from the original scale’s Cronbach’s α levels. Decreasing the number of questions reduced overall survey time.

All respondents answered demographic, firm identification, and personality questions that were measured as potential controls for the relationship under investigation. They also filled out a pre-test creativity and innovation measure. Respondents were then asked to read a scenario which was either primed with a firm-mortality salience text, or with neutral text (independent variable). After reading the scenarios, the respondents were asked again about their entrepreneurial self-esteem, and were tested on the dependent variable scales of innovation and creativity. We expand on each of the variables below.

Sample validity check: entrepreneurship status. A 4-part question determined if an individual qualified as an entrepreneur for this study, indicating that they had started, or seriously considered starting, a firm or nonprofit agency within the last seven years.

Dependent variables. The proposed responses to firm-failure salience were tested against three different scales: creativity, innovation and expansion activity. The innovation scale was drawn from the innovation subscale from Robinson et al. (1991) that measures four aspects of entrepreneurial attitudes (EAO).

A modified version of the creativity-assessment packet developed by Williams (1993) was used to measure creativity. The creativity-assessment packet is a generally accepted and widely used instrument and it tests for four different dimensions of creativity: curiosity, complexity, imagination and risk-taking. Respondents answered the creativity assessment both before and after the experiment.

The Cronbach's α level for all scales are listed in Table 1.

Table 1: Reliability (Cronbach's α) Summary Table

Scale	Number of Questions	α
State-Trait Anxiety Inventory, Trait	5	.796
BFI Neuroticism	4	.883
BFI Openness	5	.883
Entrepreneur Attitude Orientation Self-Efficacy	14	.688
State-Trait Anxiety Inventory, State pre-test	7	.799
Entrepreneur Attitude Orientation Innovation	5	.729
Creativity Assessment Packet, pre-test	18	.723
State-Trait Anxiety Inventory, State post-test	3	.912
Entrepreneur Attitude Orientation, Innovation post-test	3	.819
Creativity Assessment Packet, post-test	12	.893

Independent variable: firm-failure salience. The scenario methodology is a common experimental approach and has long been used for strategic decision making in particular (cf. Walsh, 1988). The experimental manipulation was composed of two different vignettes that control or prime for the independent variable of firm-failure salience. The vignette or scenario approach allows researchers to prime for an experimental condition without subjects being made aware of the hypotheses and cognitive biases of interest to the research.

The firm-failure salience vignette was written to model the traditional mortality-salience construct in that the subject is being 'primed' about death; however, firm failure (not individual mortality) salience was primed. In order to control for questionnaire structure and length, control respondents were also provided a vignette, but their story was designed to have a neutral effect covering business and development. In addition to the State-Trait Anxiety Inventory (STAI) scale (Spielberger, Gorsuch, & Lushen, 1970), five questions followed the vignette to serve as an experimental check that the vignette was read and understood by the participant.

Moderator variable. The entrepreneurial self-efficacy scale was drawn from the subscale from Robinson et al. (1991) measuring EAO. For this study we used the self-esteem subscale in the EAO.

Control variables. Eight common demographic items associated with differences in interest pursuant to entrepreneurship were measured as controls for the current study. Specifically, gender, age, ethnicity, socioeconomic status, employment, and work history have all been shown to be related to entrepreneurship (Startiene & Remeikiene, 2009).

Neuroticism and openness to experience were measured as additional controls; openness is highly related to creativity (Feist, 1998) and neuroticism is related to self-reports of self-esteem and self-efficacy (Judge, Erez, Bono, & Thoresen, 2002). Scales were drawn from a shortened version of the 240-item NEO-PI-R that measures interpersonal, motivational, emotional, and attitude styles of adults and adolescents (McCrae, Kurtz, Yamagata, & Terracciano, 2011).

The 40-item STAI assesses anxiety symptoms in adults. The STAI is one of the most frequently used self-report questionnaires and has become a standard international measure of anxiety (Spielberger, 2004). The STAI contains two scales (i.e., S scale, T scale). The questions on the S scale are designed to evaluate how participants feel at the moment (e.g., state anxiety), and the questions on the T scale examine how respondents feel in general (e.g., trait anxiety).

The state scale was tested twice: pre-test and post-test. This pre-test/post-test procedure was employed in order to evaluate if the experiment caused a change in state anxiety; additionally, trait anxiety was measured as a possible control variable.

Procedure

The entire study was conducted online and opened with a consent form. Participants answered the questions in the following order: entrepreneurial status, demographics, state and trait anxiety, personality, business self-efficacy, innovation, and creativity. Additionally, some information was automatically created and stored, such as the date and time of participants' entrance into the survey site and completion of surveys.

Following the above questions, participants read (1) the vignette that outlined an entrepreneur's realization that other businesses are currently experiencing financial difficulties and will be forced to close permanently due to financial issues or (2) a neutral article on business process and research. After reading the vignette, study participants were asked to answer reduced versions of the following assessments: innovation, creativity, and experimental checks. Finally, participants were debriefed and allowed to make comments via open-ended questioning.

Data Analysis

The means, standard deviations, and correlations of all variables were computed for the instruments used in the current study; additionally, a change score was calculated for all pre-test and post-test instruments. In an experimental study, the change score supports the inferences that the differences noted were affected by the experiment. Additionally, since a change score denotes a modification in the score, differences in starting values between the groups (e.g., failure of sufficient randomization) can still be calculated and inferences made. An analysis of variance (ANOVA) was used to test for significant differences between group means, which was the basis of all of the study's hypotheses. A major advantage of ANOVA over other forms of correlational statistics (e.g. regressions, structural-equation modeling) is that the ANOVA family of statistics increases statistical power by reducing within-group error variance. While the analysis of covariance (ANCOVA) design allows for the removal of noise or error introduced by the covariates, items violated necessary assumptions of normality, independence, and homogeneity of variances and covariances, requiring the ANOVA. Homogeneity of variance was tested with multiple versions of Levene's test (e.g., a median and a non-parametric test method). All scales were converted to z-scores, no normalization was done on the altered (reduced and Likert scaling changed) scales, thus any scalar reference should not be assumed.

Results

An experimental design was used for the current study with participants randomly assigned to either a firm-failure salience condition or the control condition. T-tests were run on demographic differences between the two groups to assess the random assignment of participants. Significant differences were noted for socioeconomic status ($p = .037$) and years in the workforce ($p = .046$); the other results were $p > .10$. Pre-test t -test analysis indicated a surprising, and potentially confounding, statistically significant difference between the control and experimental pre-test scores on innovation ($p = .021$). There was a moderately statistical ($p = .061$) difference in change score for state anxiety with a mean difference of .280, with the experiment being the lower score as expected. This suggests our experiment did work to prime firm-failure salience.

Post-Test Questionnaire Analysis

An examination of post-question correlations assured that the theoretical underpinning of the constructs in the current study continue to be coherent for both samples. Specifically, the correlations between scales where there is an expected relationship are present: innovation was highly correlated with creativity $r(108) = .74, p = .000$ and state anxiety $r(108) = .35, p = .000$. High correlation and statistical significance were expected for both variables (Sarooghi, Libaers, & Burkemper, 2015; Sanchez-Ruiz, Pérez-González, Romo, & Matthews, 2015). These strong correlations persist for both the control and experimental groups.

Hypothesis Testing

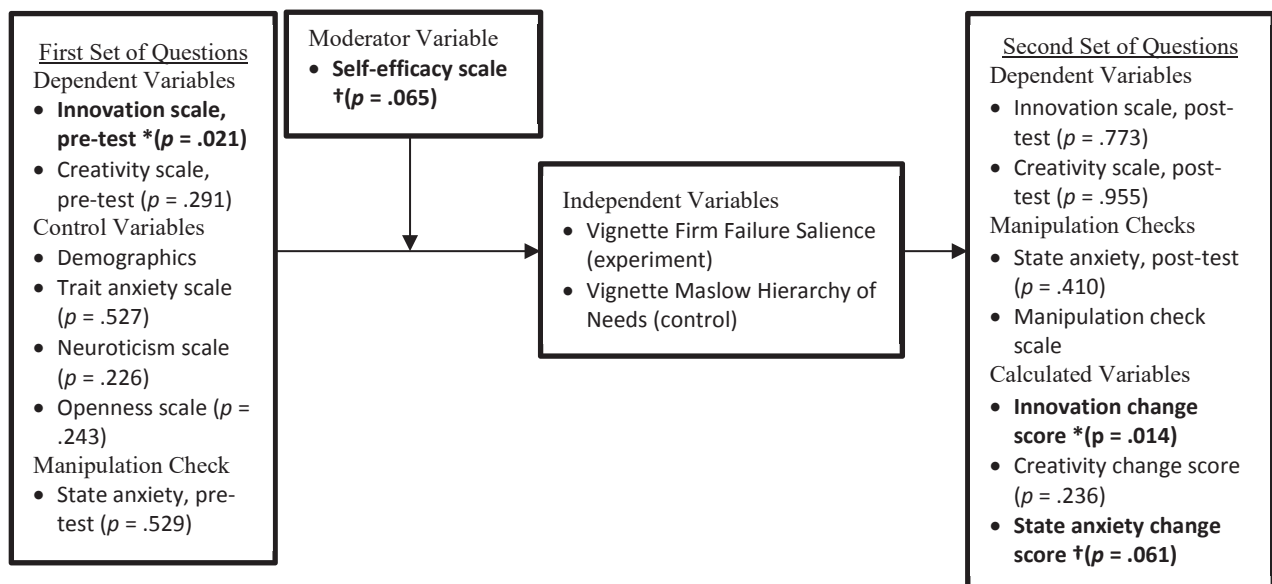
To test the firm-failure salience and innovation hypothesis (hypothesis 1a) we ran an ANOVA on the innovation change score, which was derived from the pre-test and post-test innovation scores for participants in the firm-failure salience group and control group. The results indicate a significant difference in innovation scores between participants in the control group and the firm-failure salience

group, $F(1, 107) = 6.21, p = .014$. An examination of the means shows that manipulation group ($M = -.200$) was more likely to rate innovations questions lower than the control group ($M = .183$)

To test the firm-failure salience and creativity hypothesis (hypothesis 1b) we ran an ANOVA on the creativity change score, which was calculated from the pre-test and post-test creativity scores for participants in the firm-failure and control group. The ANOVA did not show a significant difference between the firm-failure group and the control group on creativity scores, $F(1, 107) = 1.42, p = .236$. Although there is a mean difference of .22 (z score value) between groups on creativity scores, the groups were not significantly different on this measure of creativity.

Results for hypothesis 2 did not show a moderating relationship for entrepreneurial self-efficacy and was not supported. To determine if entrepreneurship self-efficacy moderated the relationship between firm-failure salience and the dependent variables innovation (2a) and creativity (2b) an ANOVA was used. The moderating interaction term was not significant in all three cases (respectively $F(1, 108) = .50, p = .470$; and $F(1, 105) = .21, p = .651$).

Figure 4. Firm-Failure Salience-Tested Model



This study offers initial theory and limited evidence that TMT may act as an analog for responses by entrepreneurs exposed to a priming of firm failure. One of the two dependent variables were statistically significant at the $p \leq .05$ level (1a) and the second (1b) was not found to be significant ($p = .236$). The hypothesized moderated relationships were not found; this is discussed in greater detail below.

Discussion and Conclusion

We found a significant result for those respondents primed by a firm-mortality salience vignette—that is, to experience a negative change in the innovation scale but we did not see a change for the creativity scale. The change in innovation happen, but the lack of change in creativity (since it is considered necessary for innovation) is very interesting. Advances in the discipline, and recent publications in the theoretical domain of creativity, may help explain why the hypothesis 1b, for creativity, was not supported. In retrospect, creativity as tested here may be better characterized as a trait variable which leads to consistent and persistent behavior—consistent with most operational and theoretical definitions— and thus unlikely to be responsive to changes in state conditions. Indeed, recent research indicates that for individuals with a high level of creativity, pursuing creative achievement may actually have an anxiety-buffering impact their mortality salience (Perach & Wisman, 2018). This research has found results similar to current up to date research. Additionally, this leads to a better understanding of the casual chain. Even though we do not fully understand the casual chain between personality and individual traits, creativity, and innovation, the above research suggest it is the ‘action’ part of innovation (i.e. the behavior thinking part) of innovation that was affected, not the creativity part (the thinking of new or novel ideas).

The following three items cannot be addressed with this study but should be rather straightforward to examine in follow-up research. First, accordingly, it may be that creativity is unlikely to move in the face of primes such as firm-mortality salience. Similarly, in a meta-analysis of the

relationship between state/trait anxiety and creativity (Byron and Khazanchi, 2011), state anxiety ($ES = -.028$) had a much smaller effect than trait anxiety ($ES = -.166$) on creativity. We estimated similar power for the meta-analysis with our sample size (109) and listed-effect size numbers ($ES = -.028$), and estimates indicated our power *was less than 6%* to find support for the creativity hypothesis.

Second, while random assignment was expected to correct for any systematic differences between groups, statistically significant differences did appear. In particular, for the pre-test questions, entrepreneurial self-efficacy was moderately noteworthy ($p = .065$), and the innovation subscale was statistically higher ($p = .021$) for the firm-failure salient group. This is particularly troublesome since both of these items are core to the hypotheses in the current study. Third, the lack of a moderation effect may indeed indicate that entrepreneurial self-efficacy does not buffer firm-failure salience effects. We suggest further research incorporate these three items into their study. Specifically, given the likely insufficient power in the sample to find moderation, and the failure to achieve full randomization on the important variables of innovation and entrepreneurial self-efficacy, we deduce that trait creativity is not influenced much by terror management theory. Further, moderation had poor power—given our current findings, we suggest a sample size of at least 146 subjects in future studies to meet the suggested power of .80.

In the current study, we investigate explanations and predictions for entrepreneurs' decisions and behaviors as manipulated by one negative vignette. In future studies, several threat vignettes could be explored (i.e., firm failure, downsizing, organizational decline, and a challenging economic environment). Future research should also consider investigating assumptions about the personal self-identity and firm-identity connection that is assumed in our study.

Finally, this study provides some initial support for the main effect on innovation. When individuals were exposed to firm-mortality salience, their innovations score decreased. We did not find differences in creativity, and this is in line with current ongoing creativity research. By sharing the issues

encountered in this study, we encourage other researchers to be more conservative in their estimations of the necessary power to discover effects. Additionally, in many instances, researchers can now reduce the risk of failure of randomization and should probably consider studying design structure to reduce those challenges in future research. At the same time, these difficulties have provided an initial foundation for follow-on research to consider how a depressed economic climate may adversely impact entrepreneurial decision-making.

Conclusion

Policy-making in entrepreneurship should be sensitive to how macroeconomic conditions may impact the effectiveness and appropriateness of interventions to promote entrepreneurship. In particular, education related to the increasing salience of business failure may make it difficult for an entrepreneur to comfortably take on their usual load of risk. Many biases—for example, sunk cost—have been incorporated into traditional entrepreneurship education. Further, training has been shown to successfully decrease cognitive bias effects on individuals (Burns, Monteith, & Parker, 2017; Forscher, Mitamura, Dix, Cox, & Devine, 2017). An acknowledgement, therefore, of this difficulty should be a part of entrepreneurial ecosystem support design. Specifically, steps ought to be taken to reinforce training on external and industry analysis and the use of pertinent information to make decisions.

Cognitive perspectives offer a valuable tool in entrepreneurship as they can contribute to both the scientific understanding of the entrepreneurial process and the practical efforts to assist entrepreneurs in their attempt to start new ventures (Baron, 2004). Understanding and applying established behavioral and social cognitive literature to entrepreneurship can help us identify and examine patterns in entrepreneurial heuristics and tendencies. Presumably, this is why Shook, Priem, and McGee (2003) called researchers to integrate psychology and cognition into entrepreneurial scholarship. The current study, like Haynie, Shepherd, Mosakowski, and Earley's (2010) metacognitive proposal, examines a central piece of the entrepreneurship puzzle.

Research continuously reaffirms that entrepreneurship, innovation, and economic growth interact within a positive virtuous circle (Galindo & Mendez, 2014). Less studied is the apparent tendency for recession to dampen entrepreneurship (e.g., Gonzalez-Pernia, Guerrero, Jung, Pena-Legazkue, 2018) as evidenced by the clear and noteworthy diminution of startups since the Great Recession. This paper extends existing psychological theory as to the 'why' entrepreneurs decrease their risk-taking behavior when there is not a logical reason to do so. Here, we added to existing perspectives from behavioral theories to understand why economic recession may independently dampen entrepreneurship and innovation. Specifically, even if recessionary conditions alter risk assessments for profitability, it is likely that psychological responses can further dampen risk-taking, creating a parallel vicious circle to that of entrepreneurship and growth.

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