

**TERROR MANAGEMENT AND PANDEMIC INFLUENZA:
SOCIAL PERCEPTION AND RESPONSE**

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ABSTRACT

Terror management theory provides a framework for investigating social responses likely to occur in the event of an influenza pandemic. The study predicted that where the threat of death from a pandemic was made salient in a relevant context involving a social outgroup, people would be more likely to behave aggressively toward those they perceived as threatening to their physical and symbolic existence. Concurrently, it was predicted that moderating personality traits – specifically Personal Need for Structure (PNS), self-esteem, and support for vaccination – would exaggerate or mitigate the likelihood of such aggression. The study involved 180 students randomly assigned to one of 3 mortality salience prime conditions and one of two worldview defence scenarios, who completed measures of self-esteem, Personal Need for Structure, and worldview defence. Results indicated that high PNS individuals were affected by both mortality salience primes equally and significantly greater than the control. This suggests a basic mortality salience effect in high PNS individuals, with the threat of a pandemic at least as provocative as standard mortality salience.

There was terror afoot in 1918, real terror. ...The media and public officials helped create that terror – not by exaggerating the disease but by minimizing it, by trying to reassure. ...The fear, not the disease, threatened to break the society apart. ...So the final lesson, a simple one yet one most difficult to execute, is that those who occupy positions of authority must lessen the panic that can alienate all within a society. (Barry, 2005)

Are we Adequately Prepared for an Influenza Pandemic?

Three major influenza epidemics occurred in the 20th century. The most infamous, the “Spanish Flu” of 1918-1919, killed between 20 and 40 million people worldwide. Following historical trends, public health officials have warned that a global influenza pandemic is now overdue (Marwick, 1996), and is expected to result in significant morbidity, mortality and economic cost, as well as the potential for serious social consequences (Gust, Hampson, & Lavanchy, 2001). It is predicted that in Ontario alone, mortality from a major pandemic could result in as many as 5,000 to 12,000 deaths (Ontario Ministry of Health, 2005).

Information like this has the potential to cause fear, anxiety, and exaggerated defensive responses in the public. The effectiveness of an Ontario Pandemic Influenza Plan – aside from ensuring adequate medical supplies and readiness – will be partially determined by how well people and communities respond to public announcements during a pandemic period. Marwick (1996) suggests that with a firm grasp on many of the factors involved in earlier crises we can now better prepare for a future pandemic. This preparation will involve the development of communication channels and strategies that educate and reassure the public and health care providers (Ontario Ministry of Health, 2005).

In November 2004, the World Health Organization (WHO) warned that the H5N1 strain of avian influenza could spark a pandemic if it were to develop human to human transmissibility. Concern expressed by the WHO at that time that “much of the world is unprepared for a pandemic,” has since led to many preparedness plan initiatives in countries throughout the world (Nature, 2005). To summarize the Ontario Health Pandemic Influenza Plan, a four-pronged strategic approach is involved, consisting of: 1) readiness; 2) watchfulness; 3) decisiveness; and 4) transparency. In terms of its communication strategy, the province plans to educate, reassure (reduce fear, avoid panic, and encourage vigilance), and be accountable (Ontario Ministry of Health, 2004). It does not, however, appear to involve the public in the decision-making process, nor does it anticipate how the public might react socially during a pandemic outbreak.

Broadly speaking, the current research investigates community perceptions of, and responses to, a pandemic influenza outbreak. A goal of this research is to provide public health officials with information to better understand and predict social behaviour in a time of collective crisis, and help in the design of effective communication to maintain order, control, and a sense of security in the face of an epidemic of this nature. The ultimate goal is to identify factors to minimize adverse behaviour and promote a healthy public response.

Current gaps in communication strategies are addressed by looking at public health measures using a terror management theory (TMT) framework. This serves us to not only better understand public perceptions of threat, but also to inform effective

communication to prevent responses to threat - such as anxiety, fear, or acts of aggression - from arising in the first place, or to minimize such responses.

Review of the Literature

Effective Communication

In a pandemic, effective communication should involve an understanding of peoples' potential responses to the level of threat and how it might differ from other threats. Effective communication will, additionally, include this understanding of psychological response so as to target different social and ethnic groups or individuals by preparing them for a pandemic during the interpandemic period – the time between pandemics. The communication should be reflective of the level of threat with knowledge of what this threat may unleash in terms of an anticipated public response.

One component of effective communication is to know your audience. Correctly interpreting the sentiment of the public involves an understanding of the myriad of ways people will respond to a crisis of this magnitude. Much research has been conducted on disaster management in the context of terrorism and natural and technological disasters (e.g. Glass & Schoch-Spana, 2002; Fischer, 2002), but we have seen a gap where this is applied to an influenza pandemic. For instance, will a pandemic – which has the potential to cause large scale disruption of communities – necessarily cause a different social response than the threat posed by an annual influenza epidemic? How might a pandemic response differ from that of other natural diseases such as West Nile virus or malaria? And how might a flu pandemic compare with an act of bioterrorism? This study initiates

efforts to compare responses common to specific public health threats by examining a potential influenza pandemic.

Can we speculate with a degree of certainty and be willing to create communication strategies within federal or provincial/state preparedness plans when we might be misinterpreting how the public feels and is likely to respond to an actual influenza pandemic? By examining responses to different crises we may prepare our communication efforts considerably more effectively. Perhaps this will enable authorities to address the public's emotional response accurately and avoid a communication breakdown between public health officials, media, and the general population.

Sarah Landry, of the Department of Health and Human Services, Pandemic Influenza Communication Plan, USA, stresses the importance of public engagement in establishing effective pandemic preparedness. She emphasizes public participation; this is important because it involves and empowers the public in the planning process, as well as building trust in the government, which she states is essential during a crisis. Landry further describes three critical components of preparedness: 1) crisis communication; 2) early public discussion for effective health and emergency preparedness activities; and 3) laying a foundation of expectation within communities. Communication will be one of few tools available in the early phases of a pandemic period (Landry, n.d.).

To this end, crisis communication attempts to find and maintain a middle ground between too soft a warning which tends to go unheard, and one too loud which often provokes needless premature fear, economic damage, and panic or chaos. The middle ground, suggests Peter M. Sandman and Jody Lanard (2005), writing for the Pan American Health Organization, regional office of the WHO, can help to build mutual

trust – one of the WHO’s overarching goals. Crisis communication posits that involving the public early arouses *appropriate* public fear which instigates effective ways to address it (Sandman & Lanard, 2005).

Sandman and Lanard (2005) make a distinction between crisis events that are technically serious and those that are culturally serious. A technically serious event is the ‘typical’ annual flu virus. It takes lives – somewhat predictably – but does not cause any significant cultural disruption. The virus is familiar and chronic, and therefore tolerated. A culturally serious event, in contrast, would include the H5N1 strain because of its potential to cause social and economic disruption due to both its virulence and its exotic nature (Sandman & Lanard, 2005).

The H5N1 virus has no known history of infecting humans. Consequently, there is no natural immunity and no vaccine (Sandman & Lanard, 2005). With these factors in mind, it may seem misguided for some national preparedness plans to place considerable emphasis on vaccine availability when it is generally accepted that following the introduction of an influenza pandemic it will likely take in the range of six months to manufacture a vaccine, and an additional 1-2 months to sufficiently distribute it (Schoch-Spana, 2000). The Public Health Agency of Canada appears to considerably over-emphasize vaccine use and dependence (Public Health Agency of Canada, 2004, October). The Ontario plan emphasizes the continuation of the yearly flu shot, which may lead to confusion over its purpose and a misunderstanding of its applicability and limitations (Ontario Ministry of Health, 2005).

Public Response

In the early phases of a pandemic an important focus – in addition to control of transmission – might be to address social responses, such as the potential for fear, panic, and aggression. Sandman and Lanard suggest that true panic is rare; people may feel panicky but their actions are usually “sensible, often helpful, and sometimes heroic” (Sandman & Lanard, 2005, July). Fischer (2002) describes this as a “disaster mythology,” where the common perception is that people will flee in panic, suffer from psychological dependency, or be unable to act on their own (disaster shock). Fischer’s study, examining the terrorist events of 9/11/2001, does not support these assertions. The belief that people cease to act predictably and orderly, says Fischer, is not factual. Furthermore, if we plan to focus on controlling particular behaviour, which we then do not find, we are left unprepared to affect a successful response.

Glass and Schoch-Spana (2002, p. 217) reiterate these points. The assumption that the public tends to act in an “irrational, uncoordinated, and uncooperative” manner, as well as being prone to panic during crisis, is likely contributing to the neglect of the public’s role in effective preparedness. Ineffective communication strategies – such as not involving the public, or misinterpreting a potential public response, may lead to a breakdown in the implementation of a preparedness plan in the event of a crisis.

The three central ideas laid out so far are that: 1) society must be *adequately prepared* for a potential future influenza pandemic; 2) preparedness plans must include *effective communication* strategies to address the interpandemic and early pandemic periods prior to widely available medical treatment; and 3) such communication must adequately address the crisis in terms of *public response*.

An influenza pandemic is both culturally and technically threatening. It threatens to disrupt our social infrastructure through sheer numbers of dead and sick as well as the cultural implications stirred by an unanticipated social response and measures taken to control the spread of infection. How are we to be assured and comforted by media and public health authorities, after all, when we are so apparently vulnerable to this threat of devastation? In the developed western nations, short of nuclear catastrophe or mass bioterrorism, few if any other mass events can boast such an impartial destructive threat. Such vulnerability exposes us to some ultimate truths that we spend lifetimes suppressing and shielding ourselves from – that life is finite and death inevitable.

Conceptual Framework: Terror Management Theory

Tom Pyszczynski, Jeff Greenberg, and Sheldon Solomon (1986) formulated terror management theory (TMT) to explain the need for culturally shared worldviews in a world where the awareness of death contradicts our self-preservation programming. TMT proposes that the existential anxiety inherent in the realization of the inevitability of death can cause psychological terror. We manage this potential terror by creating structures – namely worldviews and self-esteem – that serve to prolong the inevitable, and temporally lengthen the meaningfulness of our lives. The authors feel that striving for self-preservation and symbolic immortality in the world lies deep within human behaviour and motivation (Greenberg, Simon, Pyszczynski, Solomon, & Chatel, 1989; Greenberg, Solomon, & Pyszczynski, 1997; Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1992).

Terror management research has routinely utilized the manipulation of mortality salience in participants as a way of instigating defence of the structures described above. The mortality salience hypothesis suggests that psychological structures that protect against the existential terror of mortality recognition are heightened following priming of such thoughts. Participants have been found to react more positively toward things or social groups (ingroup) that support them and more negatively toward things or social groups (outgroup) that threaten them (Pyszczynski, Greenberg, & Solomon, 1999).

Foundational research has been conducted by Greenberg et al. (1990) to test the hypothesis that the mere existence of dissimilar others holding opposing cultural beliefs increases the affiliation of members to one's own group and the rejection of those seen as different. Participants with a Christian religious background were asked to form impressions of Christian and Jewish targets. Mortality was first made salient to half of the participants. Participants in the mortality salient condition filled out an additional questionnaire containing two open-ended questions. Specifically, they were asked to write about what will happen to them as they physically die and the emotions that the thought of their own death aroused in them.

Within the mortality salience group, attraction increased toward the Christian target and decreased toward the Jewish target. In support of the study's predictions, mortality salience led to a more positive evaluation of Christian ingroup members and a more negative evaluation of Jewish outgroup members (Greenberg et al. 1990).

The above study exemplifies mortality salience manipulation and its tendency to increase ingroup bias as a form of worldview defence. The application of these

foundational elements of the TMT framework to the current study is outlined in considerably more detail in the 'Present Study' section. The following sections address other central concepts of terror management theory utilized in the current study.

The Role of Culture

Culture serves many functions. One function, it has been suggested, is to create a world of meaning through which humanity can be elevated above the mortal limitations of the natural world. Culture offers a continuity of mortality beyond the lifespan of the individual, and it is through this perpetual source of shared meaning that our collective fear of a finite reality is effectively buffered (Greenberg et al. 1997).

This 'world of meaning' – or cultural worldview – is a collective standard of meanings and beliefs about the nature of reality. A worldview provides us with structures that create stability in the universe, though all structures are inherently fabricated. Appearing concrete and permanent, it is in fact "a fragile social construction in need of constant validation from others" (McGregor et al. 1998, p.591). Death is symbolically transcended for those who accept the worldview since the reality that we share, and which we feel is representational of our own lives, is expected to exist beyond our individual death. This provides a sense of protection from existential fears of mortality (McGregor et al. 1998).

A Need for Self-Esteem

Faith in the reality of a worldview allows people to feel significant, serving to increase self-esteem and further buffers us from existential anxiety. This self-esteem is

gained largely through the adoption of social roles; those who accept certain cultural standards and endorse its principles receive satisfaction and further acceptance by the dominant culture (Greenberg et al. 1997). As long as we continue to display the attributes that society deems valuable, we may maintain this self-esteem.

Why do we need self-esteem? Terror management theory suggests that it offers the perception that we are valuable members of a meaningful universe. It is a cultural construct that develops very early in life through the socialization process. We learn that abiding by certain values has positive outcomes, while not abiding causes anxiety and insecurity. We thus grow up striving for a level of self-esteem as a basic human need (Greenberg et al. 1997; Salzman, 2001).

The debate over the existential anxiety-buffering effects of self-esteem is not limited to whether self-esteem does in fact reduce terror management effects. Critics of terror management theory's formulation of self-esteem as an anxiety buffer, such as Crocker and Nuer (2004), argue that TMT does not provide evidence that self-esteem is in fact a need of individuals in society. They suggest that self-esteem may serve as one strategy for dealing with anxiety but is not needed for this purpose. They argue that "perhaps the fundamental human existential dilemma is not anxiety about death, but finding meaning, purpose, and value in life that give a reason and a direction to go forward" (Crocker & Nuer, 2004, p.5), as described by Frankle (1984).

Ryan and Deci (2004) also comment on this cultural need for self-esteem, contending that people typically engage life more than they avoid death. The authors argue that defensive processes must be coordinated with growth processes, and that self-esteem is based on strivings to engage life in a positive way. They alternatively argue that

when basic needs are threatened – as they are in mortality salience manipulations – people may be least likely to express growth-oriented motivation, as death provokes insecurity and the loss of all need satisfactions (Ryan & Deci, 2004). The authors seem to largely undermine their own argument here by affirming the position of terror management theory on the need for self-esteem.

Pyszczynski, Greenberg, Solomon, Arndt, and Schimel (2004), reply to their critics by referring to a study by Schimel, Arndt, Pyszczynski, and Greenberg (2001), where they describe intrinsically based self-esteem which is based on who one inherently is rather than on what one has become through accomplishments. This type of self-esteem provides maximum protection against anxiety and requires a minimum level of defensiveness, they argue. The authors of this reply paper point out that self-esteem arises out of social development beginning with affection from parents. They argue that people want to feel valued by society because this previously led to being loved and served to protect from threats of annihilation.

An additional, yet somewhat separate, criticism of the TMT application of self-esteem comes from a study by Baumeister, Smart and Boden (1996). The authors argue, contrary to considerable research linking low self-esteem to violence (e.g. Anderson 1994; Jankowski 1991; Renzetti 1992), that in fact it is threatened egotism among *high* self-esteem individuals that is related to violence. People with unstable high self-esteem are most prone to responding defensively to unfavourable feedback or criticism, the authors argue. “Unstable” is taken to imply the opposite of intrinsically-based self-esteem – as described by TMT. Consistent with this reasoning, Baumeister, Smart, and Boden suggest that people with uncertain self-appraisals require more external validation and are

consequently more susceptible to ego threats. They include conceit, arrogance, inflated self-appraisal, and a belief of personal superiority as characteristics of this high self-esteem.

While there is validity to the study, what is not addressed – as is with TMT – is the distinction between intrinsically-based self-esteem and that which is gained through personal accomplishment. The latter is unstable and prone to threat while the former, as TMT researchers have pointed out, is deeply rooted in early childhood social development. Baumeister, Smart, and Boden (1996) do, however, describe those requiring less social validation than others; they appear to have “acquired a stock of symbolic affirmations of the self” (Baumeister, Smart, and Boden, 1996, p.9), called *completeness*. Without the terminology, this appears to be consistent with the description of intrinsic self-esteem serving as a worldview buffer. It is also important to reiterate a point made above that self-esteem, as currently addressed in this TMT application, is from the perspective of an existential anxiety buffer (Greenberg et al. 1997; Salzman, 2001).

Baumeister, Smart, and Boden (1996) consider primarily personal threats to egotism as a cause of violence. The current study addresses self-esteem in the context of worldview threat. As described elsewhere in this study, individuals with intrinsically high self-esteem appear to be less sensitive to personal attack as their self-esteem is not unstable (Arndt, Greenberg, & Cook, 2002); conceit, arrogance, and inflated self-appraisals do not appear to be valid to the discussion in a terror management framework.

Worldview Defence

Self-esteem buffers anxiety only so long as faith in a cultural worldview is sustained. However, as one fragile worldview opposes another, we experience threats to our meaningful existence. Faith has historically served as a tool for affirming the truth of our worldviews. But in the context of religion it has also been the source of many intergroup conflicts. Those who oppose or question our faith, or simply subscribe to a different version of reality, threaten our beliefs and subsequently threaten to shake the foundation of a meaningful but fragile symbolic construction of reality. This has been shown historically – both religiously and politically – to be met with considerable prejudice. If the threat is significant it can cause a decrease in self-esteem, leading to insecurity and anxiety, and subsequently to a necessary defence of the worldview – as a defence of oneself (Greenberg et al. 1997). It should be pointed out, however, that while worldview defence is not in and of itself a form of aggression, aggression may be used as a form of worldview defence.

The dismissal of other worldviews has been a part of numerous religions. Missionary activity in the third-world has taken an *assimilation* approach to protecting and preserving the Christian worldview. This process served to expand the dominant cultural worldview and offered increased security and anxiety buffering through majority consensus.

Studies (Pyszczynski et al. 1999; Greenberg et al. 1997) have shown that anxiety motivates defence – through the expression of different types of aggression – in order to protect self-esteem and reduce anxiety. It should be noted, however, that those with dispositionally or intrinsically high self-esteem require fewer defensive mechanisms

(Arndt, Greenberg, & Cook, 2002). Those who are confident in their beliefs and the meaning of their existence are less threatened by others' views where they differ from their own. High self-esteem allows one to contemplate mortality without feeling anxiety and the subsequent need for cultural worldview defence (Harmon-Jones et al. 1997; Greenberg et al. 1997).

Mortality Salience and Ingroup Bias

There have been numerous investigations (Greenberg et al. 1997; Greenberg et al. 1990; Harmon-Jones et al, 1997; Arndt, Greenberg, & Cook, 2002; Landau, Solomon, et al. 2004) into the precise way in which mortality salience instigates worldview defence. The studies indicate that a delay of several minutes following mortality salience, during which time people think thoughts other than those of mortality, seems to be a necessary and sufficient precondition for terror management effects. This delay subsequently leads to greater worldview defence.

In contrast, forcing participants to keep thoughts of death in mind actually leads to decreased worldview defence (Greenberg et al. 1997; Landau, Solomon, et al. 2004). This would suggest that conscious thought leads to rational intellectualization about death and a utilization of distraction strategies or reassuring thoughts as forms of active suppression.

Tasks involving high cognitive load effectively disrupt this active suppression leading to increased death-construct accessibility and worldview defence (Harmon-Jones et al, 1997). Having death-related thoughts outside of focal consciousness creates greater anxiety. Once these thoughts are no longer conscious and suppression is relaxed (during

the time delay), death-related thoughts become more accessible and anxiety is heightened, thereby facilitating a greater need to access protective defence mechanisms to buffer this anxiety (Greenberg et al. 1997; Arndt, Greenberg, & Cook, 2002).

Simon et al. (1997) provide further insight into worldview defence by examining the differences between the rational and experiential cognitive modes of thinking. Cognitive-Experiential Self-Theory (CEST), as initially described by Epstein (1983), posits that there are 2 distinct cognitive systems.

The rational mode involves conscious activity and results in lower levels of worldview defence when mortality salience is induced because people use proximal defences to actively suppress thoughts of mortality. Proximal defences are conscious actions taken to protect oneself from the thought of death. These may include personal reassurance or justification of one's health, resolution to diet or begin exercise classes.

Distal defences, in contrast, occur within an experiential mode which is the primary system used during mortality salience because it is unconscious and irrational; this is the default system, occurring at a less than conscious level. The authors argue that when individuals are in this mode mortality salience is more likely to lead to symbolic worldview defence as they are more driven by their defensive existential concerns (Simon et al. 1997; Greenberg et al. 1997).

Studies on defence behaviour employed subsequent to mortality salience primes indicate that people show a greater affinity for ingroup (dominant social group) ideology and bias for its members, and concurrently exaggerate prejudice and aggressive behaviour toward the outgroup (Greenberg et al. 1990; Castano, 2004; McGregor et al. 1998). McGregor et al. (1998) conclude that aggression increases only toward targets that

threaten participants' worldviews and does not occur against noxious targets where worldview defence is absent. Research has shown that mortality salience effects are specific to thoughts of one's own death and parallel effects have not been shown to occur with other aversive or anxiety-producing stimuli (Landau, Johns, et al. 2004; Pyszczynski et al. 1999; Greenberg et al. 1997).

Punishment of outgroup members is explicitly noted throughout terror management theory research. Castano (2004), however, notes that research measuring derogation of outgroups has produced mixed results and requires further investigation to determine the extent of negativity toward the outgroup (Castano, 2004; McGregor et al. 1998; Greenberg et al. 1997). Perhaps this can be explained by Struch and Schwartz (1989), who suggest that only individuals strongly subscribing to a particular worldview will react negatively to those perceived as having an alternative worldview. Also, if identification with one's own group is weak, intergroup conflict should motivate less aggression because the conflict is of little concern to one's self. Another explanation may be that historical studies on aggression, such as those utilizing electric shock, are no longer ethically suitable (McGregor et al. 1998). Therefore, it has been difficult to measure real acts of aggression in laboratory settings. Additional explanations are speculative; perhaps the relationship between ingroups and outgroups, or the context of the situation, was not relevant, resulting in inconsequential findings.

Personal Need for Structure

Since cultural worldviews are essentially fragile symbols maintained through social consensus, the existence of others who do not share this consensual validation or

who do not fit the stereotypes that help define our worldview are perceived as threatening (Greenberg et al. 1997; Schimel et al. 1999).

Stereotypes are important dispositional variables involved in worldview defence. They contribute to prejudice, discrimination, and intergroup conflict – all common elements of defensive behaviour. Significant prejudice and aggression toward an outgroup is instigated by stereotypic thinking. Stereotypes emphasize differences between groups and are used to predict individual characteristics on the basis of group membership (Schimel et al. 1999). Schimel et al. (1999) suggest that mortality salience effects should increase one's tendency to perceive members of an outgroup in stereotypic ways as it is easier to derogate a group if the whole group is perceived consistently negative. In addition, mortality salience exaggerates the tendency to structure social information as well as the need for some people to view others as consistent and coherent (Landau, Johns, et al. 2004).

The use of structure in stereotypic behaviour provides stable representations of the world and allows for greater control and predictability of our social environment. The need for structure is apparently not universal as some people are comfortable with uncertainty while others are not. Landau, Johns, et al. (2004) distinguish between high and low personal need for structure (PNS).

They describe high-PNS individuals as requiring a very well-structured social world with a high degree of stability and consistency in order to manage existential anxiety. The authors of this 2004 study primed participants either with death-thoughts or uncertainty. Among high-PNS individuals, both mortality and uncertainty salience had similar effects on their need for social stability and consistency of information to buffer

existential terror; they tended to show less flexibility in response to terror management needs (Landau, Johns, et al. 2004). Mortality salience studies have shown that those with rigid worldview conceptions have a greater propensity for defence of their views than those with less rigid worldview conceptions (Mikulincer & Florian, 2000).

In contrast, those with low-PNS were more open to novelty and inconsistency, did not exhibit the same need for structure, and – it is suggested – may derive security from the freedom of not being restricted by a particular concept of reality. These people, in fact, seem to exist outside of the defining characteristics of terror management theory. This essentially means that people not bound by the need for social structure as a tool for maintaining consistency in their worldview and, concurrently, the need for high self-esteem to buffer against existential anxiety, show little insecurity in their beliefs and subsequently little, if any, need for defensive structures (Landau, Johns, et al. 2004).

Terror Management Theory in the Context of an Influenza Pandemic

In the event of a flu pandemic, popular opinion as emphasized by the media and our political and health leaders will expect all citizens to get vaccinated against the suspected strain of the virus (Ontario Ministry of Health, 2004; 2005; Public Health Agency of Canada, 2004, October). Immunization is not mandatory in Canada, and would likely not become so even in the event of an infectious pandemic. Nevertheless, an immunization campaign as a public health measure would likely be promoted as a social responsibility. Mass immunization campaigns serve a utilitarian ethic that places the good of the population above the good of the individual. The WHO states: “Vaccination is not simply a personal affair. Indeed, it is essentially a community matter, since the objective

of most vaccination programmes is to produce a herd immunity” (Diodati, 1999, p.15). Herd immunity refers to the level of disease resistance of a whole population. It carries the belief that an adequate rate of immunization will protect virtually all persons (Diodati, 1999).

Unvaccinated individuals also benefit from mass immunization, though their unwillingness to participate in such programmes should run counter to the values held by the social majority. “Vaccination has become such a routine part of health care that most individuals submit to this medical intervention without question” (Diodati, 1999, p.20). As this surely represents the dominant view, upholding this value of mass immunization should result in social praise and reward, thereby bolstering self-esteem and buffering the anxiety of potential death from a flu pandemic.

Though forced immunization campaigns may violate the individual’s right to autonomy in favour of herd immunity, those who stray from the normal behaviour may be punished more harshly – socially speaking (Greenberg et al, 1997; Landau, Johns, et al. 2004; Castano, 2004; Landau, Solomon, et al. 2004; Diodati, 1999). Those who decide for personal, health, or conscientious reasons to abstain from vaccination may theoretically be labelled as ‘social transgressors’ and become targets of greater social prejudice. Outgroup behaviour, under these conditions, may serve to threaten the fragile belief system of the ingroup, potentially leading to increased insecurity, mortality salience, and aggressive defence of the dominant worldview. Though, in truth, outgroup members may comprise a small social group, they may adequately instigate defensive reactions among ingroup members where relevant intergroup relationships exist.

McGregor et al. (1998), writing on terror management theory and aggression, appealed for future research to determine whether mortality salience motivates different forms of aggression toward outgroup members, such as *assimilation* and *accommodation* in addition to *derogation-dismissal* and *aggression*. “We believe that it is also important to investigate factors that determine which mode of defence is most likely to be used by a given person in a given situation” (McGregor et al, 1998, p.603). *Derogation* is defined as the belittlement of the point of view of others, or the denouncement of views not commonly held so as to make them of lesser importance. *Accommodation* is described as the incorporation of certain attractive components of an alternative worldview while discarding components that are considered threatening. *Assimilation* involves the conversion of others to one’s own point of view. Lastly, *aggression*, as defined by McGregor et al. (1998), is behaviour with the intent to harm the person who is its object.

The authors suggest that there are likely to be *situational* and *dispositional* factors that will affect the mode of worldview defence chosen. They hope that investigation of such factors: defining specifically what they are, how they are likely to interact, and how they will be affected by mortality salience, and in turn, influence worldview defence, will come to light. In our present study, we have specifically investigated these factors with the intent of answering these questions.

Situational factors (serving as independent variables) consist of different mortality primes for varying threats – either individual or collective (i.e. personal mortality vs. pandemic influenza vs. standard annual flu). Pandemic-scale flu may infer a collective mortality that could have stronger or at least qualitatively different effects than a mortality prime, alone, which is generally perceived personally. This is relevant because

mortality salience is often an individual experience though defence of a worldview attempts to symbolically protect a belief system that is collective in nature. Worldviews are formed through collective consensus but serve the needs of the individual. Nonetheless, from the perspective of symbolic immortality, threats to the collective should, theoretically, be more detrimental than to the individual. The individual will perish but the collective promises to sustain our personal legacy. The collective, therefore, should demand a greater level of defence than the individual (Castano et al. 2002; Kashima et al. 2004). One central question to be asked is: Does mortality salience in different contexts or situations have different effects on worldview defence?

Dispositional factors such as self-esteem, support for vaccination, concern for environmental protection, and personal need for structure, present personal variability in the response to the situational context presented. Past research has typically not provided alternative choices for expressing worldview defence (McGregor et al. 1998).

The current study provides a number of possible ways for addressing worldview threats following mortality salience primes. We investigated whether certain mortality contexts – or situations – impact differently on individuals with varying dispositional traits (i.e. high PNS; low self-esteem; strong support for vaccination), and if these traits are characteristically associated with certain predictable modes of aggressive worldview defence.

The inclusion of vaccine support (contextualized for a pandemic) and environmental protection (contextually neutral) as moderators are for the purpose of directly addressing earlier comments by Struch and Schwartz (1989). The authors

inferred that only individuals *strongly* subscribing to a particular worldview will react negatively to a perceived outgroup. If identification to one's own group is weak, the motivation to aggress or derogate will be less. Since we are involving a contextualized, anti-vaccination/pandemic-specific scenario, we need as well to confirm that some individuals have a strong identification with the scenario and the group being targeted in the scenario. Likert scales had participants rate how strongly they subscribe to a worldview in support for vaccination and additionally a worldview supporting environmental protection.

McGregor et al. (1998) further state that "future research may be able to clarify the roles that dispositional and situational variables play in determining which of the many possible responses to mortality salience a given individual tends to choose" (McGregor et al, 1998, p.604). The current study has attempted to clarify these roles by examining the mode of defence most likely to be used by a given person in a given situation.

From the outset of this research it has been an aim to provide not only an additional academic contribution to terror management theory and pandemic flu literature, but to find practical application as well. We hope to have identified ways of attenuating the aggression that may accompany the mortal threat of an influenza pandemic. And where different cultural worldviews are involved, we wish to better inform individuals about the tendency for aggressive behaviour toward others as a form of effective crisis communication. In other words, as McGregor et al. more succinctly put it: "Perhaps methods to address the fear of death could be developed individually or

culturally that would reduce the propensity for people to resort to violence against those who view the world differently than they do” (McGregor et al. 1998, p.604).

The Present Study

In light of the above review, the present study investigated the effects of 1) contextualized mortality salience (pandemic influenza), and 2) standard mortality salience, on worldview defence as moderated by the various dispositional factors, and participants’ support for vaccination and environmental protection. The study included 2 *independent variables*: 1) a mortality salience prime (MS flu vs. standard MS vs. plain flu), and 2) a defence scenario (contextualized/anti-vaccination vs. neutral/anti-environment). The *dependent variables* being measured consisted of 1) the type/severity of worldview defence (a categorical measure), and 2) the likelihood of pursuing that particular severity of punishment against a perceived outgroup (a continuous measure).

Hypothesis 1: The Primes

The mortality salience prime was expected to have a significant main effect on both measures of worldview defence. Specifically, a pandemic flu – having not only personal but potentially *collective* ramifications in terms of cultural disruption – was expected to have a greater effect on worldview defence than the mortality salience prime, which focuses only on the *personal* consequences of death. Both the pandemic and standard primes were expected to elicit stronger defensiveness than the control condition.

Hypothesis 2: Interaction between Variables

In addition to the effect of the prime on the dependent – categorical and continuous – variables, we were also interested in the interaction between the two independent variables together on the dependent variables. We expected to see that those in the pandemic mortality salience condition would exhibit stronger worldview defence in response to the anti-vaccine scenario than the anti-environmental scenario. This finding would indicate that a worldview threat that occurs in the same context as a potentially real mortality event can accentuate the defensiveness that is typically aroused by standard mortality reminders.

Hypotheses 3a, 3b, 3c, 3d: The Dispositional Moderators

These hypotheses suggested that dispositional personality differences would moderate the effects of mortality salience on worldview defence. With respect to *self-esteem* (3a), it was expected that the mortality salience primes would elicit a stronger worldview defence response in those with low self-esteem than in those with high self-esteem. Individuals with low self-esteem would experience threats to their fragile system of beliefs and would present a much more considerable response to defend these beliefs (Harmon-Jones et al, 1997).

Personal need for structure (3b), the second dispositional moderator, was also expected to moderate the effects of mortality salience on worldview defence. It was hypothesized that participants *high in PNS*, who require social stability and consistency of information, would elicit a much stronger response to mortality salience than low-PNS participants who do not have the same need for social and belief structure. These

participants, it was hypothesized, would show very little worldview defence (Landau, Johns, et al. 2004).

The third moderator, *support for vaccination* (3c), was intended to assess worldview identification involving principles of vaccination. When threatened by the anti-vaccine/pandemic scenario, participants presenting strong worldview identification were expected to elicit increased worldview defensive behaviour.

Concern for the environment (3d), the fourth moderator, served as a corollary to the vaccination-support hypothesis. The purpose, in conjunction with the anti-environmental scenario, was to serve as a more neutral condition than the pandemic-specific scenario, yet with the capacity of instigating feelings of aggression, nonetheless. It was hypothesized that the effects of the mortality salience prime on worldview defence would be stronger in those participants who more strongly endorse this worldview than in those who do not. Again, this was designed to pair against support for vaccination with the intention of assessing whether a pandemic-specific scenario would instigate greater defence than that of a scenario with a context unrelated to a pandemic.

Method

Participants

Volunteers were recruited from the Lakehead University introductory psychology research participation pool. The study involved 180 participants randomly assigned to one of 3 mortality salience prime conditions and to one of two worldview defence scenarios (30 participants per cell x 6 [3x2] cells). Due to a higher than expected number of incomplete study packages (21 of 180), it was decided that 10 completed studies

obtained from an initial pilot study of non-university community members would be added to the sample size (for a total $N = 190$) to offset the number of incomplete studies and raise the power to increase the probability of avoiding a Type II error.

With both groups combined there were a total of 132 females and 58 males included in the study. Participant ages ranged from 17 to 51. The mean age was 20.60, with a standard deviation of 5.54. The sample population was a fairly homogenous group of students with regard to cultural background. 87.4% of the participants indicated their ethnicity as Caucasian. 92.1% of participants were born in Canada. 65.2% of participants were of a Christian religion and 27.9% reported that they were not associated with any religion. Of the non-student subgroup, 100% were female. The age of participants ranged from 23 to 50. The mean age was 31.90, with a standard deviation of 9.16. This subgroup was 80% Caucasian, 90% of whom were born in Canada. Religious affiliation was mixed with 50% of participants of a Christian background and 40% reporting no religious persuasion. See Table 1 for demographic breakdown by participant group and total.

Materials and Procedure

The study was presented as an investigation of the relationship between personality and attitude. Upon providing written consent to participate in the study (see *appendix A*), participants were asked to complete a questionnaire (see *Appendix B*) to obtain basic demographic information, as well as to retrieve attitudinal information relevant to the target outgroup including attitudes toward vaccination and protection of the environment. Following this, participants were provided with a packet of written

materials and randomly assigned to one of two mortality salience groups or a control group.

1. Prior to the mortality salience manipulation, participants were instructed to complete two personality scales (see *appendix C/D*) to assess the dispositional moderators: a) Personal need for structure (Landau, Johns, et al. 2004; Mikulincer & Florian, 2000); and b) self-esteem (Greenberg et al. 1997; Salzman, 2001; Schimel, Arndt, Pyszczynski, and Greenberg, 2001). The scales had Cronbach's alpha reliability scores of .83 and .88, respectively.

2. Mortality salience manipulation: Next, participants were primed with one of three death- or non-death-thoughts: a) the true experimental condition (collective death from a pandemic flu); b) a personal mortality prime (standard TMT prime); or c) a conventional influenza prime (aversive but not death provoking). Each of the three primes consisted of a brief open-ended question similar in description, but differing in specificity of the context. Mortality salience was manipulated by having participants respond to a question concerning their thoughts and feelings about: a) their own death and the death of many others in their community from a mass mortality event (collective mortality via a pandemic); b) their own personal death (conventional mortality salience); or c) their thoughts and feelings on getting sick from the annual flu.

Using a mortality questionnaire (see *appendix E*) developed by Greenberg et al. (1990), mortality salience participants were asked specifically to: a) "Please briefly describe the emotions that the thought of your own death arouses in you" and b) "Jot down, as specifically as you can, what you think will happen to you as you physically die and once you are physically dead." The basic method employed here has been used in

many studies (Greenberg et al. 1990; Harmon-Jones et al. 1997). The questions given to the pandemic mortality salience group borrow from Kashima et al. (2004) modifications to Greenberg et al. (1990) procedure (see *appendix F*). Modifications were made to specify collective mortality in contrast to standard personal mortality; a distinction necessary for this study. Likewise, the standard flu control condition involved similar questions without reference to death (see *appendix G*).

3. Delay and distraction: The temporal delay aimed to be approximately 5 minutes in length. During this time participants were instructed to complete a standard distraction task. A word-fragment completion task (see *appendix H*) was used to remove the awareness of personal or collective death thoughts from focal attention. The task contained no deliberate affective, death-related, or existential references.

4. Measurement of worldview defence: Upon completion of the above task, participants were instructed to answer a questionnaire package consisting of questions aimed to measure worldview defence. The questions were based on one of 2 scenarios: a) describing a worldview opposing vaccination (see *appendix I*); or b) describing a worldview opposing environmental protection (see *appendix J*). Participants were provided with a list of contextual descriptors varying in the extent of confrontation – encompassing the 4 modes of defensive behaviour in the appropriate context – to measure the severity of punishment in terms of worldview defence. The instruction for this question asked to select, based on ‘gut reaction,’ only one single descriptor that most applied. The purpose here was to avoid having participants engage in moral judgments and consequently to consciously evaluate which actions were most socially acceptable; the evaluation needed to maintain an experiential cognitive mode to be effective. A rating

scale followed each of the 4 modes of defence. Participants were further instructed to rate the likeliness of their intent (certainty) to act out this chosen mode of worldview defence only for the mode they had chosen.

The defence modes range from less confrontational: 1) *dismissal (derogation)*; 2) *accommodation*; to more confrontational: 3) *assimilation*; and 4) *annihilation (physical aggression)*. Previously described by McGregor et al. (1998), they suggest that by presenting all modes simultaneously, participants would be provided with a number of possible ways to react to worldview threats following mortality salience. The present study followed this recommendation.

5. Conclusion: Upon completion of the study, participants were debriefed and thanked for their collaboration (see *appendix K*).

Results

Preliminary Analyses

Frequencies were analyzed to screen for any data entry errors. The descriptive statistics can be viewed in Table 2. Reliabilities were analyzed for the two scales, Personal Need for Structure and Self-Esteem. Both measures were found to have reliabilities exceeding a minimum acceptable alpha level of .70; PNS (.88) and SE (.83). Means and standard deviations were also analyzed. Since most of the variables are categorical, there can be no outliers. A scatter plot was run to look for multivariate outliers, which was within normal limits. Histograms were viewed for normal distribution of scores of all key variables. The PNS scale presents a normal distribution with a skew of -.149 ($SE = 1.76$) and a kurtosis value of -.127. The self-esteem scale displayed a

normal bell-curve distribution but was negatively skewed (-0.703 , $SE = .176$) and a kurtosis value of $.224$. Missing data were addressed by excluding cases pairwise in all analyses. Lastly, a paired-samples t-test was conducted to evaluate the difference in support for vaccination and of the environment. There was a statistically significant difference in general support between environment ($M=5.20$, $SD=1.14$) and vaccination ($M=4.04$, $SD=1.04$), $t(107)=7.59$, $p<.0005$. The eta squared statistic ($.35$) indicated a large effect size.

Hypotheses

Hypothesis 1 (Categorical DV): A 3 (MS prime: pandemic, standard, control) x 4 (WV defence: dismissal, accommodation, assimilation, aggression) chi-square was conducted to measure the effects of the mortality salience prime (IV1) on worldview defence (categorical DV). It was expected that the pandemic prime would elicit a significantly greater worldview defence response than the standard mortality salience prime; both of which would show a significantly greater defensive response than the control condition. The Pearson chi-square findings were inconsistent with this expected outcome, $X^2(6) = 6.39$, *ns*. The proportion of participants selecting each worldview defence option was unaffected by the prime indicating no significant effect of the prime on the categorical dependent variable.

Hypothesis 2 (Categorical DV): To measure the interaction between the mortality salience prime (IV1) and the scenario context (IV2) a 2(scenario) x 3(prime) x 4(DV) chi-square was conducted. The categorical DV was used as a layer. It was expected that the pandemic prime would elicit stronger worldview defence among participants who

were exposed to the anti-vaccine condition than those exposed to the anti-environmental condition. A moderate response was expected among the standard mortality salience group participants to the vaccine condition and a weaker response, still, to the environmental condition. The non-salient control group was not expected to be threatened by outgroup behaviour and should consequently have elicited no defensive behaviour whatsoever. This analysis revealed that the interaction of prime and scenario had no significant effect on the number of participants who chose derogation-dismissal, $X^2(2) = 0.58$, *ns*; accommodation, $X^2(2) = 0.45$, *ns*; assimilation, $X^2(2) = 1.59$, *ns*; or aggression, $X^2(1) = 1.88$, *ns*. Therefore, no support was found for this hypothesis.

Hypotheses 1 & 2 (Continuous DV): A 3 x 2 between-groups ANOVA was conducted to measure the certainty of the worldview defence choice. Using ANOVA allowed us to look at both independent variables independently and simultaneously on the one continuous dependent variable. This also enabled us to explore the possibility of the hypothesized interaction effect where the effect of the prime was expected to be stronger in the vaccine scenario than the environment scenario. Contrary to hypothesis 1, the mortality salience prime (IV1) had no significant effect on the continuous dependent variable, $F(163,2) = 1.06$, *ns*. Worldview defence scenario (IV2) also had no significant main effect on the DV, $F(163,1) = 1.46$, *ns*. Finally, contrary to hypothesis 2, there was no significant interaction between prime and scenario, $F(163,2) = 0.81$, *ns*.

Hypotheses 3a, 3b, 3c, 3d. It was expected that the main effect of prime (*Hypothesis 1*), and the interaction of prime and scenario (*Hypothesis 2*) on each dependent variable would be moderated by PNS, self-esteem, support for vaccination, and concern for environmental protection. Specifically, it was expected that effects may

be observed to be stronger in those participants (*Hypothesis 3a*) high in PNS, (*Hypothesis 3b*) low in self-esteem (Landau, Johns, et al. 2004; Arndt, Greenberg, & Cook, 2002; Mikulincer & Florian, 2000; Greenberg et al. 1997; Harmon-Jones et al. 1997), or (*Hypothesis 3c*) high in support for vaccination. Analysis of the moderating effect of PNS, SE, vaccination support, and environmental concern, required applying a median split filter to each of these variables. A median was calculated for each variable (PNS = 3.42; SE = 4.7; vaccine support = 5; environmental protection = 5). This required four tests for each analysis; when PNS was low and high, when self-esteem was low and high, and when support for vaccination and environmental protection were low and high. Two of these analyses revealed marginally significant effects. One of the vaccine support analyses revealed a significant effect.

When the 3 x 4 chi-square (*Hypothesis 1 Categorical DV*) was conducted with the median split applied, we found that when *personal need for structure (3a)* was high there was a marginally significant effect of the prime (IV1) on the categorical variable, $\chi^2(6) = 11.94, p = .06$. Post-hoc tests (nonparametric chi-squares) were run for each of the defence options where PNS was high to determine where the significant effect lay. The results indicated that the control group was significantly more likely to select derogation-dismissal (the least aggressive of the four WV defence options) than either of the experimental primes, $\chi^2(2) = 9.25, p = .01$. In other words, where PNS was high the two mortality salience prime groups were significantly less likely to choose derogation-dismissal than the control group. This was the only response on which the three groups differed significantly.

Table 3 displays cell N values demonstrating this greater response toward derogation-dismissal among high PNS participants in the control condition, irrespective of scenario. In the control condition, 47% (15/32) chose derogation-dismissal. In the standard mortality salience group, 19% (5/26) of participants selected derogation-dismissal. In the contextualized MS group 16% (4/25) chose derogation-dismissal. Where PNS was low there was no significant effect. In the case of self-esteem, there was no significant effect on the dependent variable regardless of whether self-esteem was low or high.

When the 3 x 2 ANOVA (*Hypothesis 1 & 2 Continuous DV*) was conducted with the median split applied to the *self-esteem* scale, we found that while there was no support for the hypothesized main effect of prime nor the hypothesized interaction, when self-esteem was *low*, there was a marginally significant effect of scenario (IV2) on worldview defence, $F(74,1) = 3.69, p = .059$. The *vaccine* scenario had a mean score of 3.00, and a standard deviation of 1.78; the *environment* scenario produced a mean of 2.29, and a standard deviation of 1.29. In other words, participants with low self-esteem exhibit a stronger likelihood of punishing the target in the vaccine scenario than in the environment scenario, regardless of prime condition.

When the 3 x 2 ANOVA (*Hypothesis 1 & 2 Continuous DV*) was conducted with the median split applied to the *vaccine support* moderator, we found that when support for vaccination was *low*, there was a main effect of prime on the likelihood of punishment, $F(93, 2) = 4.10, p = .02$. Tukey's HSD multiple comparison analysis was conducted to further examine this main effect of prime. This analysis revealed that participants in the standard MS condition ($M = 3.31, SD = 1.77$) exhibited a stronger

willingness to punish than those in the control condition ($M = 2.23$, $SD = 1.23$), $M_{diff} = 1.08$, $p = .02$. The pandemic prime has a mean score of 2.72, $SD = 1.59$, and did not differ significantly from standard MS or control. The Games-Howell adjustment was used in this ANOVA due to unequal variances.

When the 3 x 2 ANOVA (*Hypothesis 1 & 2 Continuous DV*) was conducted with the median split applied to the *concern for the environment* moderator, we found that when support for environment was *low*, there was a significant main effect of scenario on the likelihood of punishment, $F(96, 1) = 6.31$, $p = .014$, with participants indicating stronger response in the vaccine scenario ($M = 2.41$, $SD = 1.28$) than the environment scenario ($M = 3.10$, $SD = 1.49$).

Discussion

The purpose of this study was to investigate the potential social effects of an infectious influenza pandemic. More specifically, the aim of the study was to provide further insight into the perceptions and potential social responses to an influenza pandemic by investigating the role aggression plays during a time of crisis using a terror management theory framework. The study predicted that where the threat of death from an influenza pandemic was made salient in a relevant context involving a social outgroup, people would be more likely to behave aggressively toward those they perceived as threatening to their physical and symbolic existence. Concurrently, it was predicted that moderating personality traits – specifically Personal Need for Structure, self-esteem, and support for vaccination – would exaggerate or mitigate the likelihood of such aggression.

The first area of interest involved the priming of mortality salience using three different conditions including a standard mortality salience manipulation, a pandemic-specific prime and a seasonal flu control condition. The second area of interest involved the application of two scenarios (anti-vaccination vs. anti-environment) following the priming of mortality salience. Of the two scenarios, the anti-vaccination context was designed to instigate a social response among groups exposed to the flu pandemic prime. The anti-environment scenario was intended as a control against the anti-vaccine scenario. The third area of interest involved the use of the three moderators to examine the effects they might exert on the extent of worldview defensive behaviour. The last area of interest was, of course, to measure the extent of aggressive behaviour – in the form of worldview defence – exerted by the independent variables and moderators.

Findings of the chi-square analyses did not produce, contrary to the predictions, a significant effect from a pandemic flu over and above that of a standard mortality salience prime. Of notable value is that the control condition produced a significantly less defensive reaction than both mortality salience manipulations with *high* PNS. Though only a “marginally significant” finding, it may suggest that participants requiring greater consistency and predictability of their environment would feel more threatened by thoughts of personal mortality than similar participants who were not made aware of their mortality. As previously discussed, Mikulincer and Florian (2000) have shown that those with rigid worldview conceptions have a greater propensity for defence of their views.

The MS prime groups consistently chose accommodation as the defence option, irrespective of the scenario context and with no significant difference between either of the prime groups. Perhaps it would be helpful to remind the reader that derogation-

dismissal is the least aggressive of the worldview defence options presented, followed in severity by accommodation, assimilation, and physical aggression. Since the accommodation response is a more significant worldview defence than derogation-dismissal – as it was presented, we can likely draw the conclusion that mortality salience does in fact increase fear and uncertainty of death, as numerous previous studies have concluded, and that this effect is significant amongst individuals requiring increased personal structure.

High PNS individuals appear to be affected by both mortality salience primes equally – not as hypothesized – but significantly greater than the control. This may indicate a basic mortality salience effect in high PNS individuals, as predicted by terror management theory, but also shows that mortality salience acts the same whether alone or in the context of a pandemic flu. The lack of a significant difference between the pandemic prime and the standard prime does not mean, as one may initially conclude, that the threat of an influenza pandemic does not cause fear and consequent aggression (Type II error), but rather that the threat of a pandemic is at least as provocative as standard mortality salience. A considerable body of research has shown mortality salience to be a significant instigator of worldview defence behaviour which has significant implications for outgroup derogation at the very least (see, for example: Greenberg et al. 1997; and Mikulincer & Florian, 2000).

The implications of this finding for future pandemic communications efforts could be of valuable consideration. Though, on a scale of worldview defence aggression, accommodation is on the low end, there are strong social desirability norms affecting participants. Terror management studies routinely attempt to create and maintain an

experiential cognitive mode of thinking, as described by Simon et al. (1997). This effect seems to have great significance on the degree to which participants allow themselves to override or be guided by these norms. Whether or not the experiential cognitive mode of thinking was maintained during the study cannot be determined but it could have a profound effect on the significance of the outcome. Many of the participants in this study were teenaged first-year university students who may be even more affected by social norms than the average population because of increased peer pressures (Randall & Fernandes, 1991). If so, they may have been able to overpower the experiential effect, instead remaining in a rational mode and consciously selecting responses based on social desirability. It is highly unlikely that one will endorse violence on a questionnaire, even under mortality salient conditions. They may have been willing, however, to endorse an option such as accommodation, which is more aggressive than derogation-dismissal, but stopping short of violating social norms – whether or not consciously.

In a real-life situation, such social norms against violence can be temporarily suspended or ambiguous, and a temporary loss of individuation and diffusion of responsibility may occur (Zimbardo, 2004; Bandura, Barbaranelli, Caprera, & Pastorelli, 1996). Therefore, in a real pandemic, the evoked mortality salience may produce worldview defence and aggression that is no longer mitigated by the social norms that may have attenuated responses in this laboratory simulation. The fact that an even slightly elevated level of aggression was observed in a simulated lab-based pandemic scenario – which was consistent with the standard mortality salience prime (with considerable effects documented in other studies) – may be meaningful.

As for the role Personal Need for Structure will play in a real pandemic, under increased stress or conditions of decreased self-regulatory strength, the need for structure will more than likely increase. This assumption, though yet to be verified by research, is simply the opposite viewpoint of the research conducted by Landau, Johns, et al. (2004). They describe high-PNS individuals as requiring a very well-structured social world with a high degree of stability and consistency in order to manage existential anxiety. If looked at initially from a state of increased anxiety it would be reasonable to presume that the stability and consistency of such a person's social world would need to increase in order to further manage this increased stress and anxiety to prevent a breakdown of cognitive control. Further research to address this assumption as it specifically relates to a pandemic would be of great benefit and lead to furthering our understanding of crisis management.

In the ANOVA analyses, among participants low in self-esteem, a marginally significant result was found suggesting a greater likelihood of punishment in the vaccine scenario than in the environment scenario. This was unaffected by the prime, and so is not really that meaningful. It could tell us, perhaps, that low self-esteem individuals are particularly upset by anti-vaccine types, more so than by anti-environmental types but for reasons that are unclear. It is unlikely that this finding would be of value in modifying the way a pandemic influenza crisis is communicated.

Among participants low in support for vaccination there was a significant effect on the likelihood of punishment. These results were again consistent with other TMT studies, showing a general increase in worldview defence following mortality salience among participants in the standard MS prime group compared with the control group.

The contextualized prime showed a response above that of the control but without statistical significance. Essentially, this finding shows that mortality salience causes an effect whereby participants exhibit more certainty between their chosen level of worldview aggression and the likelihood of acting out such behaviour in the event of a real event.

Participants low in their concern for environmental protection also displayed a significant effect. In this case, the results show that people who care little for the environment were less likely to react to a scenario designed to provoke a reaction among those who support environmental protection than they would be to react to a scenario involving an anti-vaccination dialogue. This finding, though significant, has little practical value since it does not involve the prime.

An interesting point, however, is that the anti-environmental scenario was introduced into the study as the corollary to the hypothesis that aggression may be higher in response to WV threat when there is strong support for the particular worldview. Consequently, what we see is that support for vaccination, or lack thereof, and one's likelihood of responding, is impacted by the mortality salience prime, whereas the environmental scenario is not. This suggests that a pandemic flu would in fact instigate a social response – though this is regardless of the level of aggression – compared with an aversive environmental event.

General Discussion

Limitations and Recommendations

The current study addresses several dispositional variables that offer a partial, though incomplete, presentation of dispositional personality differences affecting social behaviour in times of crisis. Expectedly, there are *confounding variables* which the study cannot control for that may affect the dependent variable under investigation.

Regarding *random assignment*, each participant in the study had an equal chance of being assigned to any of the experimental groups. Therefore, random assignment should not be considered a limiting factor in this study.

With respect to the *internal validity* of the study, it is admittedly difficult to control for all influences between groups being compared. Not all extraneous variables can be controlled or eliminated from the study (i.e. there are many dispositional moderators affecting the independent and dependent variables that this study has not addressed simply due to limitations in magnitude). *History* is one aspect of internal validity that may alter the performance of participants if, for example, the study was conducted near exam time with students being under increased stress. The study was, in fact, conducted over a period of weeks between major exam periods. *Differential selection* may affect internal validity because it involves voluntary participants who, by the nature of their increased motivation, may bias the results. At the same time, however, students participated for credit which served as an incentive. *Sequence effects* can be confounding if participants' performance was altered due to an earlier condition of the study design. For example, poor placement of a scale could impact the effectiveness of the mortality salience manipulation, potentially diffusing defensive behaviour and

skewing the results. Consequently, the scales were placed preceding the MS manipulation.

Considering the small sample size, there are aspects of the design that limit its *external validity* in the sense of offering real-world applicability. For example, the participants are largely homogeneous in age, ethnicity and religious affiliation, as it was limited to Lakehead University introductory psychology classes. A wider cultural sample would help address aspects of the study that have an inherent collective-cultural sensitivity. Comparisons of individualistic and collectivistic cultural differences to mortality salience and responses to the threat of a pandemic flu might require a study addressing this specifically.

Of course, there are a number of study design limitations that could only be observed after data was collected. For example, the scenarios (IV2) could have been more realistic and engaging in order to further instigate worldview defence. They were also fairly lengthy with no way of confirming that participants actually read the passages.

Secondly, the mortality questionnaires were frequently completed insufficiently to prime participants as they were designed to do. In many instances little or nothing was written down. While there was no minimal expectation of what a participant would write – quantitatively nor qualitatively – it seems a reasonable assumption that if little was written then little was taken from the prime's effect. It is, however, difficult to create this threat in a controlled lab-based environment and expect people to react as predicted would occur in a real pandemic scenario.

With a considerable number of incomplete surveys, and a consequently reduced sample size, there is an increase in the probability of committing a Type II error; this

probability increases with a small sample size. The addition of the pilot study group was for the purpose of decreasing this probability. Nonetheless, the possibility remains that had the sample size been larger we may have found more statistical significance in the study, allowing for different conclusions than those reported.

Thirdly, the worldview defence options (categorical DV) would have been more effective had they been less specific and less simplistic. The order of presentation of these choices, since they progress in severity of aggression, should have been randomized to prevent a certain predictability of choice selection. The concern is that the first two choices were selected far more than the third and fourth choices due to their positioning rather than their content. The intention *was* to randomize the order of the WV defence options but due to a clerical error in preparation of study packages this was not presented as expected.

With respect to the moderators involved in the study, the most significant effect was predicted where high PNS, low self-esteem, and strong vaccine support occurred simultaneously, creating a substantial interaction. This, however, would have made the cell counts too small to have any chance of significance, and will instead have to remain as a future study recommendation where a more substantial N value is present.

The present study used median splits as a technique for investigating the hypotheses. While this method is not an unacceptable technique, it is an indirect test of the hypotheses and as such brings criticism relating to its validity. A more direct test involving interaction analyses in a logistic regression would be better suited for future work in this area. No other examples of median splits in terror management research were found.

In addition, the study should offer generalizations about the social responses to perceived outgroups under pandemic conditions in contrast to different mortality situations or contexts. However, the investigation of additional dispositional variables to further clarify the relationship between specific personality types to specific situational contexts would require further study beyond the scope of this study.

One recommendation for future investigation would be to study different cohorts such as a geriatric or terminally ill population. Since one significant limitation of this study was that the age group was quite young, it is likely that such individuals have had little contemplation of their own mortality. With increasing age and personal illness or death of family and friends becoming more tangible, such mortal contemplation is likely to rise. For many, presumably, getting closer to death might trigger fear of the existential unknown. It would be of interest to know if a pandemic flu produced greater worldview defensive behaviours in a cohort where death and vulnerability were more of a present reality. An interesting point to consider, however, is the fact that one key difference between standard influenza and a pandemic H5N1 virus is its virulence among young and otherwise healthy individuals. This means that the group that comprised the present study's participants would be more specifically targeted by a flu pandemic than would be a geriatric or terminally ill population which would be threatened with less specificity or propensity. Theoretically, then, a pandemic flu should produce proportionately more fear and aggression among healthy young people than the elderly or ill.

An additional contributing factor to the general response of our research participants to a pandemic threat is that a flu pandemic has not recently been headline newsworthy. Consequently, general fear of a pandemic was not salient at the time of the

study. Had there been more fear provoking news coverage during data collection, with subsequent increased fear among participants, a pandemic mortality salience prime may have had greater effects.

Conclusion

The study proposed to provide public health officials with information to better understand and predict social behaviour in a time of collective crisis, and help in the design of effective communication to maintain order, control, and a sense of security in the face of an epidemic of this nature. Addressing the key significant finding of this study involving high PNS individuals, we might recommend a suggestion to maintain calm; and that is to offer praise and assurance to ingroup members that they (we) are valuable members of society. The underlying motive would, of course, be to maintain anxiety buffers such as self-esteem so that people do not begin feeling the need to aggressively defend their worldview. The bottom line is an emphasis on the continuation and existence of such a worldview to maintain calm and prevent defensive behaviour from arising in the uncertainty of such a crisis.

Though the results of this study were not exactly as hypothesized, it is of value to remind the reader that this is the first study of its kind to examine the effects of mortality salience in specific contexts such as a potential mass mortality event. Terror management theory has provided an effective framework for investigating the potential social responses likely to occur in the event of a real crisis. Authors such as Landry (2005), and Sandman and Lanard (2005), have presented very effective crisis communication strategies for addressing a potential pandemic. National, provincial/state, and municipal

strategies could benefit from the frameworks already prepared as well as integrating an understanding of terror management and how mortality salience can affect social responses in the specific context of an H5N1 influenza pandemic.

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TABLES

Table 1

Demographic breakdown by participant group and total

| Demographic | Students | Non-students | Total |
|-----------------------------|----------|--------------|-------|
| N | 180 | 10 | 190 |
| Age: low/high (in years) | 17/51 | 23/50 | 17/51 |
| Mean age (in years) | 19.97 | 31.90 | 20.60 |
| Gender-female | 122 | 10 | 132 |
| Gender-male | 58 | 0 | 58 |
| Caucasian ethnicity (%) | 87.8 | 80.0 | 87.4 |
| Canadian at birth (%) | 92.2 | 90 | 92.1 |
| Christian religion (%) | 66.1 | 50.0 | 65.2 |
| No religious persuasion (%) | 27.2 | 40.0 | 27.9 |

Table 2

Descriptive Statistics

| | N | Min | Max | Mean | SD |
|--------------------|-----|-----|-----|-------|------|
| Age (in years) | 190 | 17 | 51 | 20.60 | 5.54 |
| Age of immigration | 15 | 1 | 26 | 12.53 | 9.10 |
| Concern for envt. | 190 | 3 | 7 | 5.18 | 1.06 |
| Support for vac. | 190 | 1 | 7 | 5.03 | 1.42 |
| Relig. Involvement | 190 | 1 | 7 | 3.67 | 1.99 |
| PNS mean | 190 | 1 | 6 | 3.42 | .768 |
| Self-esteem mean | 190 | 2 | 6 | 4.54 | .906 |
| Punishment | 169 | 1 | 7 | 2.66 | 1.59 |

Table 3

Results of 3 x 4 chi square (hypothesis 1 categorical DV): Greater response toward derogation-dismissal among high PNS participants in control condition

| Mortality questionnaire | | <u>Worldview defence scenario</u> | | Total |
|-------------------------|----------------------|-----------------------------------|-------------|-------|
| | | Vaccine | environment | |
| Standard MS | Derogation-dismissal | 3 | 2 | 5 |
| | Accommodation | 11 | 7 | 18 |
| | Assimilation | 1 | 1 | 2 |
| | Aggression | 0 | 1 | 1 |
| Pandemic MS | Derogation-dismissal | 2 | 2 | 4 |
| | Accommodation | 12 | 5 | 17 |
| | Assimilation | 2 | 2 | 4 |
| Control | Derogation-dismissal | 7 | 8 | 15 |
| | Accommodation | 9 | 7 | 16 |
| | Assimilation | 0 | 1 | 1 |

Appendixes

- A. Informed consent to participate in study
- B. Demographics questionnaire
- C. Personal need for structure scale (Neuberg & Newsom, 1993)
- D. Rosenberg self-esteem scale (Rosenberg, M. 1979)
- E. Mortality questionnaire – standard mortality salience manipulation (Greenberg et al. 1990).
- F. Modified mortality questionnaire – contextualized mortality salience manipulation
- G. Modified mortality questionnaire – mortality salience manipulation control condition
- H. Distraction task – word-fragment completion task
- I. Target outgroup – anti-vaccine scenario
- J. Target outgroup – anti-environmental scenario
- K. Debriefing form
- L. Glossary

Appendix A

Informed Consent to Participate in Study

1. I understand the nature of this type of study, and that I will be providing personal information that may be used for purposes that I am not wholly informed of at this time.
2. **I understand that as a volunteer in this study I am free to withdraw without penalty at any time.**
3. **My name will be kept anonymous and will not be associated with my responses.**
4. **There are no anticipated risks involved in this study.**
5. I understand that I will be debriefed upon the completion of my participation in this study, and that a summary will be available upon request.
6. I further understand that this study is being conducted within the Lakehead University Psychology/Public Health departments for educational purposes only, and will be stored for a minimum of 7 years.

TO BE COMPLETED BY PARTICIPANT:

PRINT PARTICIPANT'S NAME

SIGNATURE OF PARTICIPANT

DATE SIGNED

Appendix B

The following study is an investigation of the relationship between personality and attitudes. Your participation and cooperation are greatly appreciated. Please begin by providing us with some personal information.

Personal Data

Instructions: Please fill in the information below so that we may obtain some general information on the people participating in this study.

1. Age: _____ 2. Gender: _____ 3. Year of study (1st year, 2nd year, etc): _____

4. Major (e.g. psychology, English, etc): _____

5. Ethnicity (mark all that apply):

_____ Caucasian

_____ Person of colour

_____ Aboriginal (First Nations, Métis)

_____ Asian

_____ Hispanic

_____ South Asian (Indian, Pakistani)

_____ Other (specify)

6. Birth country: _____ (specify); if not Canada, how old were you when you came to Canada? _____

7. Extent of concern for the protection of the natural environment: Please enter a number using the scale below: _____

1
Not at all
concerned

2

3

4
Somewhat
concerned

5

6

7
Very
concerned

8. Extent of your personal support of public health immunization/vaccination programs: Please enter a number using the scale below: _____

1
Not at all
supportive

2

3

4
Somewhat
supportive

5

6

7
Very
supportive

9. Religious/Spiritual affiliation:

- | | |
|--|--|
| <input type="checkbox"/> non-denominational spiritual | <input type="checkbox"/> Muslim |
| <input type="checkbox"/> Jewish | <input type="checkbox"/> Hindu |
| <input type="checkbox"/> Buddhist | <input type="checkbox"/> Sikh |
| <input type="checkbox"/> Christian: Orthodox | <input type="checkbox"/> Other (specify) _____ |
| <input type="checkbox"/> Christian: Catholic | <input type="checkbox"/> None |
| <input type="checkbox"/> Christian: Protestant (Baptist, Pentecostal, Lutheran, etc) | |

10. Extent of personal Spiritual or Religious involvement (please note: this is a subjective assessment of how central your spiritual or religious beliefs are in your life, and may or may not refer to involvement in an organized religion): Please enter a number using the scale below: _____

- | | | | | | | |
|------------------------|---|---|----------------------|---|---|------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all Involved | | | Somewhat Involved | | | Very Involved |

Appendix C

Read each of the following statements and decide how much you agree with each according to your attitudes, beliefs, and experiences. It is important for you to realize that there are no “right” or “wrong” answers to these questions. People are different, and we are interested in how you feel. Please respond according to the following 6-point scale by writing the appropriate number on the line following each statement:

*1=strongly disagree 2= moderately disagree 3= slightly disagree 4= slightly agree
5= moderately agree 6= strongly agree*

1. It upsets me to go into a situation without knowing what I can expect from it. _____
2. I'm not bothered by things that interrupt my daily routine. _____
3. I enjoy having a clear and structured mode of life. _____
4. I like to have a place for everything and everything in its place. _____
5. I enjoy being spontaneous. _____
6. I find that a well-ordered life with regular hours makes my life tedious. _____
7. I don't like situations that are uncertain. _____
8. I hate to change my plans at the last minute. _____
9. I hate to be with people who are unpredictable. _____
10. I find that a consistent routine enables me to enjoy life more. _____
11. I enjoy the exhilaration of being in unpredictable situations. _____
12. I become uncomfortable when the rules in a situation are not clear. _____

Appendix D

Please read each of the following items and respond according to the following 6-point scale by writing the appropriate number on the line following each statement:

2=strongly disagree 2= moderately disagree 3= slightly disagree 4= slightly agree

5= moderately agree 6= strongly agree

1. On the whole, I am satisfied with myself _____
2. At times I think I am no good at all _____
3. I feel that I have a number of good qualities _____
4. I am able to do things as well as most other people _____
5. I feel I do not have much to be proud of _____
6. I certainly feel useless at times _____
7. I feel that I'm a person of worth, at least on an equal plane with others _____
8. I wish I could have more respect for myself _____
9. All in all, I am inclined to feel that I am a failure _____
10. I take a positive attitude toward myself _____

Appendix E

A) Please briefly describe the emotions that the thought of your own death arouses in you:

B) Jot down, as specifically as you can, what you think will happen to you as you physically die and once you are physically dead:

Appendix F

Public health officials have warned that a global influenza pandemic is now overdue. Pandemic, meaning *all people*, refers to a global epidemic of an infectious disease that affects an extensive geographical area. It is predicted that in Ontario alone, mortality from a major pandemic could result in as many as 5,000 to 12,000 deaths (Ontario Ministry of Health, 2005).

A) Please briefly describe the emotions that the thought of your death and the death of many of the people in your community arouses in you from an influenza pandemic:

B) Jot down, as specifically as you can, what you think will happen to you as you and the people of your community physically die and once you are physically dead due to an influenza pandemic:

Appendix G

A) Please briefly describe the emotions that the thought of being sick with the flu arouses in you:

B) Jot down, as specifically as you can, what you think happens to you physically when you are sick with the flu:

Appendix H

Complete the following by filling in letters in the blanks to create words. Write in one letter per blank. Some words may be plural.

1. ST_ _ _ _
2. RO_ _ _
3. MI_ _ _
4. CO_ _ _
5. PO_ _ _
6. CA_ _ _
7. KI_ _ _
8. SL_ _ _ _
9. BR_ _ _ _
10. RA_ _ _ _
11. DR_ _ _ _
12. DA_ _ _
13. MA_ _ _
14. CR_ _ _ _
15. QU_ _ _ _
16. MOU_ _ _
17. WIS_ _ _ _
18. MEDI_ _ _ _
19. HE_ _ _
20. TR_ _ _ _
21. PR_ _ _ _ _
22. LO_ _ _
23. TR_ _ _ _ _
24. EA_ _ _ _
25. BE_ _ _
26. EN_ _ _ _ _
27. REP_ _ _ _
28. PR_ _ _ _ _
29. DE_ _ _
30. FA_ _ _ _ _
31. SN_ _ _ _
32. DI_ _ _ _
33. SH_ _ _ _
34. EX_ _ _ _ _
35. DE_ _ _ _ _

Appendix I

Imagine that you are at a party. You happen to overhear a debate between two people. In this debate you witness the following argument by someone you have never met. Please read the following scenario and then go on to the proceeding section. Do not skip ahead.

“Don’t even get me started. There is no evidence that vaccines prevent any diseases. Studies supporting immunization are so flawed that it is impossible to say if immunization is beneficial to anyone or to society in general. The public deserves proof that immunization is in fact safe and effective, and that the threat of the real natural diseases justify mass immunization of everyone, even against their will if it is necessary. Unfortunately, such proof has never been given. Vaccination is not necessary, not useful, and does not protect anyone. Yes, there have been epidemic infectious diseases in history, but they have always gone away on their own. There is no evidence that any influenza vaccine is effective in preventing or minimizing any attack of influenza. The producers of these vaccines know that they are worthless, but they go on selling them anyway. There is little evidence to support regular vaccination of healthy people of any age. If we look closely, we realize that health for all means medicalization and vaccinations for all; that is to say sickness for all. The only safe vaccine is a vaccine that is never used. My own personal view is that vaccines are unsafe and worthless. I will not allow myself to be vaccinated. The bottom line is that

infectious diseases are least likely to kill those who have healthy immune systems. I no longer believe that vaccines have any role to play in the protection of the community or the individual. All the doctors and people who were living at the time of the 1918 Spanish Influenza epidemic say it was the most terrible disease the world had ever seen. The truth is, it was the mass vaccination of people following World War 1 that created that epidemic – not a real virus. That pandemic dragged on for two years, kept alive with the addition of more poisonous drugs given by the doctors who tried to suppress the symptoms. The flu hit only the vaccinated. Those who had refused the shots escaped the flu. Besides, haven't you heard of herd immunity? If vaccines work then I'll be protected by everyone else getting the shot. So I don't need to get vaccinated."

[Worldview defence modes:]

After reading the preceding argument, please select, based on *gut reaction*, only the one single descriptor that most closely describes your feelings at this moment by placing an "X" or "✓" in the box beside the description. A rating scale accompanies each selection. Please rate how likely you would actually be to follow through in the event or reaction you have selected by placing an "X" at the appropriate point along the horizontal line. Please complete only the scale that accompanies your single selection.

Choose ONE of the following options and indicate on the scale below it how likely you would be to respond that way in this situation.

- You don't care what that person has to say; they're entitled to their own views.
 You don't feel that the person's argument is valuable or worthy of your attention.
 You choose to disregard their opinion as valueless and brush them off. ^[A]

Very likely to
respond this way

Not at all likely to
respond this way

- You feel that some points of the person's argument are valid, but feel the tone is aggressive, ignorant, and self-serving. You would consider aspects of the general argument that are appealing but argue that the person's views are extreme and self-righteous. ^[B]

Very likely to
respond this way

Not at all likely to
respond this way

- That person's views do not represent the views of anyone. You don't know what right he has making that ridiculous argument here and feel you should step in to debate him. You are concerned that he may try to convince others that he is right. You know that if you were involved in this discussion, you would shut him up pretty quickly. Besides, he is wrong and you could prove your point if given the opportunity. ^[C]

Very likely to
respond this way

Not at all likely to
respond this way

- Hearing his points of view and his lack of concern for others in society, as well as his overall contempt for the system created to help and protect us in a time of crisis, makes you really angry. You would like to do something to shut him up such as slip something in his beer to make him feel ill, or even physically confront him after the party. ^[D]

Very likely to
respond this way



Not at all likely to
respond this way

[^A Derogation/dismissal]

[^B Accommodation]

[^C Assimilation]

[^D Aggression]

Appendix J

Imagine that you are at a party. You happen to overhear a debate between two people. In this debate you witness the following argument by someone you have never met. Please read the following scenario and then go on to the proceeding section. Do not skip ahead.

"Don't even get me started. There is no evidence to support the notion of global warming. On the contrary, science has shown that temperatures fluctuate over time. Yet those environmentalists would have us believe the opposite if they had their way about it. But they're all just a bunch of global warming true believers. They would sooner see hundred year-old trees fall to the ground and die than to do something productive with them like make furniture. Trees are a renewable resource after all. And it is our responsibility to manage this resource. Besides, it says right in the bible, "Be fruitful, and multiply, and replenish the earth, and subdue it; and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moves upon the earth." Don't you remember the story of the bison on the American Plains? There were way too many of them, trampling the grass and eating everything in sight. The white man cleaned up the West by getting rid of those beasts and created a civilized land to raise cattle. The purpose of nature, as I see it, is to take nature – which serves no purpose on its own – and make it better. When we dam a river we make new lakes for people to enjoy. When we burn the horrible jungles of South America we give jobs to the indigenous tribes who'd otherwise have nothing. We give


them opportunities. And there's certainly plenty of forest down there. And when we pull oil out of the ground we make fuel available to heat our homes and drive our cars. But those environmentalists expect everyone to ride around naked on bicycles. The fur industry has been a pillar of this great country from the very beginning. And certainly if I want to wear a warm fur coat, no 'fundamentalist green' is going to tell me how I am to live my life. It's my right to do whatever I please. After all, it is no coincidence that humans have evolved to control the planet. It is our divine mandate! As for those environmentalists, ignorant enough to think we are somehow making the planet worse off, the best place for them is out of my sight. They threaten the very world we have fought so hard to create."

[Worldview defence modes:]

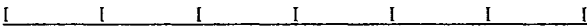
After reading the preceding argument, please select, based on *gut reaction*, only the one single descriptor that most closely describes your feelings at this moment by placing an "X" or "✓" in the box beside the description. A rating scale accompanies each selection. Please rate how likely you would actually be to follow through in the event or reaction you have selected by placing an "X" at the appropriate point along the horizontal line. Please complete only the scale that accompanies your single selection.

Choose ONE of the following options and indicate on the scale below it how likely you would be to respond that way in this situation.

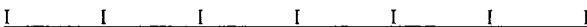
- You don't care what that person has to say; they're entitled to their own views.
 You don't feel that the person's argument is valuable or worthy of your attention.
 You choose to disregard their opinion as valueless and brush them off. ^[A]

Very likely to respond this way  Not at all likely to respond this way

- You feel that some points of the person's argument are valid, but feel the tone is aggressive, ignorant, and self-serving. You would consider aspects of the general argument that are appealing but argue that the person's views are extreme and self-righteous. ^[B]

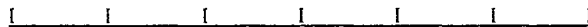
Very likely to respond this way  Not at all likely to respond this way

- That person's views do not represent the views of anyone. You don't know what right he has making that ridiculous argument here and feel you should step in to debate him. You are concerned that he may try to convince others that he is right. You know that if you were involved in this discussion, you would shut him up pretty quickly. Besides, he is wrong and you could prove your point if given the opportunity. ^[C]

Very likely to respond this way  Not at all likely to respond this way

Hearing his points of view and his lack of concern for nature, as well as his overall contempt for those serving to protect nature makes you really angry. You would like to do something to shut him up such as slip something in his beer to make him feel ill, or even physically confront him after the party. ^[D]

Very likely to
respond this way



Not at all likely to
respond this way

[^A Derogation/dismissal]

[^B Accommodation]

[^C Assimilation]

[^D Aggression]

Appendix K

Dear Participant:

The study that you have just participated in is an investigation of the potential effects of an *influenza pandemic*, addressed from both a public health and a social psychology perspective. The study will provide public health officials with information to better predict social behaviour in a time of societal crisis, and help in the design of effective communication to maintain order, control, and a sense of security in the face of an epidemic of this nature. The study uses a framework known as *terror management theory* to investigate the role aggression plays during a time of crisis. Terror management theory suggests that when confronted subconsciously with the threat of death, we tend to become more protective of beliefs and values that give meaning and longevity to our lives. This is believed to be due to the fear of a meaningless universe where nothing exists beyond our death. Such *existential* fears may alter human behaviour during times of crisis when the meaningful universe that has been created for us becomes threatened, especially when threatened by others who do not share, or who challenge, our beliefs. Terror management studies consistently show that when anxiety over personal mortality increases, people tend to react more positively toward others who support their beliefs and values and more negatively toward those who do not. Where the threat of death is a potentially real and present danger, as with an influenza pandemic, people may react more aggressively toward those they see as threatening to their existence. The present study hypothesized that the severity of threat would have a direct relationship to the severity of social response.

Participants were randomly assigned to one of 3 groups: An experimental group exposed to thoughts of a pandemic influenza with its potential for mass death, a group exposed only to general thoughts of their own death, or a control group which involved no exposure to death thoughts. Following a mortality questionnaire, half the participants were exposed to a scenario involving anti-vaccination views, and were then required to evaluate their potential reaction to such views, while the other half were exposed to a scenario involving anti-environmental views, and subsequently were asked to evaluate the subject in the same manner.

If the study hypothesis is accurate, it will become important to identify ways of reducing the tendency for people to resort to violence against those who view the world differently than they do when confronted with a crisis such as an influenza pandemic.

Your co-operation and involvement in this study will remain completely confidential and any information provided by you to the university will remain securely stored for a minimum of seven years.

For more information or for a summary of the study results, you may contact the researchers:

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Thank you again for your participation.

Appendix L

Glossary

Accommodation: Accommodation, as described by McGregor et al. (1998), involves incorporating certain appealing aspects of an alternative worldview into one's own while discarding the threatening component.

Aggression: McGregor et al. defined aggression as behaviour with the intent to harm the individual who is its object.

Assimilation: Assimilation as it pertains to worldview defence involves attempting to convert others to one's own point of view.

Derogation: To belittle the point of view of others, or denounce views not commonly held so as to make them of lesser importance.

Dispositional moderators: As pertaining to the present study, they include variables such as attachment style, self-esteem, personal need for structure, etc. These are personality characteristics.

Experiential system: The experiential system involves primary cognitive processes that are unconscious and irrational.

H5N1: This is a type of avian influenza virus. The name H5N1 refers to the subtypes of surface antigens present on the virus: hemagglutinin type 5 and neuraminidase type 1.

Influenza: Commonly known as the flu, it is a contagious disease caused by an RNA virus of the orthomyxoviridae family. It characteristically spreads around the world in seasonal epidemics, resulting in considerable economic burden, but mortality is generally confined to the elderly.

Ingroup: The dominant social group.

Interpandemic period: The temporal duration between pandemic outbreaks.

Mortality salience: The MS hypothesis states that where psychological structures provide protection against anxiety, the reminder of the source of this anxiety should lead people to have a greater need for these structures, reacting more positively toward things that support them and more negatively toward things that threaten them – such as an outgroup (Pyszczynski et al. 1999).

Outgroup: A social group having differing views, beliefs, and/or practices from that held by the dominant group (ingroup).

Pandemic: Pan meaning *all*, and demic from demos meaning *people*, refers to a global epidemic of an infectious disease that affects an extensive geographical area.

Personal Need for Structure: The tendency to impose structure and closure to people and events. The level of structure required is highly variable among people. PNS is related to stereotyping as the oversimplification and generalizability of others is greater amongst high-PNS individuals.

Proximal defences: Conscious actions taken to protect oneself from the thought of death. These may include personal reassurance or justification of one's health, resolution to diet, or begin exercise classes. In contrast, distal defences are symbolic and unconscious.

Rational system: The rational system deals with secondary processes that are conscious and rational.

Situational moderators: As pertaining to the present study, they include different mortality contexts.

Terror management theory: "TMT posits that a wide range of superficially distinct forms of human behaviour are oriented toward the pursuit of self-esteem and faith in a cultural worldview, to obtain the protection that these psychological structures provide from the potential for anxiety that results from the awareness of the inevitability of death in a highly intelligent, self-conscious animal that is instinctively programmed for self-preservation" (Pyszczynski et al. 1999, p.836).

Worldview: A cultural worldview is a collective standard of meanings and beliefs about the nature of reality.