Mortality salience increases death-thought accessibility and worldview defense among high Broad Autism Phenotype (BAP) individuals

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**ARTICLE INFO**

Article history:
Received 11 November 2016
Received in revised form 27 February 2017
Accepted 7 March 2017
Available online xxxx

Keywords:
Terror management theory
Broad Autism Phenotype
Rigidity
Mortality salience
Worldview defense
Death-thought accessibility

**ABSTRACT**

The Broad Autism Phenotype (BAP) is an individual difference whereby persons exhibit mild characteristics of autism spectrum disorder (ASD), including being socially aloof and having a rigid personality. Given that individuals high in BAP rigidity have difficulty adjusting to change, the present research examined whether rigid persons report greater concerns about death and adhere to their cultural beliefs following mortality salience (MS). In Study 1, we found that BAP rigidity was positively associated with greater mortality-related concerns. In Study 2, high rigid individuals evidenced increased death-thought accessibility following MS. Finally, Study 3 found that MS led to heightened worldview defense for individuals high in rigidity, while decreasing defensiveness for those low in rigidity. These results provide evidence for the moderating role of individual differences in terror management effects. Specifically, ASD characteristics in young adults, particularly in the area of rigidity, contribute to heightened death concerns and greater defensiveness.

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1. Introduction

Autism spectrum disorder (ASD) is a developmental disorder characterized by moderate to severe impairments in communication and social interaction (e.g., poor eye contact, lack of attention), as well as repetitive movements, limited interests or activities, and emotional distress as a function of changes in the environment (American Psychiatric Association, 2013). The Broad Autism Phenotype (BAP; see Bolton et al., 1994; Rutter, 2000) is a term used to describe non-autistic persons who display mild traits of ASD, including being aloof (i.e., a lack of interest in social interactions), rigid (i.e., expressing little or no interest in change), and having pragmatic language problems (i.e., deficits in the social aspects of language; Hurley, Losh, Parlier, Reznick, & Piven, 2007). Given that individuals high in BAP rigidity experience difficulties in adjusting to change (Bolton et al., 1994; Hurley et al., 2007), the present study examined how such persons respond to reminders of death. In light of a terror management theory (TMT) perspective suggesting that individuals adhere to their cultural beliefs when thoughts of death are salient (Greenberg, Pyszczynski, & Solomon, 1986), it was hypothesized that persons scoring high on BAP rigidity would experience heightened worldview defense in response to a mortality salience (MS) manipulation. Additionally, we examined fear of mortality and death-thought accessibility scores as a function of BAP rigidity, with the expectation that higher scores would emerge given the rigid and inflexible nature of individuals’ personalities.

1.1. TMT

Inspired by the work of existential theorists (e.g., Becker, 1973), TMT argues that humans’ desire for life combined with their cognitive awareness of death has the potential to increase anxiety, or terror. Individuals assuage their fear of mortality by adhering to their worldview beliefs and/or by deriving self-esteem from their culture. According to TMT, a cultural worldview is a shared conception of reality that provides meaning, order, stability, permanence, and the promise of literal (e.g., heaven, nirvana) or symbolic immortality (e.g., identifying with a valued group, a Personality and Individual Differences publication). Self-esteem is a sense of personal value that is obtained by believing in the validity of one’s cultural worldview and living up to the standards of that worldview. From the perspective of TMT, because of the important roles that faith in the cultural worldview and self-esteem play in managing existential concerns, many social behaviors are aimed at their maintenance and defense.

Over the past 30 years, a great deal of research has supported TMT’s mortality salience (MS) hypothesis, which states that increasing the accessibility of personal mortality should increase the need for the psychological structures that provide protection against the awareness of death (see Pyszczynski, Solomon, & Greenberg, 2015 for a review). These studies generally show that reminders of mortality heighten...
favorable reactions to people and ideas that support one's cultural worldview and increase negative reactions to people and ideas that threaten it. For example, after MS, Americans report greater affection for a pro-American author and their disdain for an anti-American author (Greenberg et al., 1990). The mortality-worldview connection is bi-directional in that threatening the validity of a person's worldview undermines its capacity to keep mortality concerns at bay, leading to increased death-thought accessibility (Hayes, Schimel, Arndt, & Faucher, 2010). The extant literature thus indicates that cultural beliefs function, in part, to provide protection from the awareness of death.

Although TMT was initially proposed to explain the role of death concerns in the pursuit of a meaningful reality and positive evaluations of the self, there are individual differences in the degree and direction of MS effects (Landau, Sullivan, & King, 2010). Several studies have demonstrated that death-related defense mechanisms are moderated by a variety of personality characteristics, including authoritarianism (Greenberg et al., 1990), political orientation (Greenberg, Simon, Pyszczynski, Solomon, & Chatel, 1992), self-esteem (Harmon-Jones et al., 1997), and measures of well-being (e.g., depression, neuroticism; Goldenberg, Pyszczynski, McCoy, Greenberg, & Solomon, 1999; Simon, Arndt, Greenberg, Pyszczynski, & Solomon, 1998). Adding to this work, the goal of the present research was to examine whether BAP rigidity also serves as a moderator of MS effects. Given that an attitudinally rigid person is someone who is characterized as being close-minded and less open to new experiences (Steinmetz, Loarer, & Houssemand, 2011), it was hypothesized that reminders of death would increase worldview defense and heighten mortality-related concerns for high (vs. low) BAP rigid persons.

1.2. BAP

The Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 2013) defines ASD as a neurodevelopmental disorder characterized by impairments in communication, social interaction, and repetitive and restricted behavior. Research has demonstrated that traits associated with ASD are not specific to clinical diagnoses; rather, milder, non-clinical characteristics of autism can be found in the general population (Rutter, 2000). For instance, in his study of children with autism, Kanner (1943) discovered that parents reported interest in different activities (e.g., art, science, literature), but had little to no interest in other people (Rotatori & Deisinger, 2015; Wolff, 2004). These observations led to a set of traits associated with relatives of individuals with ASD, which is now referred to as the BAP (Bolton et al., 1994; Rutter, 2000; Sucksmith, Roth, & Hoekstra, 2011). Early work on the BAP among family members of individuals with ASD showed that relatives exhibited higher rates of language, learning, cognitive, and psychiatric problems (Alden, Rutter, & Cox, 1975; Bolton, Pickles, Murphy, & Rutter, 1998), with the prevalence of the BAP in first degree relatives being between 14 and 23% (Sasson et al., 2013). Although it is unclear whether BAP in family members is the same as BAP in persons without a family history of ASD (Ingersoll & Wainer, 2014), several studies using convenient samples of participants (e.g., college students) have replicated the results of the BAP observed in relatives with that of individuals in the general population (Jobe & White, 2007; Wainer, Ingersoll, & Hopwood, 2011).

While ASD is characterized by a specific set of diagnostic criteria, there are no accepted criteria for the BAP (Ingersoll & Wainer, 2014). Although some researchers have defined the BAP as experiencing difficulties in one area of functioning (Losh et al., 2009), other researchers have required two or more deficits needing to be present (Hurley et al., 2007). In an article review of milder phenotypic expressions of ASD, Bailey, Palferman, Heavey, and Le Couteur (1998) described some of the traits commonly associated parents and siblings of persons with ASD. These include a preference for solitude, having few friends, employing poor communication skills, and having deficits in empathy and affection. With respect to communication, they have been shown to produce language delays, have problems with speech articulation, and they experience difficulties with reading and spelling. Although repetitive behaviors were found in only a small number of ASD relatives, Bailey et al. noted that a rigid personality type was quite common among family members of persons with ASD. Finally, with respect to the personality profile of individuals with the BAP in the general population, they have been found to score lower on the traits of extraversion and agreeableness and higher on neuroticism when administered a five-factor personality scale (Austin, 2005; Wakabayashi, Baron-Cohen, & Wheelwright, 2006).

For the past two decades, researchers have been focused on understanding the characteristics of the BAP as they believe this individual difference will yield greater insights into understanding ASD (Rotatori & Deisinger, 2015). Although a variety of structural interviews and observational ratings have been used to understand features of BAP (e.g., Autism Family History Interview [AFHI]; Bolton et al., 1994; the Modified Personality Assessment Schedule-Revised [MPAS-R]; Piven et al., 1994; the Broader Phenotype Autism Symptom Scale [BPASS]; Sasson et al., 2013), questionnaires are also available to study this individual difference variable. The Broad Autism Phenotype Questionnaire (BAPQ; Hurley et al., 2007), which was used in the current work, was created to assess BAP characteristics in relatives of individuals with ASD. As a result, the scale has been shown to have high convergent validity with interview assessments of BAP (e.g., MPAS-R), and strong test-retest and interrater reliability among parents of children with ASD (Hurley et al., 2007).

Several recent studies, however, have used the BAPQ to assess personality characteristics in college students (Jobe & White, 2007; Lamport & Turner, 2014; Trevisan & Birmingham, 2016; Wainer et al., 2011), with other work demonstrating that the BAPQ is correlated in meaningful ways with self-report measures of interpersonal difficulties and psychopathology (e.g., depression, anxiety) in non-clinical populations (Ingersoll, Hopwood, Wainer, & Donnellan, 2011; Wainer, Block, Donnellan, & Ingersoll, 2013). Importantly, Wainer et al. (2013) found approximately 18% of non-diagnosed college students’ score above the clinical cutoffs for the BAP.

1.3. The present research

Combining research on the BAP with a TMT perspective, the present work examined the associative link between characteristics of the BAP and concerns about personal mortality. In developing the BAPQ, Hurley et al. (2007) recognized that three individual difference variables occur more frequently in parents of ASD children than other BAP traits. These include pragmatic language problems, aloof personality, and rigid personality. Pragmatic language refers to an ability to use language in specific contexts and for specific reasons (Prutting & Kittchner, 1987). These individuals experience difficulties with the social aspects of language, resulting in an inability to communicate effectively or to hold reciprocal, fluid conversations (Whitehouse, Coon, Miller, Salisbury, & Bishop, 2010). Social aloofness is characterized by having limited interest in, and experiencing reduced enjoyment from, social interactions. This trait has been found to be associated with feelings of shyness, anxiety, hypersensitivity, and/or being overly-conscientious (Sasson et al., 2013). Finally, individuals scoring high on BAP rigidity have been shown to have a strong preference for routine and experience difficulty in adjusting to change. These persons may become upset when their routines deviate away from expectations, or they may become hesitant in learning new ways of doing things because of alterations in long-held strategies (Hurley et al., 2007).

Utilizing the BAPQ assessment, Study 1 was largely exploratory to see if any of the characteristics of BAP correlated with fear of mortality scores. We were specifically interested in the trait of rigidity given that the inflexibility of persons’ belief systems may make them particularly vulnerable to the awareness of death. This is consistent with prior
TMT research demonstrating that participants experience a heightened accessibility of death-related thoughts when they perceive the world as being orderly and just (Landau et al., 2004). Building on this work, it was hypothesized that individuals high in the trait of BAP rigidity would report greater concerns about mortality compared to individuals scoring low on the trait of BAP rigidity. No significant relationships were expected to emerge for pragmatic language and social aloofness on fear of mortality scores.

Given the correlational nature of the first experiment, Studies 2 and 3 examined the accessibility of death-related thoughts and worldview defense among persons low and high in BAP rigidity following reminders of death. Previous research has shown that parents of children with ASD report heightened DTA and lower well-being presumably due to compromised defense systems in response to existential anxieties (Cox, Eaton, Ekas, & Van Enkevort, 2015). This would suggest that high BAP rigid persons might report greater death cognition regardless of being primed with thoughts of mortality or a control topic. However, given that BAP characteristics are a milder form of ASD, highly rigid persons should follow the typical trajectory of TMT effects by experiencing heightened DTA in response to unconscious reminders of death (Arndt, Greenberg, Pyszczynski, & Solomon, 1997; Greenberg, Arndt, Schimel, Pyszczynski, & Solomon, 2001). Based on this later reasoning, it was hypothesized that high BAP rigid individuals would experience a greater accessibility of death-related thoughts following a subtle MS manipulation. Finally, given that cultural worldview and self-esteem defenses are believed to emerge in response to DTA (Pyszczynski, Greenberg, & Solomon, 1999), then individuals high on the trait of rigidity should react to death reminders with greater belief validation. Study 3 was designed to test this possibility.

2. Study 1

This first study examined the associative link between BAP characteristics and concerns about death. It was hypothesized that participants scoring high on rigidity would report greater concerns about mortality given their need for sameness and inflexibility to change (Hurley et al., 2007). No significant relationships were expected to emerge for aloofness and pragmatic language on fear of death scores.

2.1. Method

2.1.1. Participants

Participants included 761 students (252 male; $M_{age} = 19.72, \sigma_{age} = 2.24$) recruited from introductory psychology classes at a private university in the southwest United States. Everyone was awarded extra credit for their participation.

2.1.2. Measures and procedures

As part of a mass prescreen survey held at the start of the semester, participants were asked to complete the 36-item BAPQ (Hurley et al., 2007) to assess the traits of aloofness, rigidity, and pragmatic language problems. Example items included, “I like being around other people (aloof),” “I enjoy being in social situations (aloof),” “I find it hard to get my words out smoothly (language),” “I have been told that I talk too much about certain topics (language),” “I feel a strong need for sameness from day to day (rigid),” and “I am flexible about how things should be done (rigid).” All responses were made on a 5-point scale (1 = very rarely, 5 = very often), and scale reliabilities for the different measures were moderate to high (Cronbach’s α aloofness = 0.88; pragmatic language = 0.69; rigidity = 0.83). To measure concerns about death, participants responded to a one-item measure (i.e., “I am bothered by the thought of my mortality”) on a 7-point scale (1 = not at all true, 7 = very true; see e.g., Abdel-Khalek, 1998; Cox, Reid-Arndt, Arndt, & Moser, 2012 for similar procedures).

2.2. Results and discussion

Correlation analyses examined the relationship between the subscales of the BAPQ and the fear of mortality item. Although the findings for aloofness and pragmatic language failed to reach statistical significance, $r = 0.02, p = 0.57, R^2 = 0.004$, the results revealed a significant positive correlation for rigidity, $r(779) = 0.19, p < 0.001, R^2 = 0.04$. Additional analyses found that participants’ gender did not influence any of the obtained effects, $p’s > 0.16$.

These results suggest that the persons who should react strongly to reminders of death with greater defensiveness are those who score high on rigidity. Given the correlational nature of Study 1, we conducted two additional studies to better understand BAP rigid individuals’ fear of death using an experimental design. Whereas Study 2 explored DTA scores as a function of BAP rigidity and a MS manipulation, Study 3 examined worldview defense responses.

3. Study 2

The purpose of the second experiment was to examine the effectiveness of our MS manipulation in eliciting thoughts of death in persons scoring high on the BAP. Specifically, previous TMT research has found that parents of ASD children experience a heightened accessibility of death-related thoughts given their compromised anxiety-buffering defense mechanisms (Cox et al., 2015). This might suggest no significant difference between MS and control conditions for high BAP rigid persons on the accessibility of death-related thoughts (i.e., a ceiling effect). However, prior TMT work has elucidated the progression of death-thought accessibility following MS inductions as part of a dual defense model (see e.g., Hayes et al., 2010; Pyszczynski et al., 2015 for reviews). This research has found that death cognition is initially low in response to explicit reminders of death but increases after a delay (i.e., suppression; Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994). Once mortality awareness is heightened, it triggers worldview defenses, which function to reduce death-thought accessibility back to baseline levels (Arndt et al., 1997; Greenberg et al., 2001; see also Mikulincer & Florian, 2002; Schmeichel & Martens, 2005 for similar evidence with self-esteem and self-affirmation strategies). A different pattern of results has been found to emerge for subtle MS manipulations. Arndt et al. (1997), for instance, demonstrated that subliminal exposure to the word “death” (vs. “field” in the control condition) increased DTA given that MS prime was presented below the threshold of conscious awareness to induce suppression.

Following Arndt et al. (1997), to the extent that high BAP persons are more prone to adhere to their belief systems following reminders of death, this would suggest elevated DTA in response to a subtle MS manipulation. To test this idea, participants in Study 2 were asked to complete the BAPQ prior to the MS manipulation. In the experimental condition, individuals completed a word search puzzle with death-related words embedded (Landau, Kosloff, & Schmeichel, 2011). Control participants searched for neutral words. The dependent variable included a word-fragment completion task used extensively in TMT research to measure the accessibility of death-related thoughts (see e.g., Hayes et al., 2010). It was hypothesized that individuals high on the trait of BAP rigidity would respond to MS with greater death-thought accessibility as compared to low rigid persons.

3.1. Method

3.1.1. Participants

Two-hundred and eleven students (169 female, 41 male – one person did not report his/her age and gender but was included in the final analysis) from a private university in the southwest United States participated in exchange for extra credit. Two individuals were dropped from the final analysis after indicating that they were familiar with TMT and correctly guessed the death-thought accessibility hypothesis of the
study. This resulted in a final sample of 209 participants (167 female, 41 male, 1 missing; \( M_{\text{age}} = 19.31 \) years, \( SD = 3.11 \)). Gender did not have a significant effect on the results, \( p_s \geq 0.36 \).

### 3.1.2. Materials and procedure

Individuals completed the study on the computer (i.e., Qualtrics) in a classroom setting. After providing informed consent, participants were randomly assigned to either the death-related or control condition. The content and order of the questionnaires are described below.

#### 3.1.2.1. BAPQ

Participants completed the same 36-item BAP assessment described in Study 1. Scale reliabilities for the study were high (Cronbach's \( \alpha \) aloofness = 0.88; pragmatic language = 0.79; rigidity = 0.85). The BAP questionnaire was embedded in a variety of personality questionnaires to maintain the cover story of the experiment (i.e., “personality & attitudes”; Experiences in Close Relationships Inventory, Brennan, Clark, & Shaver, 1998; Intrusiveness, Lavy, Mikulincer, & Shaver, 2010; Social Desirability, Crowne & Marlowe, 1960).

#### 3.1.2.2. MS manipulation

Following previous research (Landau et al., 2011; Maxfield et al., 2007; Schimel, Greenberg, & Martens, 2003), participants completed a word search puzzle as the MS manipulation. Specifically, individuals were instructed to find 10 target words in a 16 \( \times \) 16 matrix of jumbled letters. The target words were neutral in content and did not relate to a particular theme (e.g., baseball, computer, build). In the death condition, seven words (i.e., death, dead, decay, die, funeral, burial, & corpse) were embedded in the puzzle as participants searched for the target words. In the control condition, the death-related words were replaced with random letter strings (e.g., the word “burial” was replaced with “hairpl”). Given the subtle nature of the MS manipulation, and following previous research (Landau et al., 2011), no delay was included prior to the assessment of the dependent variable (Arndt et al., 1997).

#### 3.1.2.3. Death-thought accessibility

A word stem completion task was used to measure the accessibility of death-related thoughts; this served as the dependent variable. This task is similar to those used by other researchers (e.g., Bassili & Smith, 1986; Gilbert & Hixon, 1991; Tulving, Schacter, & Stark, 1982) and presents participants with 25 word fragments, 6 of which could be completed with a neutral or death-related word (e.g., COFF__ could be completed as either coffin or coffee). This measure has been used successfully in a number of terror management studies (e.g., Greenberg et al., 1986; Mikulincer & Florian, 2000; Mikulincer, Florian, Birnbaum, & Malishkevich, 2002). The death-related completions in the current study were as follows: BUR__ D (buried), DE__ (dead), GRA__ (grave), KI__E D (killed), SK__ L (skull), and COFF__ (coffin). Death accessibility scores were the total number of death-related word completions.

At the end of the packet, participants were asked to provide reactions to the study along with their age and gender.

### 3.2. Results and discussion

A multiple regression analysis was performed on DTA scores as a function of MS (dummy coded; death = 0) and BAP rigidity (centered). Although the main effect of rigidity was significant, \( b = 0.19 (SE = 0.09) \), \( t = 2.09, p = 0.04, R^2 = 0.02 \), the main effect for MS was marginal, \( b = 0.23 (SE = 0.13) \), \( t = 1.74, p = 0.08, R^2 = 0.01 \). These effects were qualified by a significant 2-way interaction between BAP rigidity and MS, \( b = -0.36 (SE = 0.18) \), \( t = 1.96, p = 0.049, R^2 = 0.02 \) (see Fig. 1). Whereas the simple slope test for the death condition was significant, \( b = 0.36 (SE = 0.12) \), \( t = 2.89, p = 0.004, R^2 = 0.04 \), the control condition was not, \( b = 0.0002 (SE = 0.13) \), \( t = 0.02, p = 0.99 \). These results suggest that highly BAP rigid individuals respond to reminders of mortality with a greater accessibility of death-related thoughts compared to low BAP rigid persons. Looked at differently, there was no significant difference between death and control conditions at low levels (\(-1 SD\) of rigidity, \( b = 0.03 (SE = 0.19) \), \( t = 0.16, p = 0.87 \). At high levels of rigidity (+1 SD), participants responded with greater death-thought accessibility following a MS manipulation compared to a control manipulation, \( b = -0.50 (SE = 0.19) \), \( t = 2.64, p = 0.009, R^2 = 0.03 \).

Additionally, although Study 2 was primarily interested in the influence of BAP rigidity on DTA scores following a MS manipulation, we also examined aloofness and pragmatic language as potential moderators. The results revealed no significant findings for these two subscales: BAP pragmatic language main effects, \( ts \leq 0.58, ps \geq 0.57 \), interaction, \( b = -0.13 (SE = 0.21), t = 0.63, p = 0.53 \); BAP aloofness main effects, \( ts \leq 0.69, ps \geq 0.49 \), interaction, \( b = -0.08 (SE = 0.19) \), \( t = 0.44, p = 0.66 \).

In testing the effectiveness of the MS manipulation in eliciting thoughts of death, Study 2 demonstrated that high rigid individuals experienced greater DTA as a function of a subtle MS prime. This is important as it suggests that BAP rigid persons demonstrate a more typical terror management response as compared to parents of children with ASD (Cox et al., 2015). Second, although Study 2 found that individuals high in BAP rigidity experienced greater DTA following MS than a control condition, low BAP persons did not differ in DTA as a function of thoughts of death. This was an unexpected finding as mortality concerns should be elevated for both low and high BAP rigid individuals following MS, with an exaggerated response for persons high in rigidity. Although we found evidence for a marginal effect of MS, suggesting that participants, regardless of the BAP, responded to reminders of death with greater DTA, there was no significant difference between MS and control conditions on the accessibility of death-related thoughts among low BAP persons. These findings overlap with research demonstrating that people high, but not low, in a need for structure and order are especially likely to respond to reminders of death with greater defensiveness (Juhl & Routledge, 2010; Routledge, Juhl, & Vess, 2010; Routledge & Juhl, 2012).

### 4. Study 3

Having established that high BAP individuals react to a MS manipulation with an increase in DTA, the goal of Study 3 was to explore worldview defense responses among BAP rigid individuals following reminders of death. Terror management theory argues that we cling strongly to our most cherished beliefs in an attempt to shield against existential anxieties (Greenberg et al., 1986; Pyszczynski et al., 2015). This, along with the results of Studies 1 and 2, would suggest that those who score high on rigidity would display the strongest worldview defense responses among BAP rigid individuals following reminders of death. To test this idea, participants in Study 3 were asked to complete the BAPQ prior to being exposed to the death manipulation. The dependent variable consisted of vignette about a moral transgression that has been used previously in TMT research (i.e., burning the
American flag; Cox, Goldenberg, Arndt, & Pyszczynski, 2007). To the extent that attitude rigidity provides a source of meaning for high BAP rigid persons, it was hypothesized that individuals high on the trait of BAP rigidity would respond to MS with greater worldview defense. We were more tentative regarding predictions for low BAP persons. On one hand, following the results of the previous experiment, individuals low in BAP rigidity may not respond to reminders of death with any defensiveness. This seems unlikely in lieu of 30 years of research in support of TMT. On the other hand, however, persons scoring low on BAP characteristics may respond to MS with increased interest in exploring novel ideas and alternative worldviews (Vess, Routledge, Landau, & Arndt, 2009). This would suggest that reminders of death should lead low BAP rigid individuals to express greater support of a worldview threatening other.

4.1. Method

4.1.1. Participants

Participants initially included 188 students recruited from introductory psychology classes at a private university in the southwest United States. Four participants were removed because they had BAP scores greater than three standard deviations away from the mean (n = 2; Howell, 1998) or because they admitted to rushing through the study and not paying attention to the questions (n = 2). Ultimately, 184 participants (female = 145; Mage = 20, SD = 1.76) completed the experiment. Everyone was awarded extra credit for their participation. As in the previous experiments, gender did not significantly influence or interact with rigidity or MS, p's ≥ 0.12.

4.1.2. Materials and procedure

Individuals completed the study on the computer (i.e., Qualtrics) in a laboratory setting. After providing informed consent, participants were randomly assigned to one of two conditions as part of a MS manipulation. At the end of the questionnaire, participants were asked to provide their reactions to the study along with demographic information. The content and order of the questionnaires are described below.

4.1.2.1. BAPQ. As in the previous studies, the BAPQ was presented as part of a larger survey (i.e., Experiences in Close Relationships Inventory; Brennan et al., 1998; Affect Intensity; Larsen, 1984). Scale reliabilities for each subscale were high (Cronbach’s α aloofness = 0.90; pragmatic language = 0.80; rigidity = 0.85).

4.1.2.2. MS manipulation and delay. Participants were randomly assigned to complete the same death-related or neutral word search puzzle described in Study 2. Whereas previous research has assessed worldview defense immediately following the presentation of the death-related word search (e.g., Landau et al., 2011), we included the 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) to provide a delay. Part of the reason for doing this was to understand why low BAP individuals did not experience heightened DTA in response to the MS manipulation in Study 2. Although subtle, it could be that mortality concerns were more salient for persons scoring low on the BAP, which would require a delay to remove such thoughts from focal attention. Importantly, given that Study 2 demonstrated that individuals high in BAP rigidity experienced heightened DTA immediately following the death-related word search, this suggests that a delay is necessary before worldview defenses will manifest (see Pyszczynski et al., 1999).

4.1.2.3. worldview defense. Participants were asked to complete a portion of the Multidimensional Moral Transgression Scale (Cox et al., 2007; see Florian & Mikulincer, 1997 for a full scale) to assess worldview defense. Specifically, individuals were asked to read a short vignette about a moral transgression (“A group of college students staged a public demonstration against the United States government and their policies. As part of their protest, several people began burning the American flag”). Participants then rated how severe the wrongdoing was and how heavily the perpetrator should be punished. All responses were recorded on a 7-point Likert scale (1 = Not at all, 7 = Very severe; 1 = Very light punishment, 7 = Very heavy punishment). Higher scores indicated greater worldview defense.

4.2. Results and discussion

In order to examine the effects of MS (dummy coded) and BAP rigidity (centered) on worldview defense, a hierarchical multiple regression was conducted in which MS and BAP rigidity were entered into Step 1 and their interaction into Step 2. The results of the analysis found a significant interaction between MS and rigidity on worldview defense scores, b = 0.96 (SE = 0.33), t = 2.927, p = 0.004, R² = 0.04 (see Fig. 2). Whereas the simple slope test for the death condition was significant, b = 0.94 (SE = 0.24), t = 3.89, p < 0.001, R² = 0.04, the control condition was not, b = −0.04 (SE = 0.23), t = −0.18, p = 0.93. These results suggest that high BAP rigid individuals respond to reminders of mortality with greater worldview defense as compared to low BAP rigid individuals. Looked at differently, at low levels (−1 SD) of BAP rigidity, participants responded with less worldview defense following a MS manipulation compared to a control manipulation, b = −0.74 (SE = 0.32), t = −2.29, p = 0.02 R² = 0.03. At high levels (+1 SD) of BAP rigidity, participants responded with greater worldview defense following a MS manipulation compared to a control manipulation, b = 0.65 (SE = 0.33), t = 1.97, p = 0.05, R² = 0.02. Both BAP aloof personality and pragmatic language’s interactions with MS failed to reach statistical significance, r’s ≤ 0.1, p’s ≥ 0.31.

Study 3 expands upon the previous results in a couple of ways. First, individuals high on the trait of BAP rigidity gave harsher reactions to the flag burning vignette in response to MS. This was found in comparison to low BAP persons, in addition to control condition participants. Given the attitudinal rigidity of high BAP individuals, these results are consistent with prior work demonstrating that persons with a high need for structure respond to reminders of death by clinging more strongly to cultural beliefs and traditions (Juhl & Routledge, 2010; Landau et al., 2004; Routledge, Ostafin et al., 2010; Routledge, Juhl et al., 2010). Whereas PNS (personal need for structure) is associated with a proclivity to seek out a clear and highly structured perception of the world, BAP rigidity is a trait characteristic of persons with ASD.

Second, the current study found that individuals low on BAP rigidity were more likely to respond to MS with less defensiveness. Unlike the previous study where there was no significant difference between death and control conditions on DTA, the current work found increased liking for a worldview threatening other (i.e., protesters burning the American flag) for low BAP rigid persons following a MS manipulation and a short delay. Although the manipulation utilized was more subtle
than a typical terror management prime (e.g., writing about explicit thoughts and feelings associated with death), it appears that a delay was necessary to remove thoughts of death from focal attention and to activate defense mechanisms. Not only do these findings support past research demonstrating that individuals with a more liberal orientation embrace attitude flexibility after MS (Greenberg et al., 1992), but it coincides with the need for structure literature showing that low, as opposed to high, individuals respond to reminders of death with more exploration (Vess et al., 2009), increased openness (Routledge, Ostaftin et al., 2010; Routledge, Juhl et al., 2010), and greater creativity (Routledge & Juhl, 2012).

5. General discussion

The Broad Autism Phenotype (BAP) is a milder expression of the communication and social impairments observed in individuals with ASD. Although BAP characteristics (i.e., attitude rigidity, aloof personality, & pragmatic language problems) were initially examined in relatives of children with ASD, more recent work has focused on the extent to which these individual difference variables are observed in college-aged students (Wainer et al., 2013) and community samples of adults (Ingersoll et al., 2011). Building on this work, the purpose of the present research was to examine the associative link between mortality-related concerns and BAP traits. Study 1 found that high BAP rigid individuals reported a stronger fear of death than those low in rigidity. There was no significant relationship between aloof personality and pragmatic language difficulties on fear of death scores. Studies 2 and 3 explored whether MS interacted with BAP rigidity to influence DTA and worldview defense (two measures commonly utilized in TMT research). Study 2 found that high BAP rigid individuals experienced greater DTA in response to a subtle MS manipulation, suggesting that they should respond to reminders of death with a heightened defense of their cultural beliefs. This was supported in Study 3 where high BAP rigid individuals displayed harsher reactions to a vignette about a US flag burning. Low BAP rigid individuals, however, expressed greater support for a worldview threatening other.

These results expand on the TMT literature in a number of ways. First, although early terror management research has argued that people respond to reminders of death with greater defense of their cultural beliefs, more recent work has demonstrated the role of individual differences in these effects (see e.g., Landau et al., 2010 for a review). The current Study 3 adds to this research by demonstrating that high BAP rigid persons express greater negativity toward a worldview threatening other after MS. One individual difference that has been studied frequently from a TMT perspective is PNS (Thompson, Naccarato, Parker, & Moskowitz, 2001) – that is, a preference for clarity and structure with a corresponding avoidance of ambiguity. Several studies have shown, for example, that high PNS persons respond to reminders of death with a greater preference for order and unambiguous meaning (Landau et al., 2004; Vess et al., 2009). Although there might be an associative link between attitude rigidity and PNS (Steinmetz et al., 2011), other research has found this correlation for only a small subset of items (Neuberg & Newsom, 1993). Additionally, whereas rigidity is the area of autism is associated with obsessions, repetitive behavior, and routines (American Psychiatric Association, 2013), PNS is characterized by a desire for simple structure in how people understand and interact with their environment. To make a convincing case that PNS and BAP rigidity are two conceptually distinct constructs within a TMT framework, future research would benefit from including both individual difference measures within the same study.

Second, the non-significant findings of heightened DTA among low rigid individuals in Study 2 provides important information on the administration and timing of terror management effects in response to a subtle MS manipulation. Whereas previous research has assessed worldview defense immediately following this type of manipulation (Landau et al., 2011; Maxfield et al., 2007), we found elevated DTA for individuals high, but not low, on the trait of BAP rigidity. It could be that low BAP rigid persons were engaging in suppression efforts to minimize the threat of mortality resulting in a lower accessibility of death-related thoughts (Pyszczynski et al., 2015). By adding a delay (Study 3), we were able to demonstrate that individuals low on the trait of BAP rigidity responded to MS by expressing greater support for a worldview threatening other. Future studies should continue to examine the impact of implicit and explicit death reminders, in addition to varying the length of a delay, on DTA and worldview defense scores for persons high and low on the trait of BAP rigidity.

Third, Study 3 found evidence of significantly more lenient evaluations among low BAP individuals following reminders of death. In so much as low BAP rigid individuals are more open to change and flexibility (see Sucksmith et al., 2011), the decreased ratings in the MS condition would suggest that they are more open and accepting of culturally deviant behaviors (i.e., burning a flag), a belief that would be consistent with their worldviews. Similar findings have been observed by Greenberg et al. (1992) and others (Routledge & Juhl, 2012; Routledge, Ostaftin et al., 2010; Routledge, Juhl et al., 2010; Vess et al., 2009). Greenberg and colleagues found that although conservatives were more hostile toward someone described as liberal, liberals were more accepting toward someone described as conservative, a behavior consistent with their personal worldviews. Additionally, Vess et al. demonstrated that individuals low in PNS were more open to novel experiences following MS. Thus, in our study, low BAP rigid individuals would be embracing their worldviews by becoming more accepting of behaviors inconsistent with their own beliefs, instead of more hostile like those who are high in rigidity. This finding suggests that defenses are more complex than hostility and fundamental behavior in support of personal worldviews, and instead are embracing worldviews by behaving in a manner that is consistent with those beliefs.

Finally, the current work is important because it builds upon previous terror management knowledge about death concerns in ASD populations. Cox et al. (2015), for instance, found that parents of children with ASD experienced a greater accessibility of death-related thoughts (as compared to parents of typically developing children), which in turn was associated with lower well-being. Whereas the present studies found evidence that high BAP rigid persons respond to MS with defenses that are typical of TMT research, a similar pattern of results may not emerge for parents of children with ASD. This is because parents of children with ASD may not have effective defense strategies (i.e., close relationships, well-being, belief validation) in place in order to effectively manage concerns associated with the awareness of death. Although yet to be examined, this is an interesting direction for further study.

5.1. Limitations and future research

Although we found evidence that BAP rigidity interacts with MS to influence DTA and worldview defense, there are some limitations that need to be discussed. The small to moderate effect in Study 1 should be interpreted with caution given the large sample size. Importantly, we were able to obtain theoretically consistent effects with the remaining studies without exceeding statistical power (e.g., Type 1 error). Additionally, there is a possibility that BAP rigidity may be mediated by additional individual difference factors, such as PNS, authoritarianism, and religiosity. Although this is a potential concern, rigidity and PNS are distinct constructs that should not be directly influencing each other and are appropriately unique (Neuberg & Newsom, 1993). Examining PNS and other potential mediating and moderating variables would be an interesting outlet for extended study.

The current work is also limited by focusing exclusively on college-age samples. Although prior work has found that BAP characteristics are the same across all age groups, notwithstanding children (see Constantino & Todd, 2003; Constantino et al., 2003; Ingersoll et al., 2011), future research should extend these findings to individuals in...
the real world to increase generalizability. Importantly, much of the seminal work within the BAP literature has focused on family members of children with ASD (see Sucksmith et al., 2011). Future research would thus benefit by directly examining BAP individuals who have (i.e., clinical diagnosis) or do not have (i.e., non-clinical diagnosis) a family history of ASD. This would further suggest that the current results are consistent across both college samples and ASD populations.

Lastly, although the current studies focused on DTA and worldview defense as a function of MS and BAP characteristics, an interesting direction for future study would be to examine TMT on well-being outcomes for BAP rigid individuals. For instance, research conducted by Vess et al. (2009) demonstrated that individuals low on the trait of PNS responded to MS with lower perceptions of meaning in life. A similar pattern of results may emerge on well-being for persons scoring low on BAP rigidity if unable to engage in defensive processes following a MS manipulation. Additionally, Routledge, Ostaﬁn et al. (2010) and Routledge, Juhl et al. (2010) found that individuals who experience continuous MS response have lower well-being over time. Given that high rigid BAP persons have naturally have a heightened fear of death (Study 1), and are particularly susceptible to MS (Studies 2 and 3), these individuals may also have lower long-term well-being due to this fear; whereas, low rigid individuals may experience this susceptibility if not given the chance to defend.

5.2. Conclusion

Despite these limitations, the results of three experiments provide evidence that mild, autistic-like personality characteristics are associated with a greater fear of mortality, a heightened accessibility of death-related thoughts, and greater worldview defense following a MS manipulation. Given that the current results are speciﬁc to attitude rigidity (and not alterness and/or pragmatic language difﬁculties), an important avenue for future research and possibly clinical practice is to focus on this personality characteristic from a TMT perspective. Although reminders of death have the potential to increase existential anxieties in persons in general, these ﬁndings may inform on individuals who are particularly vulnerable (i.e., high BAP rigid persons). Individuals scoring high on the trait of BAP rigidity are a real part of society, whether or not it is associated with a family history of ASD. The fact that BAP characteristics are associated with mortality-related concerns suggest that these individuals are at heightened risk of anxiety, defensiveness, and possibly, lower well-being.

References


