

Fear, anger and responsibility: the emotional content of historical speeches about water and water policy

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Abstract Cognitive-affective science research shows that rational *cold* cognition and irrational *hot* cognition are causally integrated in the human brain. Sub-conscious and conscious emotions powerfully affect supposedly rational decisions, including those decisions we make about water resources management and governance. Through this research, I: (1) evaluated whether implicit and explicit emotions can be identified in historical documents through text analysis; (2) determined emotions' ranges and frequencies; and (3) assessed the merits of Terror Management Theory as an explanation of the influence of mortality salience on receptivity to water-resource information. Nine famous speeches (1960–2004) relating to water were coded against 17 indicator emotions. The analysis indicates that, compared to more positive emotions, negative emotions and mortality primes are more prevalent in environmental speeches, as predicted by TMT. This result is not surprising given the state of the world's water resources. But TMT also suggests that negative emotions could prompt individual mortality defenses that powerfully influence decision-making. Once triggered, these defenses may interfere with the desired behavioral changes required to address water concerns or crises. The results suggest that if we are to influence society's water policy decisions, we must understand the complex and underlying emotions that individuals and groups attribute to water problems and priorities.

Keywords Emotion · Decision-making · Environmental psychology · Rationality · Terror Management Theory · Water

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Introduction

It is not to be forgotten that what we call rational grounds for our beliefs are often extremely irrational attempts to justify our instincts (Huxley 2004, Letters from 1889–90).

Research on human cognition shows that emotion is fundamental to decision-making (Vess and Arndt 2008; Dickinson 2009). But the influence of emotions on decision-making is not yet widely acknowledged in mainstream environmental literature or policy analysis (Werbach 2005; Goldin 2015). Contemporary discussions about how environmental-policy decisions are made still largely assume that “[rational] science is a source of facts and theories about reality that can and should settle disputes and guide political action” (Sarewitz 2004, p. 386). More generally, the modern Western worldview is underpinned by an implicit theory of rationality, in which reason—rather than factors such as spiritual motivations, social obligations or divine authority—is assumed to reveal the best path of action.

In scholarly analysis of conventional water management and governance processes, emotions are not considered to have causal significance. The researchers, policy-makers and consumers involved in water decisions are widely assumed to be rational actors who rely on some version of cost-benefit analysis to arrive at decisions. Any emotions implicated in this process—for example, spiritual or historical connections to land, fears about drinking water contamination, or a feeling that a water allocation arrangement is not fair—are considered to be causally epiphenomenal or a function or source of actors’ exogenously determined preferences.

Emotions are obviously not the sole source of people’s economic, political or environmental decisions. But conventional accounts of rationality that do not effectively integrate emotions cannot fully explain how people and groups make decisions about complex problems, such as water-resource scarcities and climate problems with a high degree of perceived risk and uncertainty (Beck 1992; Freeman 2000; Sarewitz 2004; Pahl-Wostl et al. 2011).

I argue that to effectively address entrenched water challenges—such as those arising from water allocation, protection, and security—emotions must therefore be recognised as playing a central role in water consumption decisions and in water negotiations, governance processes, and policy design and implementation. It may be that interdisciplinary research will suggest that a failure to acknowledge emotions’ role will fundamentally weaken our efforts to anticipate and respond to water problems. This weakness will in turn create vulnerability in our water decision-making just as climatic uncertainties, water demands, and extreme weather events intensify. This is particularly salient as psychologists have shown that negative emotions—particularly fear, anxiety and foreboding associated with one’s mortality awareness—influences individuals’ worldview defense, consumption patterns, and antagonisms to out-groups.

This methodological study has three objectives: first, to evaluate whether a text-analysis method could reliably identify emotions from historic documents relating to water; second, to determine the emotions’ types and frequencies; and third, to consider the merits of Terror Management Theory (TMT) as a framework for assessing the presence and implications of any identified emotions. In this way, this article represents an attempt at methodological ‘proof-of-concept’ to test whether the data collection approach and theoretical framework allow insights on expressions and perceptions of water crises.

The article is structured from general-to-specific, building an argument for transdisciplinary scholarship linking insights from cognitive science and social psychology to water-governance research. The literature review is a summary of perspectives on rationality and emotion. I consider examples of emotions' influence on individual and group decision processes from the social sciences and environmental-behaviour literatures. I then turn my focus to specifically negative emotions and introduce TMT. TMT is proposed as a mechanism to assess human response to emotions induced by mortality awareness. A review of fundamental TMT insights will be presented and applied in the environmental context. I explore the potential of TMT and mortality salience as an opportunity to understand our responses to environmental crisis, particularly water-related ones. This very long review is the foundation and rationale for why emotion might be considered in discussions of decision-making in general and specific to water issues.

With the heavy lifting done, the Methodology section details the data collection and analysis methods used to address the three, water-specific objectives identified above. Expressions of conventionally negative emotions—such as fear, anxiety and sadness—were identified in environmental, and specifically water-focused speech transcripts in Tal's (2006) easily-accessible collection of important speeches between 1960 and 2004. The final two sections present the results, discussion, conclusions and consider future research opportunities for the water community.

Literature review

The biophysical origins of emotions and emotion's role in decision-making

Early descriptive theories of human cognition held that individuals can consciously control their emotions so these emotions do not contaminate "rational thought" (Lange and James 1922; Salovey et al. 2010). This perspective still has pervasive normative influence: researchers in economics, public administration, sociology, organisational management, and gender studies have documented how individuals often avoid appearing "irrational" by denying the role of emotions in decisions to avoid the associated negative connotations (Etzioni 1988; Alexander and Andersen 1993; Fischer et al. 2000; Gaudine and Thorne 2001; Cohen 2005; Tranel et al. 2005; Holian 2006; Franks 2010; Isen 2010). But cognitive-affective science research shows that emotions, grounded in brain function, can be powerful determinants of supposedly rational decisions. The conventional separation of rational "cold" cognition from irrational "hot" cognition does not accurately represent underlying human cognitive processes (Zhu and Thagard 2002; Panksepp 2010) and is likely largely an artefact of centuries old psychological mind-body dualism.

Emotions are created through biochemical signalling; they are continuously, and often subconsciously, generated by the human brain to organise and process physical and social environmental cues (Fischer and Manstead 2010). The brain uses this biochemical signalling to manage the constant stimuli it receives and to direct the cognitive functions of data interpretation, coding, storage, and recall. These functions profoundly influence people's decisions about their physical and social environments (Sawyer 1983; Herzog and Bosley 1992; Jensen 2002; Corral-Verdugo et al. 2003; Loewenstein and Lerner 2003; Hinds and Sparks 2008). This signalling directly influences our decision-making about everything that we value and believe (Schwarz 2000; Sarewitz 2004; Strang 2004; Frantz et al. 2005; Gifford 2008; Krantz et al. 2008; Rilling 2008; Chiao 2009; Mercer 2010;

Northoff 2010; Aggestam 2014). Cognitive research has shown that human brains need emotion if they are to make decisions (LeDoux 1996; Franks 2010; Isen 2010).

This study defines emotions as biochemical subconscious or conscious signals characterised by: (1) the human ability to be consciously recognised or controlled by one's cultural norms or learned experiences; and, (2) their "essential role... in [people's] beliefs and in the beliefs of others" (Mercer 2010, p. 6). Beliefs are "propositions, or collections of propositions, that one thinks are probably true." Emotions and beliefs are linked when emotion is used consciously or subconsciously as evidence to strengthen one's beliefs. This link between emotions and beliefs helps to determine one's self-awareness and identity (Fischer et al. 2000). Emotional beliefs are important because they allow an individual to take a position that "involves certainty beyond evidence" without feelings of cognitive dissonance if facts do not correspond with the individual's stated position (Mercer 2010, pp. 1–2). Emotional beliefs can become the foundation of our individual and group values.

The mental schema—cognitive shortcuts—that result can be expressed as one's attitudes, values, norms, and knowledge (Ariely 2008; Franks 2010; Stets and Turner 2010; Kahneman 2011). Emotions also shape self- and group-identity, as individuals determine where they fit within communities. Finally, decision-making is influenced by the reconciliation of conflicting priorities or emotional coherence across different choices, self-identities, and group affiliations (Thagard and Kroon 2006).

These ideas about the relationship between emotions and decision-making have been tested through social science research on: political party affiliation and voting behaviour (Marcus 2000; Settle et al. 2010); responses to reward stimuli (Northoff 2010); international negotiations (Mercer 2010); and individual and group-level responses to climate change (Gifford 2008; Fritsche et al. 2010; Fritsche and Hafner 2012; Norgaard 2011).

Other studies have indicated that emotions are the foundation for a group's internal identity and membership parameters (Sarewitz 2004; Smith and Mackie 2010). In these ways, research on the interplay of emotion and decision making suggests that emotion has an influential role in both individual and group decision-making processes (Franks 2010).

But whether *all* emotions are *equally* influential remains an open question (Etzioni 1988; Loewenstein and Lerner 2003; Fontaine et al. 2007; Isen 2010). Research suggests that negative emotions emerging from specific cultural contexts and from our awareness of mortality can be both paralyzing and highly motivating in our decision processes. For example, TMT indicates that our often out-of-consciousness death anxieties can be a dominant driver of human emotion in general, and especially of emotional responses to the threatening or uncertain situations that characterise environmental crises.

Mortality awareness and fear

Humans' extraordinary cognitive capacity has given rise to language and culture. Both language and culture allow humans an awareness of time, the ability to understand self in relation to others, and the capacity for planning and deferred gratification. But these abilities entail a significant psychological cost: a pervasive and unavoidable awareness of and, ultimately, fear of mortality.

Drawing on social anthropology and the works of Freud, Rank (1941), Brown (1959) and Becker (1973) explored how self-awareness in the context of knowledge of the broader universe generates feelings of impotence and insignificance; similarly, awareness of one's own unavoidable death also influences human behaviour. Becker argued that one's conscious and subconscious anxiety around death is the central driver of human behaviour, explaining, "why we do what we do" (Becker 1973).

Terror Management Theory

Becker's theoretical ideas have been tested, expanded and codified through a long-standing social psychological research program called TMT (Solomon et al. 2004). TMT offers a complementary framework to existing research on social norms and pro-environmental behaviour (e.g. Cialdini 2001), decision theory (Fiske et al. 2010) and fear emotion-based communications (e.g., Feinberg and Willer 2011). This program has explored how humans predictably defend against emotions triggered by mortality salience or awareness. *Mortality salience (awareness)* is a reminder of our vulnerability and inescapable mortality that TMT researchers have proven to influence behaviour and decision making (Greenberg et al. 1992). In the TMT framework, human culture and psychology are considered to be, in part, concurrent adaptive responses to fears of death. Humans generate reassurance of their significance and self-worth using individual-psychological and group-cultural responses to redirect or temporarily block mortality salience. A failure to block the emotions associated with mortality awareness can be paralyzing (Arndt and Solomon 2003; Pyszczynski et al. 2006).

Researchers have identified two psychological defensive responses in particular. "Proximal defenses" minimise or marginalise death thoughts when they surface into consciousness. These defenses include: denial that a problem exists or that it will continue; minimization of the problem's scope or implications; or rejection of human contributions to the problem or role in possible problem resolution.

In contrast, "distal defenses" keep death thoughts unconscious through sublimation and displacement. Distal defenses include projects to bolster self-esteem through seemingly unrelated mechanisms of increased out-group antagonism—an us-or-them identity response to threat—and a tendency to reinforce the individual's or group's worldview (Greenberg et al. 2000).

Becker argued that "hero projects" allow individuals to generate self-esteem and self-worth through actions that their society values and affirms (Florian and Mikulincer 1998). Culture provides the socially sanctioned roles, behaviour models, and the range of possibilities for immortality projects. These roles, models and projects allow an individual to "live on" beyond one's time-limited biological existence. Generating and bolstering one's self-esteem through cultural recognition mitigates feelings of vulnerability. Individuals feel like they are part of something bigger and longer lasting than their biological selves; they perceive themselves as valued members of society if they live successfully within the parameters set out by their cultures. But any threat to that something, such as a change or rejection, can cause the individual significant psychological and even physical distress.

Terror Management Theory and the natural environment

What the environmental movement needs more than anything else right now is to take a collective step back to rethink everything. We will never be able to turn things around as long as we understand our failures as essentially tactical, and make proposals that are essentially technical (Shellenberger and Nordhaus 2004: 7).

Werbach (2005) argued that the modern environmental movement is a failure. He cites the example of global warming: decades of effort and millions of dollars have failed to make any meaningful change in carbon emissions. Shellenberger and Nordhaus (2004, p. 6) come to the same conclusion: the hundreds of millions invested to address global

warming and “we have strikingly little to show for it.” The assumption underpinning environmental communication is that “to win action on global warming one must talk about global warming...” (Shellenberger and Nordhaus 2004, p. 13). But the intended action or responses have not materialized. Instead, “the nightmarish scenarios environmentalists were telling about global warming... so terrifies and repels ordinary Americans that they retreat from engagement... [it turns out that] the more you scared people about global warming, the more they want to buy SUVs to protect themselves” (Werbach 2005). Why is it that Werbach (2005) can propose, “saving ourselves depends not on our ability to shock but rather to inspire”? The modern environmental movement has always relied on communicating the latest crises and anticipated outcomes as part of their campaigns. So why would Shellenberger and Nordhaus (2004) propose that what we need is an inspirational vision for the future?

It turns out that researchers in social psychology can answer both of those questions. TMT researchers have shown that our efforts to repress mortality fears can have counter-intuitive consequences for individuals’ environmental actions. When faced with an environmental threat to self or to their group, individuals are not always receptive to information or prepared to make behaviour changes that could address the threat (Pyszczynski et al. 2015). Also, while tactical changes such as regulation, policy and economic incentives can guide behaviour, these conventional incentives may not fundamentally shift individuals’ belief systems and long-term behaviours, which are heavily laden with implicit emotions. For significant or sustained behaviour change, individuals’ underlying, powerful and typically ignored proximal and distal emotional defenses must be identified and understood, because they can otherwise block effective responses to environmental threats (Dickinson 2009, p. 3).

Emotions can powerfully influence group norms (Thagard and Kroon 2006). Groups’ priorities—whether as citizen stakeholders, research communities-of-practice, non-governmental advocacy groups, industry lobbies, or professional associations—can then in turn influence a society’s institutions and water-related outcomes (Nancarrow et al. 1997). But by failing to recognise underlying social-psychological drivers, environmental controversies can become inextricably linked to ideological positions (Sarewitz 2004) and then deeply entrenched as the fundamental paradigms that guide society’s understanding of the world, problems, priorities and best-practices (Kuhn 1962; for a water-related analysis, see Wolfe and Brooks 2016).

TMT research has identified a variety of connections between mortality awareness and environmental behaviours: mortality reminders increase material consumption (Kasser and Sheldon 2000; Arndt et al. 2004); strengthen aesthetic preferences for cultivated natural landscapes (Koole and Van den Berg 2005); accelerate people’s use or allocation of resources (Sheldon and McGregor 2000; Campbell et al. 2005); shape individuals’ environmental choices, actions and identities (Vess and Arndt 2008; Fritsche et al. 2010; Fritsche and Hafner 2012); and encourage denial of climate change’s threat to humanity (Van den Berg and Heijne 2005; Dickinson 2009; Fritsche et al. 2012). There is an empirically significant relationship between mortality salience, individuals’ efforts to repress that awareness and reactions—both pro and anti-sustainability—to the environment or resource consumption (Burke et al. 2010). Whether water represents a unique resource to be protected or particularly powerful mortality reminder when it is endangered remains a question for future research.

Using emotions and TMT in historical and contemporary water research

When focusing on a specific element such as water, research on emotions' role is limited. Studies that link water and emotions have examined child and adult water phobias (Shank 1987; Menzies and Clarke 1993; Graham and Gaffan 1997; Poulton et al. 1999); individual risk perceptions of extreme water events, flooding, drought and contamination (De Franca et al. 2005; Terpstra 2011); and emotional distress experienced during water insecurity (Wutich 2009) and extreme events (Babugura 2008). These studies only indirectly address risk perceptions and mortality salience; they also consider both positive and negative water experiences, if not emotions. Other, earlier research referenced the role of human psychology and cognition in water management (Vugteveen et al. 2010; Sivakumar 2011; Wolfe 2012; Overdeest and Christiansen 2013). However these studies did not explore the details of group or societal level decision making, nor did they consider the presence or influence of specific proximal and distal defense mechanisms used in response to subconscious mortality triggers or conscious awareness.

Terror Management research has shown that mortality reminders can trigger individuals' and groups' proximal and distal mechanisms, which can then generate ideological positioning and entrenchment (Burke et al. 2010). In water research, we do not yet recognise these processes, but we should: psychological defense mechanisms and subsequent positioning might fundamentally undermine the principles of good water governance and principles of multi-stakeholder involvement, participation, and transparency.

Proximal defenses in water discussions may minimise death thoughts through displacement, rationalization and distraction. The resulting proximal defenses could undermine individual motivation and engagement in water programs or conservation. They might even highlight societal incapacity to address systemic problems of water conservation, access, and pollution, in turn worsening the underlying anxiety.

Distal defenses could serve to sublimate death thoughts (arising from water issues) through self-esteem projects, out-group antagonism, and solidification of one's worldview leading to preferences for particular infrastructure efforts or unwillingness to share water resources. As climate change threatens individual, regional, and global water security (Vorosmarty et al. 2010), we will need to consider how both individual and societal distal defenses may shift the water management paradigms (Wolfe and Brooks 2016). By doing so, this opens opportunities for a larger range of water management options rather than limiting ourselves to centralized, large scale, business-as-usual approaches. Recognition of distal defenses could also allow us to anticipate increasing water-related adherence to in-group norms and intergroup hostility. This recognition could also engage the historical and contemporary debate about the causal role of water resources and scarcity in conflict (Homer-Dixon 1999; Turton 2000; Wolf 2009; Swatuk and Mazvimavi 2010).

There is limited evidence that our proximate and distal defences directly influence water decisions. Researchers have demonstrated that participants with conscious mortality awareness rated bottled water more favorably and drank more if a medical professional endorsed it. When death is on our minds, we do what's best for our health by listening to the medical expert. Participants whose mortality awareness had time to fade to unconsciousness were more likely to find celebrity endorsement of bottled water compelling. With their mortality awareness successfully shunted away, participants sought to emulate celebrity norms (McCabe et al. 2014). At a broader scale, Wolfe and Brooks (2016) used a TMT framework to explore the underlying beliefs within the water supply-management, demand-management, and soft-paths paradigms. They argued that social psychology's

insights on ‘mortality salience’ help explain the limited progress of demand management and water soft paths. They argue that proximal and distal defences to mortality awareness offers complementary explanations for why individuals and societies seek to control water supply and, by extension, deny their connection to nature and to limit consciousness of physical vulnerability.

So it is possible to use a TMT framework as a means to reconsider the discourse surrounding issues of water. A starting place—described below—is the use of historical, publically available documents (speeches) as a data set for testing our method, evidence for emotions and considering the implications of any identified emotions. The research described below is a methodological ‘proof-of-concept’. These preliminary efforts will be critical to future explorations of the intrinsic role of emotions in water governance using more diverse data drawn from texts, interviews, videos, education campaigns, and other media. These future studies could help to identify intervention opportunities that would more effectively inform water-policy negotiations and implementation processes.

Methods

In this section the data set, coding procedure and analysis are outlined, as well as the rationale for the methods used to consolidate the indicators of negative emotion.

Data set

Tal’s (2006) book *Speaking of Earth: Environmental Visions and Speeches*, provided an easily accessible compilation of environmental speeches with a transparent selection process that provided an initial filter of an unlimited number of global environmental speeches over time and place. Through his compilation, Tal (2006) attempted “to explore the one universal tool that all green activists and leaders wield at some point in their work: *their voices*” (Tal 2006, p. xv). He argues that public speechmaking is a “central mechanism for galvanizing change. Yet there appears to have been no systematic effort to collect, edit, analyse, and detail the circumstances surrounding environmentally significant speeches around the world” (Tal 2006, p. xv).

Tal selected speeches from individuals who had “made a difference,”—i.e., strongly influenced pro-environmental thought and represent clear statements of environmental problems and attitudes of the time. But the speakers’ “name recognition carried far less weight than environmental contribution” (Tal 2006, pp. xvi–xix). Tal also sought speeches “that contained an important ecological message or captured an important environmental moment or impulse” (Tal 2006, p. xvi).

While the topics addressed in the 20 speeches varied, they did share some striking similarities: “[They] are almost never funny. They are full of facts. Frankly, they can often be depressing. And yet they are compelling” (Tal 2006, p. xix). These similarities are interesting given Tal’s own observations about the elements of a compelling speech: “audiences remain unmoved if they do not sense the depth of a speaker’s feelings” (Tal 2006, p. xix). As he noted, “the people featured in this book were not necessarily spell-binding orators but... theirs was an intensity that forced listeners to stop and think” (Tal 2006, p. xix–xx).

In the speeches Tal selected—and thus in the qualitative data used here—the speakers expressed an “unshakeable conviction and a healthy dose of righteous indignation” (Tal

2006, p. xix). His selection was also influenced by his role as a professional environmental advocate and his “language limitations.” The result is a selection with a “disproportionate number of speeches from European and English-speaking nations,” that nevertheless reflects and represents “the modern environmental movement” of the last century (Tal 2006, pp. xvi–xvii).

For this study on emotions and water, I used nine of his book’s very helpfully consolidated 20 speeches. Tal had already pre-filtered the vast range of environmental speeches based on the criteria mentioned above. I further refined his sample of 20 by selecting those speeches with content that specifically addressed ‘water’, broadly defined, in any of its forms, and its quality, quantity, management, and importance for human and environmental health. I was lucky in that this sub-sample (nine speeches) exhibited a nice diversity on each of three criteria: topic, timing and nationality. The selected speeches represented each of the five decades from 1960, with speakers from Europe, Africa, Asia, and North America. Four of the nine speakers were female. The speakers’ professional affiliations included the public service (HRH Prince Charles; Kelly; Strong; Thatcher), environmental activists (Carson; Heyendahl; Maathai; Robert), and religious leaders (Dalai Lama).

Coding and analysis

Various positive and negative emotions may appear in environmental speeches, but this project was designed to investigate negative emotions applicable to a Terror Management framework. TMT offers the perspective that our responses to negative emotions—specifically those associated with mortality awareness—are influential, underlying factors in human decision-making.

Emotions’ definitions tend to be elusive and culturally and linguistically dependent rather than universally accepted (Fontaine et al. 2007). Although scholars debate the diversity and psychological roles of different emotions (Lerner and Keltner 2000; Scherer 2005; Kagan 2007; Hatfield et al. 2009), this research used the broadest possible range. The current affect and emotions literature was referenced to generate a list of possible negative emotions. Generally accepted definitions of each were adopted from the Oxford English Dictionary (OED 2013) for the codebook (Table 1).

These definitions were used to identify: (1) explicit emotional content, i.e., the use of the actual emotion words, such as in the statement “I am angry”; and (2) implicit emotional content, i.e., words or phrases that convey or allude to the emotion or feeling (Krippendorff 2013).

Speakers’ vocal nuances are lost when their speech texts are analysed as a data source. Given this potential loss of meaning, some conceptually similar emotions were included; this overlap created redundancy in the codebook. For example, the difference between the speaker’s sense of “panic” or “fear” may be difficult to discern from the text itself, and the terms may even be used interchangeably. The difference could have been clearer in the verbal speech. To provide data redundancy, both emotions were included in the codebook but only attributed and counted once. Future, more expansive research would cross-reference mixed media sources in addition to speech transcripts. Doing so would provide additional reliability by incorporating vocal nuance and visual body language cues into the analysis.

The author coded all of the speeches to ensure interpretative consistency throughout the coding process. Content analysis was used because it is flexible and allows for findings that are replicable. Each text was manually coded to identify emotions’ frequency, the use of

Table 1 Emotions' definitions comprehensive codebook

Codebook	Definition
Alarm	An anxious awareness of danger
Anger	A strong feeling of annoyance, displeasure, or hostility
Anxiety	A feeling of worry, nervousness, or unease about something with an uncertain outcome
Dismay	Concern and distress caused by something unexpected
Dread	Anticipate with great apprehension or fear
Fear	An unpleasant emotion caused by the threat of danger, pain, or harm
Foreboding	A feeling that something bad will happen; fearful apprehension
Fright	A sudden intense feeling of fear
Hatred	Intense dislike
Horror	An intense feeling of fear, shock, or disgust
Panic	Sudden uncontrollable fear or anxiety, often causing wildly unthinking behaviour
Pessimism	A tendency to see the worst aspect of things or believe that the worst will happen
Rage	Violent uncontrollable anger
Sadness	The condition or quality of being sad
Sense of responsibility	The state or fact of having a duty to deal with something or of having control over someone The state or fact of being accountable or to blame for something
Shame (Failure)	A painful feeling of humiliation or distress caused by the consciousness of wrong or foolish behaviour
Shock	A feeling of disturbed surprise resulting from a sudden upsetting event

mortality awareness-specific and of water-specific emotions, the temporal characteristics of this use, and the speakers' purpose and sentiment. Emotion was detected from sentence structure and the use of adjectives, adverbs, and verbs to convey tone and meaning. Phrases or sentences that contained emotion were highlighted. Each highlighted word, sentence or phrase was compared to the codebook emotions and then organised in the spreadsheet by emotion and speaker. The emotions' temporal characteristics were also coded, including whether the emotion was associated with an event or issue in the past or in the current period (i.e., occurring at the time of speech) or with a future possibility.

The coded data were first analysed for counts of: availability, i.e., presence of emotion in the text, and frequency, i.e., how often an emotion was identified. The frequency count included the totals for all emotions across all speeches.

When coding "mortality-specific emotions," only those apparently arising from the prospect of imminent or future death, pain, and psychological suffering of human beings were included. This second analysis combined the 17 initial emotions into four categories of Fear, Sadness, Anger and Obligation. These consolidated categories served to: reorganize the codebook by emotions tied to a human mortality consciousness and increased the reliability and validity of qualitative interpretation by making the category boundaries more distinct.

In the third analysis, the focus was on the single—albeit inclusive—issue of the emotions tied to water references. The frequency counts of the specific water-related emotions were compared to the total, generalized emotion frequency counts. Coded water-related

emotions included all direct references to all forms of water, for example “river,” “rain,” “pool,” “lake,” “ocean,” and “aquatic species,” but excluded indirect references to water such as “biosphere” or “landscape.”

Results

In this section, the results of the general, the mortality-related, and the water-specific analyses are presented.

Analysis 1: availability and frequency of emotions across all speeches

The nine speeches were coded against 17 different emotions. When the total frequency counts were combined (174 counts), four of the 17 emotions had markedly higher counts than the others; these are indicated by an asterisk in Tables 2 and 3. Some of the remaining 13 emotions had low counts while some emotions were not found.

Sense of Responsibility was the most frequent emotion (29%). For example, Kelly (2006, p. 142) argued strongly that one has a responsibility for the future and that “in fact, we must get away from the idea of ‘repairing,’ or of being able to repair all that we first destroy, because some things in nature cannot be repaired that we have damaged and have injured.”

Fear (14%), Anxiety (12%), and Anger (12%) were also higher compared to the next two most frequent emotions of Sadness (8%) and Foreboding (7%). Fear and Anxiety—about physical suffering and death—were expressed in both present and future tenses. In comments related to a sense of Foreboding, the emphasis was also on future suffering. Heyerdahl (2006, p. 33) focused his fears on our dependence on the planet’s health: “Since

Table 2 Frequency counts of all emotions expressed by all speakers

Frequency count	Count totals (*high count)
Alarm	7
Anger	*20
Anxiety	*21
Dismay	2
Dread	2
Fear	*24
Foreboding	12
Fright	2
Hatred	2
Horror	1
Panic	0
Pessimism	2
Rage	0
Sadness	14
Sense of Responsibility	*51
Shame (Failure)	3
Shock	11
Total Emotions Counted	174

life on land is so utterly dependent on life in the sea, we can safely deduce that a dead sea means a dead planet.” Twenty years after Heyerdahl expressed his concerns, the (Dalai Lama 1992, p. 158) indicated a sense of foreboding when he observed, “Our ignorance of [unsustainable resource use] is directly responsible for many of the problems we face.... If it continues unchecked, eventually we will all suffer.”

Anger as an emotion was directed at past actions as exemplified by Strong’s (2006, p. 49) comments that global society “did not intend either of these or the many other destructive, dangerous, and unhealthy and unaesthetic consequences of our past activities, but these are what we have.” Anger was evident in Thatcher’s (2006, p. 127) observations that “It is life itself—human life and the innumerable species of our planet—that we wantonly destroy.” In these comments, the emphasis was on the pain, suffering and mortality implications for the human species.

Sadness was expressed in the present tense. Sadness was related to psychological suffering because of “the huge but unquantifiable loss of landscape quality, wildlife, and cultural diversity which reduces our genetic resources, depresses the human spirit, and makes our lives less interesting and less fulfilling” (HRH Prince Charles 2006, p. 196). The Dalai Lama (1992, p. 159) indicated psychological Sadness in his observation that “We have become so engrossed in this pursuit that, without knowing it, we have neglected to foster the most basic human needs of love, kindness, and cooperation. This is very sad.”

Analysis 2: emotions associated with mortality awareness

The 17 emotions were consolidated into four coding categories based on conceptual similarity:

- *Anger* anger, hatred, rage
- *Sadness* dismay, pessimism, sadness
- *Fear* alarm, anxiety, dread, fear, foreboding, fright, horror, panic, shock
- *Obligation* sense of responsibility, shame (failure)

Of the total of 174 counts, the two largest consolidated categories were Fear (80 counts; 46%) and Obligation (54 counts; 31%).

Analysis 3: emotions specific to water and mortality awareness

Our dependence on water ties us both biologically and socially; this relationship is bound to stimulate emotional responses (Table 3).

The mortality awareness category of Fear—which includes fear, anxiety, alarm, foreboding, panic and shock—constituted 74% (20 of 27 counts) of all the water-related emotions coded. Within that category, the highest counts were Fear (33%; 9 counts), Anxiety (15%; 4 counts) and Foreboding (11%; 3 counts). Fear for humanity’s future was based on the evidence of “widespread” (Maathai 2006, p. 256) and “irretrievable damage” (Thatcher 2006, p. 127). There was also a sense that our individual and global decisions “are changing the environment of our planet in damaging and dangerous ways” (Thatcher 2006, pp. 127–128).

Anxiety and Alarm underscore a shared sense of vulnerability and complete dependence on limited and shared resources (Heyerdahl 2006, p. 33; Thatcher 2006, p. 130; Dalai Lama 1992, p. 157). Foreboding arose not from anticipation of “conventional political dangers” (Thatcher 2006, p. 127) or “spectacular accidents” (Heyerdahl 2006, p. 38), but from the uncertainty associated with accumulating and often unseen water pollution

Table 3 Frequency counts of all 'water-related emotions' from all speeches

Mortality awareness category (total count)	Water frequency count	Total (*high count)
Anger (1)	Anger	1
	Hatred	0
	Rage	0
Sadness (3)	Dismay	0
	Pessimism	1
	Sadness	2
Fear (20)	Alarm	2
	Anxiety	*4
	Dread	0
	Fear	*9
	Foreboding	*3
	Fright	0
	Horror	0
	Panic	0
	Shock	2
	Obligation (3)	Sense of Responsibility
Shame (failure)		0
Total water-related emotions counted		27

(Heyerdahl 2006, p. 38; Strong 2006, p. 52) and the inability to predict “where the hurricanes will be striking, who will be flooded, or how often and how severe the droughts will be” (Thatcher 2006, p. 130). These speeches acknowledged the economic (Kelly 2006: 146), social (Maathai 2006, p. 256), and health implications for all of humanity. The Obligation category—including Shame (failure) and Sense of Responsibility—contributed 11% (3 of 27 counts), while the remaining counts occurred in the Anger (1 count) and Sadness (3 counts) categories.

Discussion

The study objectives were to evaluate whether a text-analysis method could reliably identify emotions from historic documents relating to water; second, to determine the emotions' types and frequencies; and third, to consider the merits of TMT as a framework for assessing the presence and implications of any identified emotions. These objectives are discussed below.

Methodology and evidence of emotions

The coding method effectively captured instances of the implicit and explicit emotion expression across speech themes, dates, and oratorical styles. The Sense of Responsibility was the most frequent emotion across all of the speeches. This emotion would be an understandable motivation for speakers who are in the public service (HRH Prince Charles; Kelly; Strong; Thatcher), environmental activists (Carson; Heyendahl; Maathai; Robert), and religious leaders (Dalai Lama). But in addition to the speakers' professional sense of

responsibility, the emotions of Fear, Anxiety, and Anger, were also frequently used with a greater emphasis on fear-based emotions.

Emotion and influence

Given the content and negativity of these speeches, why were they considered influential? Tal argues for the “influential actor” perspective of historical change. He writes that “it would seem that it was a relatively modest number of environmentalists who actually changed the world, or perhaps even saved it” and that it was “the hard work of extraordinary individuals and the resonance of their message that were ultimately responsible for heralding change” (Tal 2006, p. xv). For him, the speeches were influential because renowned environmental leaders stirred “the spirits of citizens around the world.” So perhaps the speeches were deemed influential and memorable because of the speakers’ status and their emotional delivery of an informative message.

However the use of specific emotions would also be influential and should not be overlooked. Tal’s speakers were internationally renowned and they spoke “openly and ardently” (Tal 2006, p. xv) about world water problems; but they drew heavily on negative emotions to convey the seriousness of the issues. The speakers used negative emotions—in both the present and future tenses—to sustain their listeners’ interest. They may have intuitively or subconsciously chosen to highlight the negative; environmental psychology shows that threat can indeed lead to more pro-environmental attitudes and behaviour (Fritsche et al. 2010) and the environmental movement has shown a consistent strategy of using scientific facts and worst-case-examples to motivate change (Werbach 2005).

Because of the speakers’ coupling of common examples of physical suffering, negative emotions and mortality reminders, these speeches could have triggered the psychological defense mechanisms identified by TMT. So perhaps a more nuanced explanation is in order: these speeches were influential because they directly triggered the listeners’ sense of mortality and subsequent defenses. Yet new TMT research suggests a crucial insight: mortality threats can create outright denial, behavioural paralysis, out-group animosity, and other less rational decision processes (Dickinson 2009). How listeners respond to a speaker’s words and conveyed emotions—particularly those that trigger death awareness and psychological defenses—should be recognised as dynamic, contested, and often unexpected outcome that is partially dependent on one’s pre-existing environmental identity or values (Harrison and Mallett 2013).

For example, the speakers’ may have challenged their listeners’ defenses through effective use of content and contextual emotions. Specifically, their use of the Responsibility and Fear emotions primed listeners to experience conscious and subconscious death thoughts at the self and group levels, regardless of whether the speakers were consciously trying to achieve this outcome. Such mortality reminders would have been uncomfortable—and therefore memorable, if not pleasurable—for the listeners. Would the listeners’ subsequent emotional reactions and cognitive dissonance motivate them to take environmentally positive action to repress their mortality awareness and restore their psychological equanimity? Perhaps, but the record of environmental advocacy and policy implementation successes is mixed, even when powerful personalities and persuasive speakers champion environmental causes.

TMT explains why negative emotions can generate counter-intuitive behaviour. When proximal defenses are primed by thoughts of death or suffering, an individual is more likely to deny the problem, deny any culpability, or minimise the extent of the problem (Dickinson 2009). Triggering a listener’s distal defenses may actually be counter-

productive and lead the individual to idealise charismatic figures who reinforce the listener's perspective, seek out further self-esteem and status items, and increase one's antagonism toward others who do not share his or her worldview.¹

So while a compelling environmental speaker might anticipate that an emotional speech filled with frightening realities would rally the listeners to responsible action, the opposite response may also result. A TMT analysis suggests that in environmental crises, including those related to water, "the behaviors people exhibit are not necessarily those that reduce the risk of death, and in fact they may sometimes increase it as long as they also bolster the individual's symbolic self and the complex immortality-striving hero system that defines it" (Dickinson 2009, p. 34).

Research from social psychology, environmental behaviour, and communication supports this conclusion. The evidence suggests that unless individuals have pre-existing proenvironmental values, mortality awareness will not trigger 'ecoguilt' and, by extension, the willingness to make necessary behaviour changes. Realigning messages away from negative emotions and avoiding mortality salience triggers to make messages more positive, socially inclusive, and subtly competitive has been found to increase pro-environmental actions (McKenzie-Mohr 2011).

Conclusions

This research served as a methodological proof-of-concept as well as a historical assessment and theoretical exploration. The purpose was to undertake an initial examination of how emotions were conveyed in public speeches that were designed to inform, engage, and motivate action. Using TMT, it is possible to code and analyse both tacit and explicit emotions in environmental speeches. TMT also suggests how different emotions—particularly those associated with mortality fears—might be associated with discussions of climate change or concerns over water resources.

Tal recognised the water-environment speeches analysed here as historical and influential. But we might question whether the speeches—along with the masses of subsequent environmental publications, speeches, programmes and policies—evoked the most effective emotional triggers to motivate pro-environmental behaviour. I speculate that, instead of gloom and doom, fear, anxiety and foreboding, the emphasis in environmental discussions and messages could—and perhaps should—be on emotions that do not trigger recipients' unavoidable distal and proximal defenses.

But where is the line between conveying harsh facts—to motivate individuals and societies to take action—and stimulating fear, denial, and individual and institutional paralysis? The use of emotion—both consciously and subconsciously—is a powerful tool for environmentalists, water activists, policy makers, and those concerned about the future of humanity. It is critical that we learn where this line is located and thereby how to employ emotions to their most powerful and effective advantage. One thing to consider is the recognized limits of the contemporary environmental communication strategies aimed

¹ And yet, the story is never simple. Research from Pyszczynski et al. (2012) found in a series of three studies that "reminders of global climate change short-circuit the increased support for violence that often occurs in response to existential threat and increase support for peaceful reconciliation." Similarly, unrelated research on rural women farmers in South Africa were more successful and had greater self esteem when they had access to the emotional resource of hope (Goldin 2015).

at both the public and policy-makers: we've tried fear with limited success, now perhaps it's time to try a different approach (Werbach 2005; Shellenberger and Nordhaus 2004).

As this alternative approach is developed—through empirical research and experimental messaging by environmental organizations—it will be useful to incorporate insights from TMT. This body of literature allows us to consider human relationships and psychological connections with the environment in novel ways. It exposes our human vulnerabilities—fears about illness and mortality—and questions the ways in which we grapple with our temporary existence in the evolving world around us. A focus on mortality salience and the negative emotions it generates—particularly fear, foreboding, anxiety, and dread—allows us to re-examine societies' historical and contemporary water worldviews. Drawing on the abundance of water history opportunities, these theoretical tools could be used to analyze medieval beliefs about waters inhabited by spirits, historical fears of miasma, the motives behind early water infrastructure efforts in urban zones, attitudes in the Industrial Revolution towards water as a means of production, and our contemporary demand for quality-controlled H₂O and “pure” bottled water (Hamlin 2000; Tvedt and Østigård 2010).

From a more contemporary perspective, the relationship between mortality awareness and water decision-making is a new research area for both TMT and the water-governance literatures. It is an important and timely inquiry. Mortality anxiety can be exploited—benignly and malignly—to structure water discourses and become the foundation for institutional decisions about water securitization at the national or international scales. The types of inquiries I propose are timely as the water community attempts to devise and implement policies that protect human life and ecology from rapidly evolving climate-change threats. The empirical and applied research opportunities abound: Terror Management inquiries could provide key insights into how people will react to contentious negotiations around reductions in point and non-point pollution and contamination of water sources, transboundary water sharing agreements, long-term investment in water and wastewater infrastructure, and conservation and efficient use of scarce water resources.

A research program in which mortality salience and proximal/distal defences would provide a starting point for understanding this psychological process and a framework for the conscious, strategic, and effective use of emotion. Future comparative analysis using TMT would provide new insights into entrenched water management regimes and worldviews. This approach would help us better understand whether and how proximal and distal defenses influence water management priorities, policies, and decisions at all levels of analysis.

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