Death, ideology, and worldview:

Evidence of death anxiety but not mortality salience effects on political ideology and
worldview

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Research has suggested that the sense of threat aroused by reminders of death can lead to worldview defense and elevated conservatism. The current studies disentangled the effects of mortality salience and death anxiety on two core components of conservatism—resistance to change and acceptance of inequality—and on the broader worldviews of normativism and humanism among Swedish adults. Study 1 ($N = 186$), which used a mortality salience manipulation, and Study 2 ($N = 354$), which measured self-reported death anxiety, suggested that existential threat was most consistently associated with resistance to change and normativism, consistent with theoretical expectations. This was true predominantly among left-wingers. However, existential threat was not significantly more strongly associated with resistance to change and normativism than with acceptance of inequality and (low) humanism respectively, contrary to the hypotheses. Furthermore, Study 3, which was a pre-registered online replication of Study 1 with respondents from the United Kingdom, yielded no evidence for any effects of mortality salience on ideology ($N = 319$) or worldview ($N = 199$). An internal pre-registered meta-analysis of mortality salience effects indicated that mortality salience had a marginally significant effect only on normativism. Taken together, the results provided little clear evidence of mortality salience effects on ideological preferences and worldviews, but dispositional death anxiety was associated with resistance to change, normativism, and acceptance of inequality particularly among leftists.

Keywords: conservative shift, existentialism, worldview, ideology, mortality salience, terror management

“Life’s experience takes different forms in all individuals. But its common ground in all men covers the views of the power of destiny, of the corruptibility of all that we own, cherish or even hate or fear, and of ever present death which, all powerful for everyone of us, determines the significance and meaning of life”

Wilhelm Dilthey (1957/1890, p. 22)

One of the most distinctive features of what it means to be a person is having the capacity to reflect on your own existence—to understand that everything you cherish is temporary and corruptible and that your body is gradually decaying and dying. At least in the modern scientific age, it also entails the capacity to understand that your very existence, and even the entirety of human civilization, is merely an ephemeral speck of dust in a vast universe. The existential angst produced by these insights can be crippling. Dating back at least to the 19th century, existentialist scholars (Becker, 1973; Dilthey, 1957/1890; Jaspers, 1919; Kierkegaard, 1980/1844; Royce, 1964) have suggested that human beings manage such angst by constructing or adopting worldviews that transform the brute existential realities into a purposeful, stable, and manageable symbolic world, while imbuing the self with a sense of significance that transcends physical death. Subsequently, contemporary research programs in social and personality psychology have subjected these conjectures to empirical tests (Burke et al., 2010; Jonas et al., 2014; Pyszczynski et al., 2015).

Terror management theory (Greenberg et al., 1986; Solomon et al., 1991) is by far the most influential psychological theory in this area of research. It is rooted in the Pulitzer-prize winning writings of the cultural anthropologist Ernest Becker (1962, 1973, 1975), which merge psychodynamic and existentialist perspectives on the role of death in human life. The central proposition is that subconscious fear of death propels defense of shared cultural meaning systems (e.g., religious beliefs, political ideologies, social norms, or national values), which in turn serve to uphold the individual’s self-esteem by imparting the self with a sense of significance. Based on this theory, a plethora of experimental studies have investigated the link between mortality salience and cultural worldview defense. Mortality salience has most

commonly been operationalized in terms of an essay-writing induction, through which participants briefly describe the thoughts and emotions that are evoked by the thought of their own death (Rosenblatt et al., 1989), but some studies have also manipulated exposure to death-related words, objects, places, or other subtle mortality cues (e.g., Hirschberger, 2006; Jonas et al., 2002). Worldview defense has been operationalized in a wide range of ways, including punishment of those who violate cultural standards (Florian & Mikulincer, 1997; Rosenblatt et al., 1989), affirmation of one's own worldview and hostility toward those who threaten to undermine it (Greenberg et al., 1990, 1994; McGregor et al., 1998), and positive perceptions of ingroup members and negative perceptions of outgroup members (Greenberg et al., 1990; Vaes et al., 2010). The results reported in published research have traditionally been interpreted as supportive of the theory (for reviews, see Burke et al., 2010; Pyszczynski et al., 2015). However, it should be noted that a series of failed replications have recently (after the current research was conducted) begun to cast doubt on the robustness of the effects (Klein et al., 2019; Schindler et al., 2021; Sætrevik & Sjøstad, 2022; Treger et al., 2021; see "General Discussion").

A somewhat different take on the impact of existential threat on human life is provided by earlier existentialist philosophers such as Wilhelm Dilthey (1957/1890) and Karl Jaspers (1919), who complemented the assumption that worldviews offer refuge from existential threat with theories about the structure and dynamics of the individual's *personal* worldview (Naugle, 2002). The central idea was that aspects of the individual's existential predicament (such as mortality) are occasionally projected into focal awareness as s/he moves through life, which can in turn cause the worldview to adapt so that it more effectively mitigates existential terror—in this sense, the individual's worldview reflects personal lived experience as much as it is a cultural product (Nilsson, 2013). Although a handful of terror management studies have tested the hypothesis that mortality salience strengthens endorsement of culturally prescribed

and identity-congruent meanings, including egalitarianism (Halloran & Kashima, 2004), environmental concern (Vess & Arndt, 2008), self-transcendence values (Joireman & Duell, 2005), and religious beliefs (Norenzayan & Hansen, 2006), this research has not investigated whether some belief systems are more likely than others to be strengthened in the presence of death. From the perspective of existential philosophy, this is an important omission.

In the current research, we sought to contribute by disentangling effects of existential threat on two core aspects of conservatism—*resistance to change* and *acceptance of inequality* (Jost et al., 2003)—based on existentialist thought and contemporary theories in political psychology. Furthermore, because former studies have failed to address foundational aspects of personal worldviews, which occupy a central position within existentialist thought, we also investigated effects of existential threat on the two broad worldviews of *normativism* and *humanism* (Tomkins, 1963). We investigated three types of potential effect of existential threat on personal worldviews and ideologies: *conservative shift*, *reactive leftists*, and *extremism* effects. In addition, while the vast majority of past studies in this area focus on a North American cultural setting, our studies were conducted in Sweden and the United Kingdom. We provide explanations of all key effects, constructs, and cultural differences in the following sections.

Conservative shift, reactive leftists, and extremism effects

Over the last decades, researchers have garnered evidence of an association between various forms of perceived existential threat and conservatism (Duckitt & Sibley, 2010; Jost et al., 2017; Onraet, van Hiel, & Cornelis, 2013). Jost et al. (2003) have argued that conservative ideologies afford a sense of certainty, structure, stability, and security, which makes such ideologies particularly effective for mitigating fear of death and other threats (see also Hennes et al., 2012; Thorisdottir et al., 2007). Subsequently, experimental studies have found evidence of a conservative shift induced by mortality salience manipulations (Burke et

al., 2013) or by natural occurring threats, such as terrorist attacks (Bonanno & Jost, 2006; Echebarria-Echabe & Fernández-Guede, 2006; for a review, see Jost et al., 2017). It is possible that some results that have been interpreted in terms of cultural worldview defense are really instances of conservative shift, given the fact that conservatism incorporates a defense of traditional cultural norms (Wicklund, 1997). At the same time, it should be noted that Onraet et al. (2013) found that right-wing attitudes were more strongly associated with external threats (e.g., terrorism) than internal threats (e.g., death anxiety).

Some studies have also provided evidence of a particular liberal reactivity, suggesting that liberals (or left-wingers) are more inclined to exhibit conservative shift upon mortality salience than conservatives, who are more inclined to chronically experience threat (Nail et al., 2009; Van de Vyver et al., 2016). These results are consistent with the suggestion that conservative worldviews effectively ward off death anxiety—it is possible that liberals are more defenseless and therefore in greater need to get their defenses up when they are exposed to mortality reminders while conservatives already reap the potential psychological benefits of a conservative worldview.

Other studies have suggested that mortality salience instead produces ideological polarization, suggesting that conservatives become more conservative while liberals become more liberal upon mortality salience (Castano et al., 2011; Chatard et al., 2010). These results are consistent with theories concerning extremism, which propose that psychological distress (including existential threat) makes both leftist and rightist attitudes more extreme (van Prooijen & Krouwel, 2019). Some researchers have also described the notion that mortality salience causes a shift to more extreme attitudes as a hypothesis derived from terror management theory (Castano et al., 2011), although the central hypothesis put forth by originators of terror management theory was that mortality salience boosts rigidity, simplicity,

and faith with respect to *pre-existing* ideological worldviews rather than ideological shift (Greenberg & Jonas, 2003; Solomon et al., 2015).

In sum, at least three effects have been proposed to account for the association between existential threat and ideological worldviews: *conservative shift* (among both left- and right-wingers), *leftist (liberal) reactivity* (more conservative shift among leftists), and *extremism shift* (a strengthening of an initial tendency in either ideological direction). It would be presumptuous to think that a limited set of studies from two countries could resolve the inconsistencies in the literature and determine the robustness of these different effects. The goal in the present research was instead to disentangle *any* effects of existential threat on different aspects of ideology and broader worldviews.

Resistance to Change and Preference for Equality

Whereas most experimental studies have focused on how mortality salience affects attitudes to particular conservative policies or leaders (most often George W. Bush), we sought to measure conservatism in a more systematic way. Drawing on the influential framework introduced by Jost et al. (2003), we used measures (Nilsson & Azevedo, 2022; Nilsson & Jost, 2020) developed to specifically target the core components of conservatism called *resistance to change* (vs. openness to change) and *acceptance of inequality* (vs. preference for equality).

When considering this framework through the prism of existentialist thought, the former dimension seems to be most closely related to the management of existential anxiety, which at its very core involves a concern with the transitoriness, corruptibility, and eventual decay of everything we hold dear. Dilthey (1957/1890), for instance, traced the structure of worldviews to the “profound human yearning” to overcome “the transitoriness and final futility of all things human... the corruptibility of all that we own, cherish or even hate or fear” (p. 22) through “stability and fixity or the cosmic picture” (p. 30). Becker (1973, p. 5) too

emphasized the psychological power of the “hope and belief” that “the things that man creates in society are of lasting worth and meaning, that they outlive or outshine death and decay, that man and his products count”. It is less obvious from the observations made by these and other existentialist scholars that social and economic hierarchies would be essential for providing refuge from existential threat. There is also plenty of empirical evidence to suggest that existential threat is more consistently and strongly associated with right-wing authoritarianism, which incorporates resistance to change, than with social dominance orientation, which incorporates acceptance of inequality (see Duckitt & Sibley, 2010, Jost et al., 2003, Jost et al., 2017, Nilsson & Azevedo, 2022, for reviews). Furthermore, cross-cultural research has found that needs for security robustly predict social conservatism, which incorporates resistance to change, but they frequently predict *liberalism* with respect to economic equality, presumably because of the sense of material security an egalitarian system can provide (Malka et al., 2014).

For these reasons, we hypothesized that death anxiety is, whether it occurs naturally or is induced through mortality salience manipulations, more strongly associated with elevated resistance to change than with elevated acceptance of inequality. We were able to test this hypothesis in a more direct and precise way than previous studies have done by using scales developed specifically to measure resistance to change and acceptance of inequality rather than adjacent constructs such as right-wing authoritarianism and social dominance orientation (Nilsson & Azevedo, 2022; Nilsson & Jost, 2020). Because past experimental studies of mortality salience effects on conservatism have often used support for George W. Bush in the wake of the 9/11 terrorist attacks as the dependent variable, it not clear whether they suggest that mortality salience elevates conservative beliefs and attitudes *per se* rather than authoritarian deference for a charismatic leader (Burke et al., 2013). Similarly, if right-wing authoritarianism is elevated by mortality salience, this does not tell us if it is the adherence to

conventional norms, deference for authority, or aggression toward deviants (Altemeyer, 1981), or all of them, that was increased.

Normativist and Humanist Worldviews

Although studies in personality and social psychology frequently address specific aspects of worldviews, theory and research on more foundational aspects of worldviews and the broad patterns of meaning they produce is much rarer (Koltko-Rivera, 2004; Nilsson, 2014b). A notable exception is *polarity theory* (Tomkins, 1963, 1965, 1987), which traces the ancient, perennial conflicts between different worldviews to one single clash between two different visions of humanity, with different root assumptions about the world and derivative divergences with respect to interpersonal orientations, emotional proclivities, political beliefs, and epistemological assumptions. *Humanism* is based on the assumption that human nature is an “active, creative, thinking, desiring loving force in nature” (Tomkins, 1963, p. 391), with intrinsic worth and goodness. It urges unconditional love and warmth toward others, as well as openness to affects and impulses, and it portrays protection of human rights and well-being as the core purpose of society, and imagination, creativity, and excitement as critical to the pursuit of knowledge. *Normativism*, on the other hand, rests on the assumption that human goodness and worth is contingent upon “struggle toward, participation in, conformity to a norm, a measure, an ideal essence basically prior to and independent of man” (Tomkins, 1963, p. 392). It urges discipline, punishment, respect that is contingent upon achievement, as well as restraint of affects and impulses, and it portrays the maintenance of law and order as the core purpose of society, and observation, rigor, and minimization of error as critical to the pursuit of knowledge (Nilsson, 2014a). Tomkins (1963) described humanism as the worldview of the political left and normativism as the worldview of the political right (see also Nilsson & Jost, 2020).

Research has revealed that these two worldviews are not as opposed to each other as the original theory suggested. They proved to be virtually uncorrelated in early measures (de St. Aubin, 1996; Stone & Schaffner, 1997), negatively correlated but factorially distinct when their hierarchical structure was later taken into account (Nilsson, 2014a), and associated with different sets of metaphysical and epistemological assumptions, moral inclinations, and aspirations (Nilsson & Strupp-Levitsky, 2016). Past findings suggest that normativism is precisely the kind of worldview that might effectively mitigate existential angst by providing a sense of stability, certainty, and security. Normativism is associated with essentialist, determinist, and mechanist assumptions about persons, society, and the universe, an absolutist epistemology that portrays knowledge as a collection of certain facts, and resistance to change in the political domain, whereas humanism is virtually uncorrelated with these variables (Nilsson & Jost, 2020; Nilsson & Strupp-Levitsky, 2016). Nilsson and Strupp-Levitsky (2016) proposed that normativism is indeed a key part of the psychological systems that help human beings deal with threat while humanism is associated with a mindset based on positive affect, including playfulness, exploration, creativity, and intimacy. Insofar as positive and negative affect are distinct (Diener & Emmons, 1984), normativism and humanism should be functionally distinct. For these reasons, we hypothesized that existential threat is associated more strongly with elevated normativism than with decreased humanism.

Although this hypothesis does not follow directly from polarity theory (Tomkins, 1963, 1965, 1987), it is not inconsistent with this theory. Polarity theory broke new ground in emphasizing the emotional foundations of worldviews and describing their development in terms of a mutual interplay between “ideo-affective postures” (feelings and ideas about feelings) and ideologies (de St Aubin, 1996; Nilsson, 2013; Nilsson & Strupp-Levitsky, 2016). Tomkins’ (1987) also conjectured that normativism had thrived in conditions of resource scarcity, during which a toughminded mentality is required, while humanism had

proliferated in times of peace and prosperity, during which people could afford to be jovial, empathetic, altruistic, and curious. Even though Tomkins (1963, 1965, 1987) did not discuss situational effects on worldviews (or fear of death), it is reasonable to assume that humanism and normativism are similar to political ideology in being both highly stable *and* subject to situational influences (Duckitt & Sibley, 2012). Stability of individual differences (i.e., inter-individual stability) is independent of group-level variations between situations—the “person-situation” dichotomy is in this sense false (Funder, 2006).

If the hypotheses of this research would receive support, this would have important theoretical implications for how to understand the link between existential themes and worldviews. On a more practical level, it would suggest also that it is possible to fashion political narratives, and other kinds of messages, that retain a degree of humanism and advocacy of equality, without repelling both liberals and conservatives in the face of threat, insofar as these messages manage to instill a sense of existential stability and security.

Cultural and Political Settings

Most studies in this area have been conducted in a North American cultural setting. Out of 22 studies in the classical Jost et al. (2003) meta-analysis of correlations between fear of death and conservatism, eleven were conducted in the United States (and two in Canada). Out of 26 studies in the Burke et al. (2013) meta-analysis of the effect of mortality salience on political outcomes, 20 were conducted in the US (and two in Canada). Although a recent meta-analysis encompassing both these literatures (Jost et al., 2017) included data from a wider range of countries, more than half of the studies were still conducted in the US. This is a significant limitation, because effects of mortality salience on ideological worldviews may vary with contextual factors (e.g., dominant beliefs and values), and the sociopolitical history of the country may matter (Burke et al., 2013).

The first two studies in the current research were conducted in Sweden and the third was conducted in the United Kingdom. Both countries are Western-European post-industrial democracies with high secularism, liberalism, and egalitarianism, although Sweden is somewhat more extreme in these respects, with a Protestant (vs. Anglo-Saxon) cultural heritage (Inglehart & Welzel, 2010). This means that it would be difficult to explain a conservative shift of attitudes concerning social change and a shift toward normativism in terms of a hypothesized strengthening of dominant cultural values. Another difference is that Sweden has a multiparty system with a left-right division between socialist, social democratic, and green parties (the left) and social liberal, liberal-conservative, and conservative parties (the right) primarily based on divergent attitudes to social and economic equality, while the UK has a biparty system (similar to the U.S.) with a left-right division between the Labour party and the Conservative party that is primarily based on a divergence with respect to traditionalist values (Aspelund et al., 2013). In other words, although leftists are liberal in both Sweden and the UK, it is more common for rightists as well to be liberal in Sweden (Nilsson et al., 2020).

Furthermore, Sweden has a history of peace and prosperity, including more than two centuries without war and more than one century of economic growth (Merriman, 2019), a relatively low homicide rate compared to North America (Eurostat, 2018), and a generous social democratic welfare state (Esping-Andersen, 1990), all of which may lower levels of chronic existential threat. The UK has a similar homicide rate (Eurostat, 2018) but a more violent past (Merriman, 2019) and a liberal, less generous welfare state (Esping-Andersen, 1990).

Overview of Research

The overarching goal of the research was to investigate the association between existential threat (operationalized in terms of mortality salience or death anxiety) and political

attitudes and worldviews. Our hypotheses were that existential threat is associated mainly with (1) conservative attitudes concerning social change rather than equality in the political domain, and (2) with normativism rather than (low) humanism in terms of broader worldviews. We investigated whether existential threat increases conservatism and normativism (and decreases preference for equality and humanism to a lesser extent) among both left- and right-wingers (*a conservative shift effect*; Bonanno & Jost, 2006), predominantly among leftists (*a reactive-leftists effect*; Nail et al., 2009), or predominantly among rightists, with the opposite occurring among leftists (*an extremism effect*; Castano et al., 2011). We had no specific a priori theoretical expectations about which of these three kinds of effect that would be more likely to emerge. We tested four statistical hypotheses (two-tailed) in each study: (1) existential threat has a stronger main effect on (a) resistance to change than on acceptance of inequality and (b) normativism than (low) humanism, and (2) the interaction of existential threat and political self-placement has a stronger effect on (a) resistance to change than on acceptance of inequality and (b) normativism than (low) humanism.

Study 1 had an experimental design, drawing on the most common paradigm for manipulating mortality salience (Rosenblatt et al., 1989), whereas Study 2 had a correlational design, drawing on research on ideology as motivated social cognition (Jost et al., 2003). Both studies were conducted in Sweden with paper-and-pencil instruments. A manuscript reporting the results from these two studies was under review at three social psychology journals in 2017-2018. Some reviewers felt that the results were not sufficiently clear or consistent with previous theory and research to merit publication. Two reviewers also raised a more substantive methodological point: the manipulation we had used in Study 1 deviated subtly from the original (Rosenblatt et al., 1989). We therefore conducted a pre-registered replication of Study 1 with a UK-based online sample and the manipulation phrased exactly as the

original. In sum, although the results of Study 1 seemed promising at the time, strict hypothesis tests performed later did not yield support for the hypotheses and Study 3 did not yield any significant mortality salience effects at all. However, Study 2 did provide some correlational evidence of associations between dispositional death anxiety and resistance to change, normativism, and acceptance of inequality.

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the studies. We provide electronic supplementary documents with all the research materials (including English translations), data files, and code for running the statistical analyses: <https://osf.io/vakgp/>. Data collection was completed prior to data analysis in all studies.

Study 1

This study was modeled on past research in the terror management tradition. We used a standard procedure for manipulating mortality salience (Rosenblatt et al., 1989) that has been widely used in past research (for a review, see Burke et al., 2010), combined with a new set of outcome measures of political attitudes and worldviews.

Method

Participants

Swedish adults were recruited personally by university students in Sweden in 2013 ($N = 186$, after excluding seven participants with 70%-100% missing data on the items used to measure ideological preferences and worldviews; 62.9 % women, 37.1% men; mean age = 28.5 years, $SD = 12.3$). They received no compensation for their participation. They were randomly assigned to a mortality salience condition ($n = 93$; 58 women, 35 men; mean age = 30.3, $SD = 14.5$) or a control condition ($n = 93$; 59 women, 34 men; mean age = 26.7, $SD = 9.43$).

We determined sample size through power estimates calculated in GPower 3.1 (Faul et al., 2007). Meta-analyses that were published prior to this study had suggested that mortality salience effects tend to be large in general ($r = .35$; Burke et al., 2010) and particularly with respect to political outcomes ($r = .50$), although the effect on conservatism specifically was somewhat lower ($r = .22$; Burke et al., 2013). In order to obtain 80% power to detect an effect of $|\rho| = .20$ at a 5% alpha level (two-tailed), we would need around 190 participants. We set the target at 100 participants per group. The sample size we obtained (after excluding incomplete responses) was larger than that of 96% of the studies reported in an influential meta-analysis of mortality salience effects (Burke et al., 2010). However, it should be noted that a meta-analysis that was published after this study was conducted (Jost et al., 2017) indicated that the effect of mortality salience on conservatism is considerably weaker than we had assumed (unweighted: $r = .13$; weighted: $r = .08$; weighted with an extremely large sample excluded: $r = .11$).

Materials and Procedure

After giving informed consent, participants reported demographics, left-right self-placement on a scale ranging from 1 (“Extremely far to the left”) to 9 (“Extremely far to the right”), religiosity on a scale ranging from 1 (“Extremely atheistic”) to 9 (“Extremely religious”), and which party they would vote for had it been election day. They also responded to items measuring system justification and political involvement¹. After this, the participants received the experimental manipulation.

There were no significant differences between the experiment group and control group on gender, left-right self-placement (Experiment: $M = 4.32$, $SD = 1.89$; Control: $M = 4.34$, $SD = 1.87$), or religiosity (Experiment: $M = 4.20$, $SD = 1.84$; Control: $M = 4.24$, $SD = 1.79$) prior to

¹ These scales were initially included as controls but were later dropped to avoid complicating interpretation of the findings. Their exclusion did not alter the results, and they are included in supplementary documentation and data files.

the manipulation ($p \geq .88$). Although mean age differed marginally between the conditions ($p = .051$, see Table 1), the median age was the same in both conditions ($Md = 24$) and a non-parametric test indicated that the difference was not significant ($p = .30$).

The instructions for the mortality salience condition read: “Imagine that you die of a disease. Please describe the emotions that the thought of your own death awakens in you. Write down, as in as much detail as you can, what will happen to you as you physically die.” This procedure for manipulating mortality salience has been used frequently in previous research, particularly within the terror management theory tradition (e.g., Kosloff et al., 2010; Rosenblatt et al. 1989).

The participants in the control condition were asked to think about dental pain instead: “Imagine that you suffer from aching dental pain. Please describe the emotions that the thought of having aching dental pain awakens in you. Write down, in as much detail as you can, what happens to you when you suffer from dental pain.” By encouraging the participants in the control condition to think about pain, we sought to balance the two conditions in terms of negative valence, which might otherwise confound the experimental effect and render it more difficult to interpret (see Burke et al., 2010, for a review).

Previous research has suggested that reactions to mortality salience tend to be temporally delayed, presumably because they occur below the threshold of consciousness (Pyszczynski et al., 1999). Therefore, effects of mortality salience tend to be stronger when a distraction task follows the manipulation. The most commonly used distractor in past mortality salience experiments is the positive and negative affect schedule (PANAS; Watson et al., 1988; see Burke et al., 2010, for a review). We therefore used this distractor in the current experiment, letting participants rate their current mood on 23 items (e.g., upset, proud, nervous).

After the distraction task, the participants filled out measures of political attitudes and worldviews, and after this they reported left-right self-placement once again. We measured

resistance to change ($\alpha = .75$) and preference for equality ($\alpha = .81$) with nine items each, including one reversed item per scale, based on previous attempts to isolate these components of ideology (Nilsson & Azevedo, 2022; Nilsson & Jost, 2020). Sample items are “If you start changing things very much, you often end up making them worse” (resistance to change) and “Prosperous nations have a moral obligation to share some of their wealth with poor nations” (preference for equality). Although the questionnaire included two additional items that had initially been a part of these scales, we excluded them from the data analyses, after making sure that this did not fundamentally alter the results, based on later psychometric refinement of the scales (Nilsson & Jost, 2020).

We measured humanism ($\alpha = .72$) and normativism ($\alpha = .70$) with 10-item short-scales with items evenly dispersed across five facets: view of human nature, interpersonal attitude, attitude to affect, political values, and epistemology (Nilsson, 2014a, 2015). Sample items include “Human beings are basically good” (humanism) and “Human beings should be treated with respect only when they deserve respect” (normativism). Participants responded on a five-point Likert scale, ranging from 1 (“completely disagree”) to 5 (“completely agree”).

All of the measures had previously been translated into Swedish and back-translated into English. The second author translated the experimental manipulations into Swedish and the first author evaluated the translations.

Statistical Procedure

We investigated the effect of mortality salience on political attitudes and worldviews through a series of regression analyses, entering standardized left-right self-placement and experimental condition, as well as the standardized interaction term, as predictors. Although worldviews have often been treated as predictors of political self-placement rather than the other way around, it is reasonable to assume that the links between them are bidirectional (Nilsson & Jost, 2020; Sibley & Duckitt, 2013). The purpose of including political self-

placement as a predictor in this study was to investigate whether it moderates effects of mortality salience on worldviews and ideological preferences (adjusting for potential main effects).

To formally test the hypotheses, we first inspected the confidence intervals (Cumming, 2009). For the predictors to be significantly different at a 5% alpha level, their standardized regression coefficients would need to be outside of each other's 95% confidence intervals (e.g., the negated coefficient for preference for equality would have to be outside of the confidence interval of the coefficient for resistance to change). In cases for which there was a difference, we proceeded to computing a p-value for it through a Steiger (1980) test based on partial correlations (adjusting for other predictors in the model) and applying a Holm-Bonferroni (1979) correction for the four statistical hypotheses that were tested. We used Lee and Preacher's (2013) online calculator for the Steiger tests. These statistical tests were planned after data collection; we did not have a precise statistical operationalization of our research hypotheses prior to data analysis. A post-hoc power analysis suggested that we had 80% power to detect an effect of $|\rho| = .22$ (one-tailed) at the lowest corrected alpha threshold.

To probe the robustness of the results, we subsequently adjusted for additional predictors (political ideology or worldview and demographic variables) in the regression models and the tests of the hypotheses. For the hypotheses to be robustly supported, the effects should remain significant when demographic variables are added to the models. We report standardized regression coefficients with 95% confidence intervals.

Results

All descriptive statistics and correlations between the measured variables are displayed in Table 1. The lack of correlation between normativism and right-wing self-placement was due to the manipulation ($r = -.15$ in the experimental condition; $r = .20$ in the control condition).

[Insert Table 1]

Exploratory Analyses

There were, as shown in Table 2, marginally significant interaction effects at the .05 alpha level on both resistance to change² and normativism, indicating that mortality salience made left-wingers more resistant to change and higher in normativism, consistent with the notion of a reactive-leftists effect. These interaction effects are illustrated in Figures 1-2³. None of the main effects were significant.

[Insert Table 2]

The interaction term had no significant effects on preference for equality or humanism. However, the main effects of mortality salience on humanism and preference for equality were in the negative direction with magnitudes and p-values similar to those for the interaction effects on resistance to change and normativism.⁴

[Insert Figures 1-2]

The interaction effect on resistance to change remained marginally significant when we adjusted for preference for equality ($\beta = .14[-.27, -.01]$, $p = .042$), as did the interaction effect on normativism when we adjusted for humanism ($\beta = -.17[-.32, -.02]$, $p = .028$). The main effects of mortality salience on humanism ($\beta = -.15[-.30, .00]$, $p = .053$) and preference for equality ($\beta = -.10[-.23, -.04]$, $p = .15$) were not significant when we adjusted for normativism and resistance to change respectively (tolerance $\geq .94$). When we adjusted for gender, age, and religiosity, the interaction effects on resistance to change and normativism remained

² When all ten original resistance to change items ($\alpha = .78$) were included, the interaction effect was still significant ($\beta = .15[-.29, .00]$, $p = .043$).

³ We constructed the figures using Excel-sheets available from <http://www.jeremydawson.co.uk/slopes.htm>, with minor modifications. Although these figures use scale dichotomization for illustrative purposes, there was no dichotomization of any of the numeric scales in our analyses.

⁴ We investigated the robustness of the effects when excluding the three preference for equality items that were not included in Study 2 ($\alpha = .76$) and later dropped from the preference for equality scales (Nilsson & Azevedo, 2022). The main effect of mortality salience on preference for equality barely reached significance, $\beta = -.15[-.29, .00]$, $p = .045$, but it was no longer significant when we controlled for gender, age, and religiosity, $\beta = -.12[-.26, .02]$, $p = .11$. The interaction effect remained far from significant when excluding these items, $\beta = .03[-.12, .17]$, $p = .72$.

significant, but the main effects on humanism and preference for equality did not (see Step 2, Table 2; tolerance $\geq .94$). Age had significant effects on resistance to change and normativism and female gender had significant effects on preference for equality and (low) normativism (see Step 2, Table 2).

Hypothesis Tests

The confidence interval for the interaction effects on resistance to change and normativism encompass the negated interaction effects on preference for equality and humanism respectively (see Table 2). In other words, we cannot conclude from these data that mortality salience increased resistance to change significantly more than it decreased preference for equality or that it increased normativism significantly more than it decreased humanism.

Inspection of the confidence intervals indicated that the interaction had a marginally stronger effect on resistance to change than on acceptance of inequality when the results were adjusted for gender, age, and religiosity (see Step 2, Table 2). However, this result did not survive a correction for multiple testing. The p -value computed from the Steiger test was .032 and the corrected alpha threshold for this analysis was .0125. In other words, the interaction term was not significantly more strongly associated with resistance to change than with acceptance of inequality adjusting for other Step-2 predictors. Therefore, none of the statistical hypotheses were supported in any analysis.

Discussion

The results of the initial analyses suggest that mortality salience elevated resistance to change and normativism more among leftists than among rightists, consistent with the notion of a reactive-leftist effect. These effects remained significant when we controlled for preference for equality and humanism respectively and for gender, age, and religiosity. Although mortality salience had marginal main effects on humanism and preference for

equality in the negative direction, these effects were not significant when we controlled for normativism and resistance to change respectively. In sum, exploratory analyses indicated that mortality salience had more robust effects on resistance to change and normativism than on preference for equality and humanism (in the opposite direction). However, formal hypothesis tests (that were not planned prior to data collection) failed to reveal any significant differences in the strength of the effects on resistance to change compared to acceptance of inequality and normativism compared to low humanism. Therefore, none of our statistical hypotheses were supported.

The exploratory results nevertheless provide some ground for speculation. A potentially interesting possibility is that the character of the effects might differ across different outcome measures. Mortality salience elevated resistance to change and normativism only among left-wingers, consistent with the notion of a reactive-leftist effect (Nail et al., 2009)—none of its effects were even in the direction of higher resistance to change or normativism among right-wingers under high (vs. low) threat. But if anything, the results indicate that mortality salience had main effects on humanism and preference for equality, consistent with the notion of a conservative (or anti-liberal) shift (Bonanno & Jost, 2006). The results thereby raise the possibility that selection of the outcome measure of political attitudes and worldviews could matter in a different manner than we had anticipated—whether general conservative shift, liberal reactivity, or extremist polarization occurs could potentially vary across different aspects of personal ideologies and worldviews. At the same time, it is important to bear in mind that this is a conjecture that could be tested in future research rather than a conclusion that can be drawn from the present results.

An obvious limitation is that the sample did not provide us with the statistical power needed to detect small effects. A larger sample could have yielded a clearer pattern of results. In particular, comparisons of the strength of mortality salience effects across different

outcome variables would have been more informative with a larger sample size. In addition, even the effects that were significant in the exploratory analyses were marginally below the alpha threshold. A correction of the alpha threshold for testing multiple statistical hypotheses tested would render them non-significant. Replication is clearly needed before conclusions can be drawn.

Furthermore, we cannot rule out the possibility that another selection of manipulations would have yielded different results. It is, for example, possible that the manipulation of mortality salience that we used was biased against the extremism hypothesis, because it instructed participants to imagine dying “of a disease”, which may have evoked feelings of disgust and concomitant conservative sentiment (Inbar et al., 2012; but see Elad-Strenger et al., 2019, for a perspective that challenges the disgust-conservatism link).

Finally, it is conceivable that responding to a political self-placement item prior to the manipulation could have made the participants less amenable to change their ideological preferences. On the other hand, we needed a pre-test measure of political placement to be able to investigate potential reactive-liberals and extremism effects, and we used a single self-placement item to minimize unintended effects on the post-test.

Study 2

It is possible that death anxiety that is induced by mortality salience inductions is different from the sort of dispositional death anxiety that self-report measures tap into. Castano et al. (2011) have argued that this may explain the divergence of findings between terror management research, which typically uses mortality salience inductions, and research on ideology as motivated social cognition, which typically uses self-report measures of death anxiety. In this study, we therefore followed up on our experimental results by using a correlational design, drawing on past research on ideology as motivated social cognition (Jost et al., 2003).

Method

Participants

Swedish adults were recruited by university students at Swedish campuses and other public spaces in 2014 ($N = 354$; 56.7% women, 43.3% men; mean age = 31.7 years, $SD = 13.6$; mean years of higher education = 3.03, $SD = 2.61$). They were compensated for their participation with a lottery ticket or chocolate bar. Scales measuring humanism and normativism were completed by a subset of 179 participants (mean age = 31.4, $SD = 13.5$, 54.9% women, 45.1% men; mean years of higher education = 2.98, $SD = 2.62$); all other scales were completed by all participants.

The sample size was determined by the availability of resources. *Post hoc* power analyses conducted in Gpower 3.1 (Faul et al., 2007) indicated that we had 80% power (two-tailed) to detect correlations of .15 for resistance to change and preference for equality and .21 for worldviews normativism and humanism at a 5% alpha level. At the lowest corrected alpha level of 1.25% for tests of hypotheses, we had 80% power (one-tailed) to detect correlations of .16 and .23 respectively. Onraet, Van Hiel, Dhont and Patton (2013) reported a meta-analytic estimate of $r = .24$ for the correlation between death anxiety and right-wing attitudes, while Jost et al. (2017) found considerably weaker estimates (unweighted: $r = .12$; weighted: $r = .02$; weighted with an extremely large sample excluded: $r = .06$). Simulation studies suggest that correlations tend to stabilize substantially at approximately $N = 250$ (Schönbrodt & Perugini, 2013).

Materials and Procedure

All participants completed a larger battery of questionnaires on politics, worldviews, and personality from which the current measures were drawn. The complete questionnaires were based on a planned missing data design (Graham et al., 2006). There were three versions of the battery and each of these included two thirds of all items (n ranged from 175 to 212). The

reason that more participants completed the ideology scales than the worldview scales is that the ideology scales (and death anxiety scales) were included in two versions of the battery while the worldview scales were included only in one. No participants who had responded to the measures relevant to this study were excluded.

The participants completed the same 9-item measure of resistance to change ($\alpha = .79$) that respondents in Study 1 completed, a revised 9-item version of the preference for equality scale in which three items had been substituted (Nilsson & Azevedo, 2022; Nilsson & Jost, 2020), and 15-item versions of the measures of humanism ($\alpha = .86$) and normativism ($\alpha = .75$) that were used in Study 1 (Nilsson, 2014a, 2015). Participants responded on five-point Likert scales, ranging from 1 (“completely disagree”) to 5 (“completely agree”).

We measured death anxiety ($\alpha = .88$) as an aggregate of four items from a scale focusing on death-related thoughts, including “I avoid thinking about death altogether” (Wong et al., 1994), and four items from a scale focusing on behavioral manifestations of fear of death, including “The sight of a corpse deeply shocks me” (Tomás-Sábado & Gómez-Benito, 2005). The response options ranged from 1 (“very false of me”) to 5 (“very true of me”).

Participants reported left-right self-placement ($M = 4.41$, $SD = 2.22$) on a 10-point Likert scale ranging from 1 (“Left”) to 10 (“Right”) and religiosity ($M = 1.77$, $SD = 1.95$) on a 7-point scale ranging from 1 (“Not at all religious”) to 7 (“Extremely religious”). We measured education with an open question: “Approximately how many years of education have you completed, whether full-time or part-time? Please report these in full-time equivalents and include compulsory years of schooling”.

Statistical Procedure

We investigated the associations between death anxiety and political attitudes and between death anxiety and worldviews through a series of regression analyses. The analyses

were structured the same way as in Study 1, except that death anxiety took the place of mortality salience and education was included among the covariates in this study.

Results

All descriptive statistics and correlations between the measured variables are displayed in Table 3.

Exploratory Analyses

The results of the regression analyses are reported in Table 4. The interaction between death anxiety and left-right orientation had significant effects on both resistance to change and normativism, similar to Study 1, and it had a significant (negative) effect on preference for equality as well in this study. These interaction effects are illustrated in Figures 3-5. They all indicate that death anxiety is more strongly associated with conservatism (resistance to change, acceptance of inequality, and normativism) among left-wingers than among right-wingers. Death anxiety had a significant main effect only on resistance to change.

[Insert Table 4]

[Insert Figures 3-5]

When the model predicted resistance to change, the interaction effect ($\beta = -.13[-.23, -.04]$, $p = .006$) and main effect ($\beta = .14[.05, .23]$, $p = .003$) remained significant when we controlled for preference for equality, as did the interaction effect on normativism ($\beta = -.16[-.33, -.02]$, $p = .026$) when we controlled for humanism. The interaction effect on preference for equality ($\beta = .09[.01, .18]$, $p = .034$) was significant when we controlled for resistance to change as well (tolerance $\geq .65$).

When we controlled for gender, age, religiosity, and education, the interaction effects on resistance to change and preference for equality and the main effect on resistance to change remained significant, while the interaction effect on normativism did not (see Step 2, Table 4;

tolerance $\geq .90$)⁵. Gender had significant effects on resistance to change, normativism, and preference for equality, education had significant effects on resistance to change and preference for equality, and both age and religiosity had significant effects only on resistance to change (Table 4).

Post hoc analyses revealed possible gender differences in reactivity to threat. When we re-checked the results of Study 1, they also showed similar gender differences. Mortality salience (Study 1) and death anxiety (Study 2) had significant or close to significant main effects on resistance to change (Study 1, $\beta = .17$, $p = .065$; Study 2, $\beta = .26$, $p < .001$) and normativism (Study 1, $\beta = .20$, $p = .042$; Study 2, $\beta = .24$, $p = .017$) among women but no such effects at all among men ($-.07 \leq \beta \leq .02$, $p \geq .56$). In Study 2, death anxiety had an interaction effect on resistance to change among women ($\beta = -.19$, $p = .003$) but not men ($\beta = -.09$, $p = .25$) and an interaction effect on preference for equality among men ($\beta = .15$, $p = .029$) but not women ($\beta = .05$, $p = .36$). All interactions were consistent with the reactive-liberals hypothesis.

Hypothesis tests

The confidence intervals reported in Table 4 show that neither death anxiety nor the interaction between death anxiety and right (vs. left) orientation had a significantly stronger effect on resistance to change than on (low) preference for equality (i.e., the negated regression coefficients for preference for equality were inside of the confidence interval of the corresponding coefficients for resistance to change). The confidence intervals do suggest that the interaction of death anxiety and right (vs. left) orientation was more strongly associated with normativism than with low humanism both with and without covariates added to the model. However, Steiger tests with a correction for multiple testing showed that the

⁵ We also ran all these regression models excluding age, because the age distribution deviated greatly from normality in both studies. This did not noticeably affect any of the regression coefficients of the other variables.

difference in the strength of the coefficients was not significant when we adjusted for age, gender, education, and religiosity ($p = .071$) or when we did not ($p = .021$; corrected alpha threshold = .0125). The statistical hypotheses were therefore not supported.

Discussion

Consistent with the results of the first study, both resistance to change and normativism were associated with death anxiety. Death anxiety was more consistently linked to these variables than to (low) preference for equality and humanism (one main effect and two interactions vs. one interaction). These results seem to suggest that choice of outcome measures may matter when the relationships between existential threat, political attitudes, and worldviews are investigated. However, strict hypothesis tests failed to provide clear evidence that any of the effects were significantly stronger for resistance to change and normativism than for (low) preference for equality and humanism. Testing the hypotheses with a larger sample would have been desirable, because we did not have the statistical power needed to detect small differences between the regression coefficients, particularly given that the sizes of the associations between death anxiety and humanism and preference for equality were not zero.

Interestingly, the exploratory analyses suggested that the link between death anxiety and both political attitudes and worldviews took the form of an interaction with left-right orientation, in line with the reactive-leftists perspective (Nail et al., 2009) and similar to the first study. These results suggest that a sub-group of the participants who identify as left-wingers do in fact have a relatively conservative outlook on the world, coupled with a relatively high level of death anxiety—they might, in this sense, be called “pseudo-liberals” (Adorno et al., 1950) rather than genuine liberals. These correlational results cannot tell us whether the higher conservatism among this group of leftists was in fact a reaction to elevated existential threat, as suggested by the reactive-leftists hypothesis, or whether it was rather the

case that conservative attitudes, narratives, or something else provoked increased fearfulness. But they suggest that the relationship between death anxiety and outlook on the world is moderated by political self-placement such that the concern with death matters more among left-wingers. At the same time, it is important to bear in mind, once again, that these exploratory conjectures need be exposed to rigorous tests before conclusions can be drawn.

Another potentially interesting *post hoc* result was that gender might play a role in moderating the effects of existential threat on political attitudes and worldviews. It was primarily the attitudes and worldviews of the right-wing men rather than women that proved to be unreactive to existential threat. Although the overall magnitude of death defenses detected in past terror management research is not moderated by gender, it is possible that men and women engage in different kinds of defense against existential threat (Burke et al., 2010). It is conceivable that conservatism plays a more important role in the defense against death anxiety among women in general than among men (or at least right-wing men). However, the effects of gender that we found in the current studies were neither strong nor predicted, so further research is certainly needed to investigate their reproducibility as well as the potential moderating roles of other individual difference variables and contextual factors.

Study 3

This study was a direct replication of Study 1. The only substantive differences in the design were that the participants were from the United Kingdom rather than from Sweden, they participated in the study online, and they were instructed to imagine dying rather than dying “of a disease” so that the manipulation would be less likely to evoke disgust and thereby less biased against potential extremism effects.

A preregistration of hypotheses, methods, and analyses was posted at the Open Science Framework in 2018, prior to data collection: <https://osf.io/eugs6>. The hypothesis stated in the preregistration was that “effects of mortality salience on conservative worldviews among left-

and right-wingers (i.e., any of the three types of effect listed above [conservative shift, liberal reactivity, extremism]) consist primarily in elevating normativism and resistance to change rather than lowering humanism and preference for equality”.

Method

Participants

As in Study 1, the target sample size was 200. The pre-registration included both analyses of data from this sample by itself and an internal meta-analysis of results from this study and Study 1.

Data were collected through the Prolific ($n = 236$) and CloudResearch ($n = 86$) platforms for online participant recruitment in 2018 to 2020. The participants were stratified by age (50%: 20 to 40 years; 50%: 40 years and up) and gender (50% men; 50% women). Initially, data were collected through psychsurveys.org. Due to an electronic error, responses to humanism and normativism items (but not any other items) were overwritten for the first 122 participants, who completed the study in 2018. We thereafter switched to registering data through Qualtrics and collected additional data in 2019 and early 2020 to reach our sample size goal for all outcome variables. Based on our pre-registration, we excluded three participants who had failed two attention check questions (and zero participants who had used the same response option for more than 80% of the items measuring our outcome variables). Ten participants satisfied an additional criterion for exclusion—they did not write more than a few words in response to the mortality salience induction essay-question—but we decided to compare the results when analyses were run with and without this group, because an exclusion of this sort could introduce selection bias.

This brings our sample sizes to $N = 319$ (52.7% men, 47.0% women; mean age = 37.3 years, $SD = 11.1$) for ideological preferences and $N = 199$ (54.8% men, 44.7% women; mean age = 36.3 years, $SD = 10.8$) for worldviews, and this was reduced to 309 and 191

respectively when participants with very brief responses to the essay-question had been excluded. The participants were randomly assigned to a mortality salience condition (ideological preferences: $n = 152$, 74 women, 78 men, mean age = 37.5, $SD = 11.0$; worldviews: $n = 92$, 43 women, 49 men, mean age = 37.0, $SD = 11.6$) or control condition (ideological preferences: $n = 167$, 76 women, 90 men, 1 other, mean age = 37.2, $SD = 11.2$; worldviews: $n = 107$, 46 women, 60 men, 1 other, mean age = 35.6, $SD = 10.2$). *Post hoc* power analyses showed that the sample sizes gave us 80% power to detect an effect of $|\rho| = .16$ at a 5% alpha level (two-tailed) and $|\rho| = .17$ at a 1.25% corrected alpha level (one-tailed) for ideological preferences and $|\rho| = .20$ at a 5% alpha level (two-tailed) and $|\rho| = .21$ at a 1.25% corrected alpha level (one-tailed).

Materials and Procedure

After giving informed consent and responding to the same left-right self-placement, religiosity, and party preference items that were included in Study 1, the participants reported the highest level of education they had completed and their occupation (open-ended question). After this, they received the experimental manipulation. The instructions for both conditions were identical to those used in Study 1 except that the words “of a disease” were omitted from the mortality salience condition.

There were no significant differences between the experiment group and control group on left-right self-placement (Experiment: $M = 4.23$, $SD = 1.74$; Control: $M = 4.26$, $SD = 1.75$, $p = .89$), religiosity (Experiment: $M = 3.82$, $SD = 2.40$; Control: $M = 3.67$, $SD = 2.24$, $p = .58$), or gender, age, and education ($p \geq .30$), prior to the manipulation ($n = 319$). This was true also when the analysis was run on the subset of participants with complete recorded responses on humanism and normativism ($p \geq .37$, $n = 199$).

The participants thereafter completed the PANAS filler task and measures of resistance to change ($\alpha = .79$), preference for equality ($\alpha = .78$), humanism ($\alpha = .68$), and normativism (α

= .73) in exactly the same manner as in Study 1, except that they filled out the revised preference for equality scale (with three substituted items) from Study 2 instead of the one from Study 1, and one attention check question was included among the ideological preference items and one was included among the worldview items (e.g., “Choose ‘Completely agree’ in this row to show that you are paying attention”). The methods adhered to the pre-registration.

Statistical Procedure

We ran a series of regression analyses with the same procedure as in our previous studies. Following our pre-registration, we also conducted internal meta-analyses of effect sizes relevant to our hypotheses that we obtained in Study 1 and Study 3. We computed weighted effect size estimates (in terms of r) using Meta-Mar 2.7 (Beheshti, 2020). We report results based on fixed-effect models. Results were very similar when random-effects models were used.

Results

All descriptive statistics and correlations between the measured variables based on analyses with all participants who passed the attention checks are displayed in Table 5.

[Insert Table 5]

Exploratory Analyses

We investigated the association between mortality salience and ideological preferences and worldviews in the same manner as in the previous studies. As shown in Table 6, which reports results of the analyses, neither the main effect of experimental condition nor the interaction effect of experimental condition and left-right self-placement was significant for any of the four outcome variables in this study. Excluding participants who had not responded to the mortality salience induction with more than a few words did not render any of these effects significant ($p \geq .33$; $|\beta| \leq .07$).

[Insert Table 6]

Including male vs. female gender, age, education, and religiosity as covariates did not render any of the focal effects significant either ($p \geq .46$; see Table 6). Effects of age on resistance to change, religiosity on resistance to change, male gender on normativism, and education on preference for equality were significant or close to significant (see Table 6). When we ran the main analyses separately for men and women to follow up on the results from our previous studies, none of main effects or interaction effects relevant to our hypotheses were significant ($p \geq .12$). In other words, we found no evidence for gender subgroup effects of mortality salience on ideologies or worldviews in this study.

Hypothesis Tests

Inspection of the confidence intervals did not reveal any differences in the strength of effects on resistance to change and (low) preference for equality or on normativism and (low) humanism. In other words, the hypotheses of the research were not supported.

Internal Meta Analysis

The weighted interaction effect of mortality salience and ideological self-placement on normativism was marginally significant ($r = -.12[-.21, -.02]$, $p = .021$), but the interaction effects on resistance to change ($r = -.07[-.16, .01]$, $p = .096$), preference for equality ($r = .04[-.04, .13]$, $p = .33$), and humanism ($r = .03[-.07, .13]$, $p = .56$) were not. Mortality salience had no significant weighted main effect on resistance to change ($r = .06[-.03, .14]$, $p = .21$), preference for equality ($r = -.07[-.16, .01]$, $p = .10$), normativism ($r = .04[-.06, .14]$, $p = .40$), or humanism ($r = -.08[-.18, .02]$, $p = .10$). Inspection of the confidence intervals reveals that the weighted effects were not significantly stronger for resistance to change or normativism than for (low) preference for equality or humanism in any case. The hypotheses were therefore not supported.

Discussion

The results of this preregistered replication study did not provide support for any significant effects of mortality salience on ideological preferences or worldviews, and there were no significant differences between effects on resistance to change and low preference for equality or normativism and low humanism. Even weighted effect size estimates that were calculated based on both the original study and the replication study generally failed to reach significance. Although the weighted effect of mortality salience on normativism across both studies was significant, this effect was just below the alpha threshold, and the effect from the preregistered study was considerably weaker than the effect from the original study. In sum, we did not obtain clear evidence for any effects of mortality salience on ideologies or worldviews consistent with our hypotheses.

The most direct interpretation of these results is that mortality salience operationalized as done in our studies does not have any effect on ideologies and worldviews, or at least not an effect of a magnitude we had the statistical power to detect in this research. This interpretation is consistent with recent articles that have reported failed pre-registered replications of paradigmatic mortality salience effects (Klein et al., 2019; Schindler et al., 2021; Sætrevik & Sjøstad, 2022; Treger et al., 2021), as well as a recent meta-analysis (Jost et al., 2017) that reported a weighted estimate for the effect on mortality salience on conservatism that was considerably smaller ($r = .08$, 95% CI[.06, .11]) than the one reported in the widely cited meta-analysis by Burke et al. (2013).

It is theoretically possible that the differences in results between the original (Study 1) and the replication (Study 3) were due to differences in the samples of participants or the manipulation, but this is not very likely. Mortality salience effects are generally assumed to be universal and have often been reported in North American and Western European samples (Burke et al., 2010, 2013), and there is little reason to think that a UK population would not be amenable to such effects, especially given that it is more similar to the US population

(which the majority of studies have sampled from) than the Swedish population is. Likewise, it is unlikely that the subtle reformulation of the manipulation could explain the replication failure because the wording that was used in the replication study is the one that most closely corresponds to the standard paradigm in past research (Burke et al., 2010).

A more substantive difference between the studies was that participants in the replication study were recruited through crowdsourcing platforms and completed the study online. Although there can be problems with the quality of data collected from participants who take multiple studies through online platforms (Chandler et al., 2015; Chmielewski & Kucker, 2020), the platforms used in the current study (Prolific, CloudResearch, and Qualtrics) have mechanisms for filtering out careless respondents, bots, and duplicate responses, and we also used attention check questions to screen the data. Nevertheless, it is possible that it is more common among participants who take studies through crowdsourcing platforms to fill in questionnaires in a routinized manner without the emotional engagement or imagination that may be needed for mortality salience effects to occur. Incorporating useful manipulation checks in mortality salience effects is notoriously difficult, as the psychological processes that are purportedly set in motion are assumed to operate at a subconscious level. Furthermore, there is a potential risk for selection bias in online studies insofar as some participants could be more inclined to drop out of the study when they are behind a screen. These possibilities could be tested in future research. For instance, researchers may want to consider whether length or emotional content of the essays written by participants and online (vs. lab) study format moderate mortality salience effects.

General Discussion

Past research has suggested that confrontations with the facticity of death can elicit worldview defense, but researchers have paid less attention to the way in which worldviews may be transformed by the encounter with death. Research in the terror management tradition

has investigated the effect of mortality salience on cultural worldview defense (Burke et al., 2010) but has not investigated whether some belief systems are more impacted than others by mortality salience. Research based on theories of motivated social cognition has suggested that conservatism is correlated with existential threat (Jost et al., 2017) and that mortality salience and objectively threatening circumstances can lead to a shift toward greater conservatism (Burke et al., 2013; Jost et al., 2017), perhaps especially among leftists (Nail et al., 2009), but it has rarely measured different components of conservative preferences in a systematic way—instead *ad hoc* measures have often been used (e.g., Castano et al., 2011; Nail et al., 2009).

The current studies were based on these two traditions of research—Study 1 used a traditional mortality salience manipulation and Swedish participants, Study 2 measured self-reported death anxiety in Swedish participants, and Study 3 was a pre-registered online replication of Study 1 with UK participants—but we sought to provide a more nuanced understanding of the outcomes of existential threat. First, we disentangled the core components of conservatism identified by Jost et al. (2003), hypothesizing that existential threat leads predominantly to elevated resistance to change rather than acceptance of inequality. Second, we also addressed humanism and normativism, which are more basic dimensions of worldviews that span the domains of human nature, politics, epistemology, emotions, and interpersonal action (Nilsson, 2014a; Tomkins, 1963), hypothesizing that existential threat predominantly affects normativism rather than humanism. Our goal was thus to contribute with a more nuanced understanding of the worldview reactions evoked by the presence of death, along with new empirical evidence from previously underexplored cultural and sociopolitical contexts to a culturally homogeneous field.

Effects of Mortality Salience

The results of Study 1 seemed promising at the time. We found marginally significant interactions between mortality salience and left-right self-placement, indicating that mortality salience elevated resistance to change and normativism particularly among left-wingers, as well as marginally significant main effects indicating that mortality salience may have reduced humanism and preference for equality. These effects are consistent with the conservative shift (Bonanno & Jost, 2006) and reactive-leftists (Nail et al., 2009) hypotheses but not with the extremism hypothesis (Castano et al., 2011). Overall, mortality salience seemed to have more consistent effects on resistance to change and normativism than on (low) humanism and preference for equality in Study 1.

More rigorous tests performed retrospectively did, however, not provide support for our hypotheses even in Study 1—mortality salience was not significantly more strongly associated with resistance to change and normativism than (low) preference for equality and humanism adjusting for multiple testing. Furthermore, the effects did not replicate. In Study 3, which was a preregistered replication of Study 1, none of the main effects or interaction effects on ideological preferences or worldviews were significant. An internal meta-analysis suggested that the two studies could not provide clear evidence for any effects of mortality salience on political ideologies or worldviews overall.

A critical limitation of this research is that we did not have the statistical power to detect small effects. The Many Labs 4 consortium (Klein et al., 2019) recently replicated a classical study from the terror management literature across 21 labs ($N = 2220$) with the guidance of experts on the theory, yet the results suggested that if an effect exists, then it is very small (Chatard et al., 2020; Haaf et al., 2020). Similarly, a recent meta-analysis has suggested that the effect of mortality salience on conservatism is very small (Jost et al., 2017). The effect size estimates in these studies are not much different from the sizes of the (non-significant) effects we observed in our replication study. The directions of the effects were generally very

similar across the replication study and the original study (see Table 2), so the results are consistent with the possibility that mortality salience had tiny real effects on ideologies and worldviews. At the same time, if the real effects are this small, then several thousand participants would be needed to obtain reasonable power to detect them. Furthermore, such miniscule effects are a far cry from the riveting narratives about the profound impact of death on our lives that are ubiquitous in this area of research.

Ironically, our samples (*N*s from 186 to 319) were larger than the vast majority of samples used in published research on mortality salience effects, which is replete with large positive effects (Burke et al., 2010, 2013). For instance, in three of the most influential articles on effects of mortality salience on political ideology, a total of twelve studies with sample sizes ranging from 25 to 48 (Castano et al., 2011), 35 to 68 (Nail et al., 2009), and 46 to 157 (Landau et al., 2004) are reported. This should arouse suspicion, because the utilization of multiple small samples often conspires with publication bias and questionable research practices to produce inflated effect size estimates and false positives (Bakker et al., 2012; Open Science Collaboration, 2015). The results of our pre-registered study in conjunction with other recent pre-registered studies (Klein et al., 2019; Schindler et al., 2021; Sætrevik & Sjøstad, 2022; Treger et al., 2021) suggest that if mortality salience effects on ideology operationalized in terms of standard experimental paradigms even exist, then their size has been greatly overestimated.

At the same time, it is important to keep in mind that the results do not necessarily contradict terror management theory (Greenberg et al., 1986; Solomon et al., 1991). Proponents of this theory have often hypothesized that mortality salience impacts not the content of the person's beliefs, values, attitudes *per se* but rather their simplicity and rigidity, the faith with which they are held, and the fervor with which they are defended (Greenberg & Jonas, 2003; Solomon et al., 2015). This hypothesis was not tested in the current research.

Effects of Death Anxiety

The results of Study 2 suggested that death anxiety was associated with resistance to change, (low) preference for equality, and normativism particularly among left-wingers. Similar to the results of Study 1, conservative-shift and reactive-leftist effects occurred while extremism effects did not. However, death anxiety was not more strongly associated with normativism than (low) humanism or with resistance to change than acceptance of inequality when we corrected for multiple testing. Therefore, the hypotheses were not supported.

The clearest results of the study overall (with low p -values) were the main effect of death anxiety and the interaction effect of death anxiety and right (vs. left) political placement on resistance to change. The main effect is consistent with existing evidence that perceptions of threat are associated with conservatism, right-wing authoritarianism, and other constructs that overlap with resistance to change (Duckitt & Sibley, 2010, Jost et al., 2017; Onraet et al., 2013). The interaction effect is consistent with evidence of higher reactivity among liberals to existential threats in laboratory and natural experiments (Nail et al., 2009; Van de Vyver et al. 2016). However, the typical explanation that liberals tend to be more reactive to situational threats because they have less chronic activation of perceptions of threat does not square well with the present results—if anything, the results suggest that dispositional rather than situational death anxiety is associated with left-wing conservatism (and this is the kind of death anxiety leftists are potentially reacting to). The results fit better with recent studies that have demonstrated that a combination of left-wing attitudes on economic issues and right-wing attitudes on social issues is common among individuals with strong needs for security and certainty (Malka et al., 2014), suggesting that a sub-group of participants who identify as left-wingers are “pseudo-liberals” (Adorno et al., 1950) with relatively high resistance to change coupled with high death anxiety. *Post hoc* analyses suggested that the effects occurred

primarily among women. Further research is needed to rigorously test the replicability of this exploratory finding.

An important limitation of Study 2 is that the correlational design does not permit causal inferences. The results cannot say whether death anxiety elevated resistance to change (and whether there was a particular reactivity among leftists), whether resistance to change elevated death anxiety, or whether some other factor (e.g., an external threat) elevated both. Furthermore, although individual differences in death anxiety tend to be stable over time (Thiemann et al., 2015; Wong et al., 1994), the results cannot tell us whether some participants were currently experiencing situationally activated death anxiety in their lives. In addition, the lack of pre-registration in this study is a significant limitation, because there is always a possibility that the analyses were biased by theoretical expectations or previous results.

Future Directions

Concluding that mortality salience has no important impact on our lives based on this study and other recent studies would be premature. One reason for this is that the literature on mortality salience effects is vast and enormously heterogeneous. There are probably more than a thousand studies, covering mortality salience effects on, for instance, worldview defense, prejudice, religiosity, materialism, environmentalism, prosocial behavior, sexuality, parenting, risk-taking, well-being, creativity, and performance on a range of tests (Nilsson, 2018). Pre-registered replication studies have only addressed a small portion of these effects. Furthermore, the focal hypotheses of terror management theory, concerning cultural worldview and self-esteem defense (Greenberg et al., 1986; Solomon et al., 1991), as well as mortality salience effects on worldview rigidity, simplicity, and faith (Greenberg & Jonas, 2003; Solomon et al., 2015), were not tested in the current research; and a recent *p*-curve analysis suggested that there are non-zero effects in this literature (Chen et al., 2022).

Considering the tremendous impact of the mortality salience paradigm on psychological research, more pre-registered and high-powered direct replications particularly of the focal hypotheses from different theoretical traditions, based on designs that provide the best possible conditions for the effects to emerge, are warranted. Benefiting from increased transparency with respect to data, researchers could also investigate whether mortality salience effects are contingent upon the content or length of the essays that the paradigmatic mortality salience induction evokes (e.g., Kastenbaum & Heflick, 2011; Storelv & Sætrevik, 2021). The data sets provided in the current research may be particularly valuable to this end, as there are still few comparable open data sets with qualitative responses to the essay induction.

Nevertheless, expending all our resources on replication studies may not be wise, as there is also a possibility that theorized mortality salience effects do exist even if the experimental paradigm typically used is not effective in emulating real existential terror. Complementing correlational studies and laboratory experiments with longitudinal studies would permit more ecologically valid inferences about causality, based on the person's real-life confrontations with death and struggles with meaning-making with a real sense of urgency, and it would shed light on whether changes of the worldview are temporary or permanent. Longitudinal studies are relatively uncommon in this area, but there are some that have generated promising results (e.g., Chatard et al., 2010; Van de Vyver et al., 2016). Future research could benefit from recent methodological advances in assessing effects of life events on personality characteristics, such as including multiple measurement waves along with measures of how participants subjectively experienced events that occurred (Bleidorn et al., 2020; Luhmann et al., 2020). Longitudinal tests of hypotheses concerning mortality salience effects can be pre-registered, although it can be more difficult to estimate statistical power *a priori* in such designs, as the life events that are assumed to play a causal role are not manipulated.

It would also be fruitful at this juncture, when ideas in this area of research are under increased methodological scrutiny, to enrich the theoretical framework and question the assumption that death is the single core theme that would explain all links between existential threat and worldviews (Martin & van den Bos, 2014; Nilsson, 2013). Although scholars have begun to study the effects of other kinds of existential threats, such as meaninglessness (Heine et al., 2006) and uncertainty (McGregor et al., 2001; van den Bos, 2009), there is still little research on whether different kinds of existential threat might impact worldviews differently.

This state of affairs is somewhat ironic given the richness of theoretical ideas in classical existentialist writings. Most notably, Dilthey (1890/1957) and Jaspers (1919) argued long ago that a function of worldviews is to provide subjectively satisfying solutions to existential enigmas concerning a range of timeless themes, such as reason and emotion, mind and matter, finitude and infinity, uncertainty and certainty, good and evil, permanence and change, freedom and destiny. They argued, furthermore, that worldviews adapt, evolve, and occasionally change their core features as individuals move through life and confront aspects of their existential predicament that propel engagement, questioning, and rethinking of core assumptions. Becker's (1962, 1973, 1975) more recent anthropological account, and its tremendously influential intellectual progenies (Pyszczynski et al., 2015; Solomon et al., 2015), miss these possibilities—personal beliefs, values, and other personality constructs have generally been treated as moderators that determine how and when people engage in cultural worldview defense but rarely as potential outcomes of confrontations with existential issues.

To rectify this omission, future research should take the diverse ways in which people struggle with and adjust to their existential realities through their worldviews into consideration (Martin & van den Bos, 2014; Nilsson, 2013; Sullivan, 2016; see Janoff-Bulman, 1992, for an example). This includes investigating what affinities between diverse worldviews and existential anxieties (e.g., death, loss, change, uncertainty, meaninglessness,

social exclusion, freedom, and regret) may exist, whether worldviews are predictably affected by what aspect of the existential condition life projects into focal awareness at any point in time, and whether some worldviews are more effective than others for mitigating different existential anxieties of different kinds. Mapping the potential connections between existential themes and worldviews in a systematic, data-driven, bottom-up way could, further down the line, lead to the formulation of more precise hypotheses that are not vulnerable to the kinds of falsifiability issues that can arise from a desire to understand all links between existential questions, culture, and worldviews through the lens of mortality salience (Martin & van den Bos, 2014).

References

- Adorno, T. W., Frenkel-Brunswik, Levinson, D., Sanford, N. (1950). *The authoritarian personality*. New York: Harper & Brothers.
- Altemeyer, B. (1981). *Right-wing authoritarianism*. Manitoba, Canada: The University of Manitoba Press.
- Aspelund, A., Lindeman, M., & Verkasalo, M. (2013). Political conservatism and left-right orientation in 28 Eastern and Western European countries. *Political Psychology*, 34, 409-417.
- Bakker, M., van Dijk, A., & Wicherts, J. M. (2012). The rules of the game called psychological science. *Perspectives on Psychological Science*, 7(6), 543-554.
- Becker, E. (1962). *The birth and death of meaning*. New York: Free Press.
- Becker, E. (1973). *The denial of death*. New York: Free Press.
- Becker, E. (1975). *Escape from evil*. New York: Free Press.
- Beheshti, A. (2020). *Meta-Mar: Free online meta-analysis service*. <https://www.meta-mar.com>.
- Bleidorn, W., Back, M. D., Denissen, J., Hennecke, M., Jokela, M., Kandler, C., et al. (2020). Longitudinal experience-wide association studies (LEWAS) – A framework for studying personality change. *European Journal of Personality*, 34(3), 285-300.
- Bonanno, G. A., & Jost, J. T. (2006). Conservative shift among high-exposure survivors of the September 11th terrorist attacks. *Basic and Applied Social Psychology*, 28, 311–323.
- Burke, B. L., Martens, A., & Faucher, E. H. (2010). Two decades of terror management theory: A meta-analysis of mortality salience research. *Personality & Social Psychology Review*, 14, 155–195.
- Burke, B. L., Kosloff, S., & Landau, M. J. (2013). Death goes to the polls: A meta-analysis of mortality salience effects on political attitudes. *Political Psychology*, 34(2), 183-200.

Castano, E., Leidner, B., Bonacossa, A., Nikkah, J., Perrulli, R., Spencer, B., et al. (2011). Ideology, fear of death, and death anxiety. *Political Psychology*, 32(4), 601-621.

de St. Aubin, E. (1996). Personal ideology polarity: Its emotional foundation and its manifestation in individual value systems, religiosity, political orientation, and assumptions concerning human nature. *Journal of Personality and Social Psychology*, 71(1), 152-165.

Chatard, A., Arndt, J., Pyszczynski, T. (2010). Loss shapes political views? Terror management, political ideology, and the death of close others. *Basic and Applied Social Psychology*, 32, 2-7.

Chatard, A., Hirschberger, G., & Pyszczynski, T. (2020, February 7). *A word of caution about Many Labs 4: If you fail to follow your preregistered plan, you may fail to find a real effect.* <https://doi.org/10.31234/osf.io/ejubn>

Chandler, J., Paolacci, G., Peer, E., Mueller, R., & Ratliff, K. A. (2015). Using nonnaive participants can reduce effect sizes. *Psychological Science*, 26(7), 1131-1139.

Chen, L., Benjamin, R., Lai, A., & Heine, S. J. (2022, January 3). Managing the terror of publication bias: A comprehensive p-curve analysis of the terror management theory literature. <https://doi.org/10.31234/osf.io/kuhy6>

Chmielewski, M. & Kucker, S. C. (2020). An MTurk crisis? Shifts in data quality and the impact on study results. *Social Psychological and Personality Science*, 11(4), 464-473.

Cumming, G. (2009). Inference by the eye: Reading the overlap of independent confidence intervals. *Statistics in Medicine*, 28(2), 205-220.

Diener, E., & Emmons, R. A. (1984). The independence of positive and negative affect. *Journal of Personality and Social Psychology*, 47(5), 1105–1117.

Dilthey, W. (1957/1890). *Dilthey's philosophy of existence: Introduction to Weltanschauungslehre* (W. Kluback & M. Weinbaum, Trans.). New York: Bookman Associates (Original work published 1890)

- Duckitt, J. & Sibley, C. (2010). Personality, ideology, prejudice, and politics: A dual-process motivational model. *Journal of Personality*, 78(6), 1861-1893.
- Echebarria-Echabe, A., & Fernández-Guede, E. (2006). Effects of terrorism on attitudes and ideological orientation. *European Journal of Social Psychology*, 36, 259–265.
- Elad-Strenger, J., Proch, J., & Kessler, T. (2020). Is disgust a "conservative" emotion. *Personality and Social Psychology Bulletin*, 46(6), 896-912.
- Esping-Andersen, G. (1990). *The three worlds of welfare capitalism*. Princeton, NJ: Princeton University Press.
- Eurostat (2018). *Crime statistics*. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Crime_statistics#intentional_homicides_in_the_EU-27_in_2018
- Faul, F., Erdfelder, E., Lang, A-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39, 175-191.
- Florian, V., & Mikulincer, M. (1997). Fear of death and the judgment of social transgressions: A multidimensional of terror management theory. *Journal of Personality and Social Psychology*, 73, 369-380.
- Funder, D. C. (2006). Towards a resolution of the personality triad: Persons, situations, and behaviors. *Journal of Research in Personality*, 40(1), 21–34.
- Graham, J. W., Taylor, B. J., Olchowski, A. E., & Cumsille, P. E. (2006). Planned missing data designs in psychological research. *Psychological Methods*, 11(4), 323–343.
- Greenberg, J., & Jonas, E. (2003). Psychological motives and political orientation--The left, the right, and the rigid: Comment on Jost et al. (2003). *Psychological Bulletin*, 129(3), 376–382.

- Greenberg, J., Pyszczynski, T., & Solomon, S. (1986). The causes and consequences of a need for self-esteem: A terror management theory. In R. F. Baumeister (Ed.), *Public self and private self* (pp. 189-212). New York: Springer-Verlag.
- Greenberg, J., Pyszczynski, T., Solomon, S., Rosenblatt, A., Veeder, M., Kirkland, S., & Lyon, D. (1990). Evidence for terror management II: The effects of mortality salience on reactions to those who threaten or bolster the cultural worldview. *Journal of Personality and Social Psychology*, 58, 308-318.
- Greenberg, J., Pyszczynski, T., & Solomon, S. (1992). Terror management and tolerance: Does mortality salience always intensify negative reactions to others who threaten one's worldview? *Journal of Personality and Social Psychology*, 63(2), 212-220.
- Greenberg, J., Pyszczynski, T., Solomon, S., Simon, L., & Breus, M. (1994). Role of consciousness and accessibility of death-related thoughts in mortality salience effects. *Journal of Personality and Social Psychology*, 67, 627-637.
- Haaf, J. M., Hoogeveen, S., Berkhout, S. W., Gronau, Q. F., & Wagenmakers, E. (2020, April 14). *A bayesian multiverse analysis of Many Labs 4: Quantifying the evidence against mortality salience*. <https://doi.org/10.31234/osf.io/cb9er>
- Halloran, M. J. & Kashima, E. S. (2004). Social identity and worldview validation: The effects of ingroup identity primes and mortality salience on value endorsement. *Personality and Social Psychology Bulletin*, 30(7), 915-925.
- Heine, S. J., Proulx, T., & Vohs, K. D. (2006). The meaning maintenance model: On the coherence of social motivations. *Personality and Social Psychology Review*, 10(2), 88-110.
- Hennes, E. P., Nam, H. H., Stern, C., & Jost, J. T. (2012). Not all ideologies are created equal: Epistemic, existential, and relational needs predict system-justifying attitudes. *Social Cognition*, 30(6), 669-688.
- Hirschberger, G. (2006). Terror management and attributions of blame to innocent victims:

- Reconciling compassionate and defensive responses. *Journal of Personality and Social Psychology*, 91, 832-844.
- Holm, S. (1979). A simple sequentially rejective multiple test procedure. *Scandinavian Journal of Statistics*, 6(2), 65-70.
- Inbar, Y., Pizarro, D., Iyer, R., & Haidt, J. (2012). Disgust sensitivity, political conservatism, and voting. *Social Psychological and Personality Science*, 3(5), 537-544.
- Inglehart, R. & Welzel, C. (2010). Changing mass priorities: The link between modernization and democracy. *Perspectives on Politics*, 8(2), 551-567.
- Janoff-Bulman, R. (1992). *Shattered assumptions: Towards a new psychology of trauma*. New York: Free Press.
- Jaspers, K. (1919). *Psychologie der Weltanschauungen* [Psychology of worldviews]. Berlin: Springer.
- Joireman, J. & Duell, B. (2005). Mother Teresa versus Ebenezer Scrooge: Mortality salience leads proselves to endorse self-transcendent values (unless proselves are reassured). *Personality and Social Psychology Bulletin*, 31(3), 307-320.
- Jonas, E., Schimel, J., Greenberg, J., & Pyszczynski, T. (2002). The Scrooge Effect: Evidence that mortality salience increases prosocial attitudes and behavior. *Personality and Social Psychology Bulletin*, 28, 1342-1353.
- Jost, J. T., Federico, C. M., & Napier, J. L. (2009). Political ideology: Its structure, functions, and elective affinities. *Annual Review of Psychology*, 60, 307-337.
- Jost, J. T., Glaser, J., Kruglanski, A. W. & Sulloway, F. J., (2003). *Political conservatism as motivated social cognition*. *Psychological Bulletin*, 129(3), 339-375.
- Jost, J. T., Stern, C., Rule, N. O., & Sterling, J. (2017). The politics of fear: Is there an ideological asymmetry in existential motivation? *Social cognition*, 35(4), 324-353.
- Kastenbaum, R. & Heflick, N. A. (2011). Sad to say: Is it time for sorrow management

theory? *OMEGA – Journal of Death and Dying*, 62(4), 305-327.

Kay, A. C., & Jost, J. T. (2003). Complementary justice: Effects of “poor but happy” and “poor but honest” stereotype exemplars on system justification and implicit activation of the justice motive. *Journal of Personality and Social Psychology*, 85, 823-837.

Kierkegaard, S. (1980/1844). *The concept of anxiety* (R. Thomte, Trans.). Princeton University Press (Original work published 1844).

Klein, R. A., Cook, C. L., Ebersole, C. R., Vitiello, C. A., Nosek, B. A., Chartier, C. R., ...

Ratliff, K. A. (2019, December 11). *Many Labs 4: Failure to replicate mortality salience effect with and without original author involvement*. <https://doi.org/10.31234/osf.io/vef2c>

Koltko-Rivera, M. E. (2004). The psychology of worldviews. *Review of General Psychology*, 1, 3-58.

Kosloff, S., Greenberg, J., Weise, D., & Solomon, S. (2010). The effects of mortality salience on political preferences: The roles of charisma and political orientation. *Journal of Experimental Social Psychology*, 46, 139–145.

Landau, M. J., Solomon, S., Greenberg, J., Cohen, F., Pyszczynski, T., Arndt, J. et al. (2004). Deliver us from evil: The effects of mortality salience and reminders of 9/11 on support for President George W. Bush. *Personality and Social Psychology Bulletin*, 30(9), 1136-1150.

Lee, I. A., & Preacher, K. J. (2013). *Calculation for the test of the difference between two dependent correlations with one variable in common* [Computer software]. <http://quantpsy.org>

Luhmann, M., Fassbender, I., Alcock, M., & Ruhr, H. (2020). A dimensional taxonomy of perceived characteristics of major life events. *Journal of Personality and Social Psychology*. <https://doi.org/10.1037/pspp0000291>

Malka, A., Soto, C. J., Inzlicht, M., & Leles, Y. (2014). Do needs for security and certainty predict cultural and economic conservatism? A cross-national analysis. *Journal of Personality and Social Psychology*, 106(6), 1031-1051.

- Martin, L. L. & van den Bos, K. (2014). Beyond terror: Towards a paradigm shift in the study of threat and culture. *European Review of Social Psychology*, 25(1), 32-70.
- McGregor, H., Lieberman, J. D., Solomon, S., Greenberg, J., Arndt, J., Simon, L., & Pyszczynski, T. (1998). Terror management and aggression: Evidence that mortality salience motivates aggression against worldview threatening others. *Journal of Personality and Social Psychology*, 74, 590–605.
- McGregor, I., Zanna, M. P., Holmes, J. G., & Spencer, S. J. (2001). Compensatory conviction in the face of personal uncertainty: Going to extremes and being oneself. *Journal of Personality and Social Psychology*, 80(3), 472-488.
- Merriman, J. (2019). *A history of modern Europe* (4th ed.) New York: W. W. Norton & Company.
- Nail, P. R., McGregor, I., Drinkwater, A. E., Steele, G. M., & Thompson, A. W. (2009). Threat causes liberals to think like conservatives. *Journal of Experimental Psychology*, 45(4), 901-907.
- Naugle, D. (2002). *Worldview: The history of a concept*. United States: Wm. B. Eerdmans Publishing Co.
- Nilsson, A. (2013). *The psychology of worldviews: Toward a non-reductive science of personality*. Doctoral dissertation, Lund University, Sweden. Available online at: <http://lup.lub.lu.se/record/3738772/file/3738786.pdf> (Accessed February 9, 2022).
- Nilsson, A. (2014a). Humanistic and normativistic worldviews: Distinct and hierarchically structured. *Personality and Individual Differences*, 64, 135-140.
- Nilsson, A. (2014b). Personality psychology as the integrative study of traits and worldviews. *New Ideas in Psychology*, 32, 18-32.
- Nilsson, A. (2015). Humanism and normativism facet scales and short scales. *Lund Psychological Reports*, 15(2), 1-16.

- Nilsson, A. (2018). *A list of studies with mortality salience manipulations*.
<https://osf.io/574hc/>
- Nilsson, A. & Azevedo, F. (2022). *Measuring political ideology: Development and validation of measures of resistance to change and preference for equality*. Linköping University and Friedrich Schiller University Jena.
- Nilsson, A., & Jost, J. T. (2020). Rediscovering Tomkins' Polarity Theory: Humanism, normativism, and the psychological basis of left-right ideological conflict in the U.S. and Sweden. *PLoS ONE*, 15(7): e0236627.
- Nilsson, A., Montgomery, H., Dimdins, G., Sandgren, M., Erlandsson, A., & Taleny, A. (2020). Beyond 'liberals' and 'conservatives': Complexity in ideology, moral intuitions, and worldview among Swedish voters. *European Journal of Personality*, 34(3), 448-469.
- Nilsson, A. & Strupp-Levitsky, M. (2016). Humanistic and normativistic metaphysics, epistemology, and conative orientation: Two fundamental systems of meaning. *Personality and Individual Differences*, 100, 85-94.
- Norenzayan, A. & Hansen, I. G. (2006). Belief in supernatural agents in the face of death. *Personality and Social Psychology Bulletin*, 32(2), 174-187.
- Onraet, E., Van Hiel, A., & Cornelis, I. (2013). Threat and right-wing attitudes: A cross-national approach. *Political Psychology*, 34(5), 791-803.
- Onraet, E., Van Hiel, A., Dhont, K., & Pattyn, S. (2013). Internal and external threat in relationship with right-wing attitudes. *Journal of Personality*, 81, 233-248.
- Open Science Collaboration (2015). Estimating the reproducibility of psychological science. *Science*, 349(6251), aac4716.
- Pyszczynski, T., Greenberg, J., & Solomon, S. (1999). A dual-process model of defense against conscious and unconscious death-related thought: An extension of terror management theory. *Psychological Review*, 106, 835-845.

- Pyszczynski, T.A., Solomon, S., & Greenberg, J. (2015). Thirty years of terror management theory: From genesis to revelation. *Advances in Experimental Social Psychology*, 52, 1-70.
- 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, 681-690.
- Royce, J. R. (1964). *The encapsulated man: An interdisciplinary search for meaning*. Princeton, NJ: Van Nostrand.
- Sætrevik, B., & Sjøstad, H. (2022). Mortality salience effects fail to replicate in traditional and novel measures. *Meta Psychology*, 6. <https://doi.org/10.15626/MP.2020.2628>
- Schindler, S., Reinhardt, N., & Reinhard, M-A. (2021). Defending one's worldview under mortality salience: Testing the validity of an established idea. *Journal of Experimental Social Psychology*, 93. <https://doi.org/10.1016/j.jesp.2020.104087>
- Schönbrodt, F. D. & Perugini, M. (2013). At what sample size do correlations stabilize? *Journal of Research in Personality*, 47(5), 609-612.
- Sibley, C. & Duckitt, J. (2013). The dual process model of ideology and prejudice: A longitudinal test during a global recession. *Journal of Social Psychology*, 153(4), 448-466.
- Solomon, S., Greenberg, J., & Pyszczynski, T. (1991). A terror management theory of social behavior: The psychological functions of self-esteem and cultural worldviews. *Advances in Experimental Social Psychology*, 24, 93-159.
- Solomon, S., Greenberg, J., & Pyszczynski, T. (2015). *The worm at the core: On the role of death in life*. New York: Random House.
- Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin*, 87(2), 245–251.
- Stone, W F, & Schaffner, P. E. (1997). The Tomkins Polarity Scale: Recent developments. *Bulletin of the Tomkins Institute*, 4, 17-22.

- Storelv, S., & Sætrevik, B. (2021, November 19). Nothing is certain except taxes and the other thing: Searching for death anxiety in a large online sample.
<https://doi.org/10.31234/osf.io/3tkzq>
- Sullivan, D. (2016). *Cultural-existential psychology: The role of culture in suffering and threat*. New York: Cambridge University Press.
- Thiemann, P., Quince, T., Benson, J., Wood, D., & Barclay, S. (2015). Medical students' death anxiety: Severity and association with psychological health and attitudes toward palliative care. *Journal of Pain and Symptom Management*, 50(3), 335-342.
- Thorisdottir, H., Jost, J. T., Liviatan, I., & Shrout, P. (2007). Psychological needs and values underlying left-right political orientation: Cross-national evidence from Eastern and Western Europe. *Public Opinion Quarterly*, 71, 175-203.
- Tomás-Sábado, J. & Gómez-Benito, J. (2005). Construction and validation of the Death Anxiety Inventory (DAI). *European Journal of Psychological Assessment*, 21(2), 108-114.
- Tomkins, S. S. (1963). Left and right: A basic dimension of ideology and personality. In R. W. White (Ed.), *The study of lives* (pp. 388-411). New York: Atherton Press.
- Tomkins, S. S. (1965). Affect and the psychology of knowledge. In S. S. Tomkins & C. E. Izard (Eds.), *Affect, cognition, and personality* (pp. 72-97). New York: Springer.
- Tomkins, S. S. (1987). Script theory. In J. Aronoff, A. I. Rabin, & R. A. Zucker (Eds.), *The emergence of personality* (pp. 147-216). New York: Springer.
- 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 den Bos, K. (2009). Making sense of life: The existential self trying to deal with personal uncertainty. *Psychology Inquiry*, 20(4), 197-217.
- Van de Vyver, J., Houston, D. M., Abrams, D., & Vasiljevic, M. (2016). Boosting belligerence: How the July 7, 2005, London bombings affected liberals' moral foundations

and prejudice. *Psychological Science*, 27(2), 169-177.

Van Prooijen, J. W. & Krouwel, A. P. M. (2019). Psychological features of extreme political ideologies. *Current Directions in Psychological Science*, 28(2), 159-163.

Vess, M. & Arndt, J. (2008). The nature of death and the death of nature: The impact of mortality salience on environmental concern. *Journal of Research in Personality*, 42(5), 1376-1380.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 53, 1063-1070.

Wicklund, R. A. (1997). Terror management accounts of other theories: Questions for the cultural worldview concept. *Psychological Inquiry*, 8(1), 54-58.

Wong, P. T. P., Reker, G. T., & Gesser, G. (1994). *Death attitude profile – Revised: A multidimensional measure of attitudes toward death*. Philadelphia: Taylor & Francis.

Table 1. Correlations between the measures used in Study 1 and descriptive statistics divided by experimental condition

	Exp. group:	Control group:	1	2	3	4	5	6	7
	<i>M</i> (SD)	<i>M</i> (SD)							
1. Right (vs. left) self-placement	4.32 (1.89)	4.34 (1.87)							
2. Resistance to change	3.50 (.91)	3.31 (.97)	.16*						
3. Preference for equality	4.81 (1.08)	5.08 (1.06)	-.27***	-.38***					
4. Normativism	4.04 (.79)	3.88 (.90)	.03	.48***	-.26***				
5. Humanism	5.30 (.81)	5.53 (.67)	.12#	-.02	.33***	-.10			
6. Male gender			-.07	.00	-.21**	.28***	-.13#		
7. Age	30.3 (14.5)	26.7 (9.43)	.17*	.22**	-.03	.08	.00	-.02	
8. Religiosity	4.20 (1.84)	4.24 (1.79)	.06	.12	-.12#	.08	.08	-.01	-.03

Note: # $p \leq .10$. * $p \leq .05$. ** $p < .01$. *** $p < .001$. Correlations involving age were computed in terms of Spearman's ρ , because of large deviations from normality; all other correlations were computed in terms of Spearman's r .

Table 2. Standardized regression coefficients (with 95% CI), p-values, and squared semi-partial correlations for predictors in Study 1

	Resistance to change			Preference for equality			Normativism			Humanism		
	β	p	sr^2	β	P	sr^2	β	p	sr^2	β	p	sr^2
Step 1												
LR	.16[.02, .30]	.025	2.62%	-.27[-.41, -.13]	<.001	7.18%	.03[-.11, .18]	.65	0.12%	.12[-.02, .27]	.10	1.49%
MS	.10[-.04, .24]	.16	1.04%	-.13[-.27, .01]	.067	1.69%	.09[-.06, .24]	.22	0.86%	-.16[-.30, .01]	.035	2.46%
LR*MS	-.15[-.30, -.01]	.033	2.37%	.05[-.10, .18]	.53	0.20%	-.17[-.32, -.03]	.023	2.99%	.05[-.10, .19]	.52	0.22%
Step 2												
LR	.12[-.02, .26]	.092	1.37%	-.26[-.40, -.12]	<.001	6.60%	.02[-.12, .16]	.77	0.04%	.12[-.03, .27]	.11	1.44%
MS	.07[-.07, .20]	.36	0.41%	-.11[-.25, .02]	.11	1.23%	.06[-.08, .21]	.38	0.40%	-.14[-.29, .00]	.055	2.02%
LR*MS	-.20[-.34, -.06]	.005	3.84%	.04[-.09, .18]	.53	0.18%	-.18[-.32, -.03]	.016	2.99%	.04[-.10, .19]	.56	0.18%
Gender	.00[-.14, .14]	.98	<.001%	-.23[-.36, -.09]	.001	4.97%	.28[.14, .42]	<.001	7.67%	-.12[-.26, .03]	.12	1.35%
Age	.27[.13, .41]	<.001	6.86%	-.12[-.26, .02]	.098	1.30%	.19[.05, .34]	.010	3.39%	-.08[-.23, .07]	.30	0.59%
Religiosity	.12[-.02, .26]	.088	1.61%	-.11[-.25, .02]	.10	1.28%	.09[-.05, .23]	.19	0.86%	.07[-.08, .21]	.37	0.44%

Note: LR: Left-Right self-placement; MS: Mortality salience.

Table 3. Correlations between the measures used in Study 2

	<i>M (SD)</i>	1	2	3	4	5	6	7	8	9
1. Right (vs. left) self-placement	4.41 (2.22)									
2. Death anxiety	2.27 (.93)	.05								
3. Resistance to change	2.57 (.65)	.41***	.17**							
4. Preference for equality	4.22 (.59)	-.58***	-.09	-.38***						
5. Normativism	2.88 (.49)	.20**	.06	.47***	-.16*					
6. Humanism	3.68 (.62)	.12#	.02	.12	.13#	.13#				
7. Male gender		.14**	-.14*	.14*	-.21***	.32***	.00			
8. Age	31.7 (13.6)	-.04	-.07	.15**	.03	-.01	-.11	-.02		
9. Religiosity	1.77 (1.95)	.00	.02	.29***	.06	.01	.06	-.04	.16**	
10. Education	15.0 (2.61)	-.10#	-.27***	-.26***	.21***	-.06	-.08	.02	.19**	-.08

Note: # $p \leq .10$. * $p \leq .05$. ** $p < .01$. *** $p < .001$. Correlations involving age were computed in terms of Spearman's ρ , because of large deviations from normality; all other correlations were computed in terms of Spearman's r .

Table 4. Standardized regression coefficients (with 95% CI), p-values, and squared semi-partial correlations for predictors in Study 2

	Resistance to change			Preference for equality			Normativism			Humanism		
	β	p	sr^2	β	p	sr^2	β	p	sr^2	β	p	sr^2
Step 1												
LR	.40[.30, .51]	<.001	16.3%	-.58[-.67, -.48]	<.001	33.1%	.21[.06, .38]	.008	4.41%	.13[-.03, .29]	.12	1.59%
DA	.15[.05, .25]	.003	2.31%	-.06[-.16, .03]	.18	0.40%	.06[-.10, .22]	.44	0.37%	.02[-.14, .19]	.76	0.06%
LR*DA	-.15[-.25, -.05]	.003	2.34%	.12[.02, .21]	.014	1.32%	-.17[-.35, -.02]	.032	2.82%	-.06[-.23, .11]	.48	0.31%
Step 2												
LR	.37[.28, .46]	<.001	13.1%	-.55[-.64, -.45]	<.001	28.6%	.16[.01, .32]	.035	2.53%	.12[-.05, .29]	.15	1.37%
DA	.13[.03, .22]	.011	1.44%	-.04[-.14, .05]	.36	0.18%	.09[-.06, .25]	.23	0.81%	.01[-.16, .18]	.90	0.01%
LR*DA	-.12[-.21, -.02]	.015	1.28%	.09[.00, .19]	.043	0.86%	-.12[-.29, .04]	.13	1.28%	-.06[-.24, .12]	.49	0.30%
Gender	.11[.01, .20]	.025	1.10%	-.12[-.22, -.03]	.009	1.44%	.31[.16, .47]	<.001	8.70%	-.01[-.18, .16]	.89	0.01%
Age	.21[.11, .30]	<.001	4.08%	.01[-.08, .10]	.85	<.001%	.10[-.06, .25]	.21	0.86%	.00[-.17, .16]	.98	<.001%
Religiosity	.24[.15, .34]	<.001	5.80%	.07[-.02, .16]	.12	0.50%	.02[-.12, .16]	.77	0.05%	.05[-.11, .20]	.53	0.25%
Education	-.15[-.25, -.05]	.003	2.02%	.14[.05, .24]	.004	1.80%	-.05[-.21, .10]	.50	0.26%	-.07[-.24, .10]	.41	0.45%

Note: LR: Left-Right self-placement; DA: Death anxiety.

Table 5. Correlations (*r*) between the measures used in Study 3 and descriptive statistics divided by experimental condition

	Exp. group:	Control group:	1	2	3	4	5	6	7
	<i>M</i> (SD)	<i>M</i> (SD)							
1. Right (vs. left) self-placement	4.23 (1.74)	4.26 (1.75)							
2. Resistance to change	3.05 (.55)	3.02 (.58)	.41***						
3. Preference for equality	3.70 (.57)	3.74 (.57)	-.38***	-.25***					
4. Normativism	3.23 (.51)	3.23 (.47)	.27***	.46***	-.28***				
5. Humanism	3.78 (.47)	3.81 (.48)	-.18**	.02	.54***	-.16*			
6. Male gender			-.03	.03	-.08	.15*	-.10		
7. Age	37.5 (11.0)	37.2 (11.2)	.07	.22***	-.07	-.04	-.06	-.06	
8. Religiosity	3.82 (2.40)	3.67 (2.24)	.22***	.18**	-.05	.03	.04	.14*	.09

Note: # $p \leq .10$. * $p \leq .05$. ** $p < .01$. *** $p < .001$.

Table 6. Standardized regression coefficients (with 95% CI), p-values, and squared semi-partial correlations for predictors in Study 3

	Resistance to change			Preference for equality			Normativism			Humanism		
	β	p	sr^2	β	p	sr^2	β	p	sr^2	β	p	sr^2
Step 1												
LR	.41[.31, .51]	<.001	16.6%	-.38[-.48, -.28]	<.001	14.4%	.26[.13, .39]	<.001	6.91%	-.18[-.31, -.04]	.010	3.31%
MS	.03[-.07, .13]	.54	0.10%	-.04[-.14, .07]	.50	0.12%	.00[-.14, .14]	.99	<0.01%	-.03[-.17, .10]	.63	0.12%
LR*MS	-.03[-.13, .07]	.55	0.10%	.04[-.07, .14]	.47	0.14%	-.06[-.19, .08]	.41	0.34%	.03[-.10, .17]	.65	0.10%
Step 2												
LR	.38[.27, .48]	<.001	13.2%	-.38[-.48, -.27]	<.001	13.3%	.27[.13, .40]	<.001	7.24%	-.19[-.32, -.04]	.010	3.35%
MS	.02[-.08, .12]	.64	0.06%	-.03[-.13, .07]	.55	0.10%	.01[-.13, .15]	.89	0.01%	-.03[-.17, .11]	.64	0.11%
LR*MS	-.03[-.12, .07]	.62	0.06%	.04[-.06, .14]	.46	0.14%	-.05[-.19, .08]	.46	0.26%	.04[-.10, .17]	.61	0.13%
Gender	.04[-.07, .14]	.50	0.12%	-.08[-.18, -.03]	.15	0.56%	.16[.03, .30]	.021	2.56%	-.09[-.23, .05]	.19	0.85%
Age	.18[.08, .28]	<.001	2.99%	-.02[-.12, .09]	.73	0.03%	-.08[-.23, .06]	.28	0.56%	-.02[-.17, .12]	.75	0.05%
Religiosity	.09[-.01, .19]	.09	0.74%	.01[-.10, .12]	.85	0.01%	.02[-.12, .16]	.75	0.05%	.04[-.11, .18]	.62	0.12%
Education	-.05[-.15, .06]	.36	0.21%	.11[.00, .21]	.052	1.02%	-.02[-.17, .12]	.73	0.05%	.09[-.05, .24]	.20	0.81%

Note: LR: Left-Right self-placement; MS: Mortality salience.

Figure 1. Interaction effect of morality salience and left-right political self-placement on resistance to change (Study 1)

Figure 2. Interaction effect of morality salience and left-right political self-placement on normativism (Study 1)

Figure 3. Interaction effect of death anxiety and left-right political self-placement on resistance to change (Study 2)

Figure 4. Interaction effect of death anxiety and left-right political self-placement on normativism (Study 2)

Figure 5. Interaction effect of death anxiety and left-right political self-placement on preference for equality (Study 2)

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