

# Exploitation of mortality salience in communication on climate change

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## Abstract

This research focuses on the effectiveness of anxiety-inducing communication for mobilizing consumers against climate change. Based on terror management theory (TMT), we show that this register can be counterproductive in generating consumer choices that run counter to pro-environmental logics. In particular, we report the results of an experiment ( $N=132$ ) testing the influence of the type of communication (anxiogenic vs informative) on consumer choices (pro-materialistic vs pro-environmental). The results reveal that people's consumption choices depend on their cultural worldviews (i.e. materialistic vs environmentalist) and the type of communication used. The effectiveness of communication strategies on climate change is then discussed in terms of people's cultural worldview.

## Keywords

climate change, materialism, mortality salience, terror management theory

## Introduction

After a long period of controversy, climate change (CC) is now acknowledged to be basically anthropogenic (Álvarez-Iglesias et al., 2012). CC is a problem of capital importance due to the rapidity of its onset. Attempting to minimize its effects requires

immediate action, such as the reduction in carbon emissions by consumers (Wells et al., 2010). As a result, many communication campaigns are currently calling on people to adopt low-carbon consumption (Coutrot et al., 2011; Frémeaux et al.,

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2014). The discursive register used in such communication is characterized by the exploitation of negative emotions – and it proves to be extremely anxiety-inducing (Leiserowitz, 2006; Moser and Dilling, 2007). The severity of the climate problem, especially the abruptness of its occurrence and the irreversibility of its effects, is regularly discussed in the literature (Marquet and Salles, 2014). End-of-the-world threats, natural, social and cultural disasters, extinction of plant and animal species and issues of survival are regularly depicted and dramatized as the effects of CC (Mauger-Parat and Peliz, 2013). Ideas of death are implicitly or explicitly communicated, giving rise to the emotional state termed ‘existential anxiety’ by Urien (2003). This anxiety is characterized by a ‘set of negative affective reactions of varying intensity caused by conscious and unconscious ideas about one’s own death’ (Urien, 2003: 25). This discursive register, commonly called ‘blackwashing’, is regularly adopted, on one hand, because of the importance of the stakes and, on the other, because of the urgent need for action. In addition, this use of blackwashing is justified both by those engaged in combating CC (environmental activists, non-governmental organizations (NGOs), companies, etc.) and by concerned researchers (e.g. Doherty and Clayton, 2011). However, the arousal of a negative emotion such as anxiety at the prospect of death can generate very varied defensive reactions, despite its motivational character. These reactions can be seriously counterproductive in the specific framework of CC (O’Neill and Nicholson-Cole, 2009). Various criticisms thus arise with regard to this communication register. Some critics point to the lack of research testing its effectiveness in attracting people to low-carbon consumption (Lorenzoni et al., 2007; O’Neill and Nicholson-Cole, 2009). Others are concerned about the possible negative effects stemming from the dramatization of the discourse (Feinberg and Willer, 2011; Hamilton, 2010), among which the risk of collective apathy is frequently mentioned (Moser, 2007; Randall, 2009). Rather than leading to action, as expected, the anxiety induced would be inhibiting (Doherty and Clayton, 2011). It could then lead to a denial of the problem (Futerra, 2009). Or again, it could induce ill-considered behaviours – that is, the adoption of behaviour that exacerbates the problem (Radanne, 2006).

The effectiveness of anxiety-inducing messages in the fight against CC has thus been questioned on various grounds, especially since research on communication regarding public health (anti-smoking, anti-alcoholism, etc.) has indicated the sometimes counterproductive (i.e. unfavourable) impact of this type of message (e.g. Becheur and Valette-Florence, 2014; Hansen et al., 2010). These studies show that the effectiveness of this type of anxiogenic communication depends on a number of factors, including the level of perception of the threat, the inclusion of solutions or recommendations in the message and the sense of self-efficacy on the part of the individuals concerned. Other studies have also highlighted the importance of variables such as perceived effectiveness and social representations in the fight against CC (Gifford, 2011; Lorenzoni et al., 2007). Little research, however, has addressed the role of the ‘cultural worldview’, defined as

a set of beliefs about the nature of reality shared by groups of individuals that provides meaning, order, permanence, stability and the promise of literal and/or symbolic immortality to those who live up to the standard of values set by the worldview. (Harmon-Jones et al., 1997: 24)

The cultural worldview would have strong explanatory power regarding people’s commitment or non-commitment to environmental causes such as the climate (Bunting, 2011; Vess and Arndt, 2008). It would also seem able to significantly influence the effectiveness of blackwashing messages.

This concept of a cultural worldview is central to terror management theory (TMT). As a premise for these conceptual developments, it draws on the idea that people are subject to a constant tension between the will to live and consciousness of the finitude of life, of the inescapability of death. Their ‘psychological management’ of this tension occurs through the adoption of defence mechanisms. Thus, anxiety about death is mitigated by means of the cultural worldview linked to values that make life meaningful. More precisely,

identification with the worldview of a given culture and respect for the values it conveys allows people to feel valued in this culture and to increase their self-esteem and thus to reduce anxiety about their own

death (for example, in an individualistic and materialistic culture, focused on social success, the accumulation of material objects could alleviate anxiety at the prospect of death). (Urien, 2003: 28)

which can arise when they are placed in a situation, or exposed to a stimulus, of ‘mortality salience’ (MS) (a reminder of the ineluctably finite nature of existence). The communications involving black-washing are an exemplary case. Compared to traditional psychosocial approaches to persuasive communication, TMT introduces the central role of the cultural worldview into its analysis; and this is where its main conceptual interest lies.

In adopting the theoretical perspective of TMT, we propose studying the principles, issues and limitations of using reminders of mortality in communications urging consumers to involve themselves in the fight against CC. In this respect, our research responds to some of the suggestions made in previous studies – for example, Urien (2003): ‘It would be interesting to test the interactive effect of people’s various values (moderator variables) with their anxiety about death (independent variable) on ecologically responsible behaviour (dependent variable)’ (p. 37). This study has a twofold objective. Theoretically, the aim is to show that the effectiveness of these messages depends on people’s cultural worldview; and empirically, our research sets out to experimentally examine the effects of exposure to an anxiety-inducing video about CC (an MS situation) on pro-materialistic consumption choices (as opposed to pro-environmental choices). TMT, originally developed by Greenberg et al. (1986), is also mobilized within this perspective. After outlining its principles and mentioning current developments, we present the experimental protocol of our research and discuss the original, practical implications of our findings in terms of CC communication strategy.

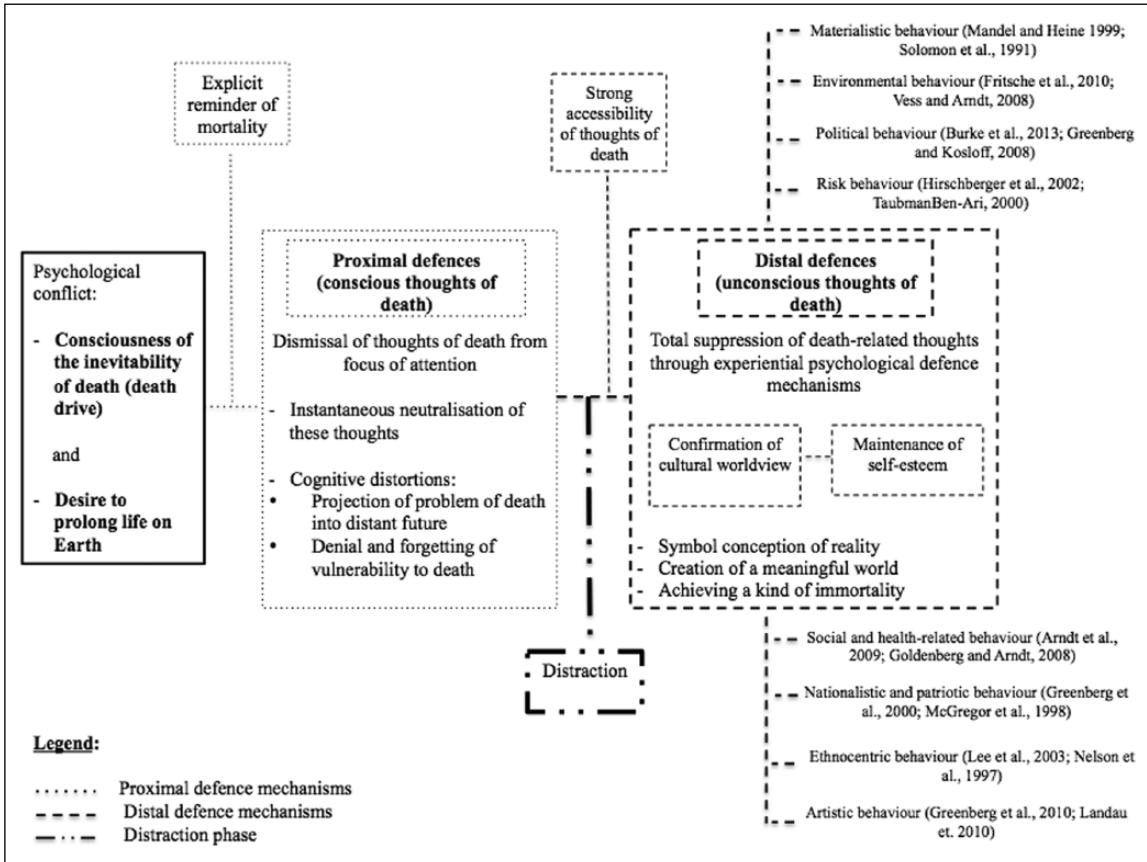
### **Deployment of TMT for impact studies on anxiety-inducing communication on CC**

Developed in a number of empirical studies covering various disciplines (see Arndt, 2012; Greenberg, 2011; Pyszczynski et al., 2015; Shehryar and Hunt,

2011), TMT provides theoretical contributions by experimentally exploring the consequences of the anthropological observations made by Becker (1973). According to Becker, awareness of the finitude of existence, in conflict with a universal desire for everlasting life, engenders fundamental anxiety. Everyone avoids thinking about his or her own death, but concern about such annihilation affects a substantial proportion of human activity (see Trémolière, 2013). TMT develops these ideas through concept of mortality saliency, the effects of which are systematically explored.

The term ‘mortality salience’ refers to any situation that recalls the fundamentally and ineluctably finite nature of existence, any situation that may reawaken consciousness of the basic fact of mortality. At the causal level, any sign denoting or connoting death can induce MS – for instance, evocation of a natural disaster (Pyszczynski et al., 2003). In terms of effects, MS can generate varied reactions, of indeterminate valence, that in principle may be positive, neutral or negative. The way in which people react to MS is in fact a function of their attitude to their own death, and this varies significantly depending on the person’s age (Urien, 2003, 2007), quality of life experiences (Tomer and Eliason, 2008), religious beliefs and the strength of hopes for an afterlife (Neimeyer et al., 2004).

TMT argues that MS has a negative affect, namely, existential anxiety, from which all other forms of anxiety arise (Arndt et al., 2005). To counter such existential anxiety, people mobilize two main defence mechanisms (see Figure 1): proximal (conscious defences) and distal (unconscious defences). Proximal defences correspond to processes of neutralization of a threat at the same level of abstraction as the threat itself (Pyszczynski et al., 2015). Their activation allows anxiety-inducing thoughts to be suppressed. Such thoughts are neutralized variously by denial, minimization of the credibility of the threats, minimization of their implications and displacement (with the help of distractors) away from the focus of attention (Vess and Arndt, 2008). Distal defences, on the other hand, operate at a different level of abstraction than the threat. Deployed mainly in the register of the symbolic, through psychological defences, they emphasize the value of the person’s life and completely



**Figure 1.** Adaptive mechanisms of proximal and distal defences against mortality salience.

suppress and reject the idea of death as the end of everything (Pyszczynski et al., 2015). Drawing by Becker’s (1973) work in anthropology, TMT theorists argue that there are two main distal defences for countering MS, namely, a cultural worldview and self-esteem. Self-esteem is defined as ‘a culturally derived construction that is dependent on sources of social validation, it is essentially defensive in nature, and it functions to provide a buffer against core human fears’ (Pyszczynski et al., 2004: 437). According to TMT, a person obtains higher self-esteem from a given behaviour when such behaviour fully conforms to the person’s worldview. These two types of distal defence are interdependent and are positively correlated with MS. Strengthening them reduces existential anxiety; weakening them increases it (Arndt et al., 2003; Solomon et al., 2004). Three basic propositions

encapsulate the functioning of the distal defence process revealed by TMT. First, if a cultural worldview and self-esteem reduce the existential anxiety produced by reminders of mortality, the fact of being exposed to such a reminder is likely to increase the need to defend one’s cultural worldview and the need for self-esteem (Arndt et al., 2004). Second, if self-esteem reduces the anxiety generated by a reminder of mortality, having high self-esteem is likely to reduce the existential anxiety produced by MS (Solomon et al., 2004). Third, if self-esteem reduces the anxiety generated by a reminder of mortality, having high self-esteem is likely to reduce the need to defend one’s cultural worldview in the face of MS (Solomon et al., 2004). Figure 1 summarizes the main adaptive mechanisms related to MS and the associated behavioural impacts.

## *Behavioural effects of MS*

This coherent perspective is manifested through behaviour. MS inclines people to conform to socio-cultural norms and moral codes (Gailliot et al., 2008; Neimeyer et al., 2004), which in turn leads them to value and support those who share their cultural model, and to disparage or sanction those who do not share it or who transgress it (Arndt et al., 2004; Jonas et al., 2005). MS results in the distancing of individuals or social groups having a different cultural worldview (Vail et al., 2012). In addition to influencing interpersonal relations, MS also guides subjective choices. It thus affects, in a situational way, political behaviour and ideological orientations (Burke et al., 2013; Greenberg and Kosloff, 2008), stylistic preferences in the visual arts (Greenberg et al., 2010; Landau et al., 2010) and musical preferences (Selimbegović et al., 2013). It also affects people's relationships to brands and products, thereby inducing ethnocentric, nationalistic and patriotic consumption patterns (Liu and Smeesters, 2010; Maheswaran and Agrawal, 2004) or preferences for locally produced goods and services (Fransen et al., 2008). In short, it alters the relationship to consumption.

One of the major impacts of MS on consumer behaviour thus comes from materialism. In his work on consumer behaviour, Ladwein (2005) defines materialist consumption as 'the propensity of individuals to value material goods or possessions' and describes ordinary materialist consumers as 'individuals who are very caught up in what the consumer society offers them and which they view as a means to self-fulfilment' (p. 52). These tendencies and predispositions are related to a distinctive personality trait and to the dominant values characteristic of the Western cultural worldview (Fransen et al., 2008), such that the acquisition and possession of material objects regularly and very significantly enhances self-esteem and indeed reinforces this cultural worldview (Choi et al., 2007). In other words, when a materialistic, consumerist culture prevails, the response to the idea of death is, however much it may be denied, to increase consumption. MS thus leads people to boost their expenditure (Ferraro et al., 2005; Mandel and Smeesters, 2008). It gives rise to materialistic consumption behaviours: an increase in the quantity of goods purchased and improvement in

the quality of the items selected, with the emphasis on brands and an orientation towards luxury (Rindfleisch et al., 2009; Vess and Arndt, 2008). MS reduces the impact of guilt-inducing communication used in ethical marketing (Lee-Wingate et al., 2014) and augments the attractiveness of products, highlighted in advertisements, that reinforce self-esteem (Dar-Nimrod, 2012; Das et al., 2014).

## *MS and environmentalism*

By emphasizing the ecologically catastrophic effects of human behaviour, pro-environmental communication can induce MS (Harrison and Mallett, 2013). Rather than the virtuous effect intended, the defences mobilized against MS are then often negative and destructive for the environment (Pienaar, 2011). Simply confronting an individual with nature may provoke MS by inducing awareness of the impermanence of human existence (Pienaar, 2011). This in turn, as a defence, leads to an increase in the psychological distance from the natural environment, since such distancing facilitates the denial of mortality (Vess and Arndt, 2008). Individuals subject to MS retreat from ideas or activities that remind them that they are basically natural beings, that they are indeed animals (Goldenberg et al., 2001, 2002).

These early, counter-intuitive, conclusions have been refined by recent studies that reveal more complex links between MS and relations with nature: depending on their representations of nature, not all individuals respond in the same way to MS. On one hand, if people include the natural, non-human environment as a component of their identity, they are more likely to want to preserve it (Fritsche and Häfner, 2012). On the other hand, environmental concerns may be either anthropocentric or biocentric. MS reduces biocentric, but not anthropocentric, motivations: with the latter, people are less concerned about the impact of environmental crises on non-humans than on humans (Fritsche and Häfner, 2012). Pro-environmental behaviour is reduced if it is linked to the preservation of nature, but not if linked to the preservation of human beings or of oneself. Finally, the distal behavioural effects of MS are a function of contextually salient socio-cultural norms (Jonas et al., 2008, 2013) MS increases environmentally minded individuals' feelings of

guilt when ecological values are emphasized (Harrison and Mallett, 2013). For them, MS induces pro-environmental commitment and behaviour (Fritsche et al., 2010; Gailliot et al., 2008), but it has no effect on those who do not subscribe to these values (Harrison and Mallett, 2013). When ecological values are simultaneously salient, MS significantly (positively vs negatively) influences people's degree of environmental concern, depending on whether self-esteem is a function of commitment to environmental action or not (Vess and Arndt, 2008). Table 1 summarizes the main studies that have used TMT to examine the pro-materialist and pro-environmental behavioural effects of MS.

### *CC, MS and defences against existential anxiety*

From the perspective of TMT, the negative emotions that standard communication on CC give rise to can activate proximal defences – an effect that is beginning to be documented. In particular, MS communicated by dramatic messages to increase pro-environmental behaviours may, in the specific case of CC, lead variously to increased scepticism, denial of the reality of CC or of its anthropogenic origins (Bashir et al., 2013; Feinberg and Willer, 2011; Whitmarsh, 2011), downplaying the severity of its effects (Feinberg and Willer, 2011; Whitmarsh, 2011), emphasis on the spatial and/or temporal distance of the threats (Spence and Pidgeon, 2010) and the conviction that the problem will eventually be resolved or disappear (Landau et al., 2004).

With regard to distal defences, there is at present very little research on the subject. Vess et al. (2011) have suggested, without experimentally testing their idea (derived from the current TMT corpus), that the negative emotions, particularly anxiety regarding death, induced by the standard forms of communication on CC could result in a symbolic distancing from nature and could therefore negatively impact pro-environmental behaviour. Yet from the standpoint of TMT, the problem could be even greater. Not only is there a risk that anxiety-inducing communication on CC diminishes ecological motivation (since self-esteem is culturally unrelated to the environment) but also it is likely to

contribute directly to CC. In connection with materialism, as the dominant cultural model, the psychological defences against MS in fact lead to an increase in greenhouse gas (GHG) emissions by causing consumption to rise, as TMT shows. The relationship between consumption and GHG emissions is such that the latter are currently used as one of the most significant indicators of materialism (Gadrey, 2011).

Overall, the links between the variables used in this study can be summarized as follows. Exposure to MS tends to trigger behaviour by consumers that reinforces or valorizes their cultural worldview. From the standpoint of TMT, this behaviour stemming from the cultural worldview is associated with the activation of a distal defence mechanism that seeks, if not to eliminate, at least to attenuate anxiety about death. Much of the communication pertaining to the fight against CC reminds people of their mortality. Such inherently anxiety-inducing communication is liable to generate distal defences among the individuals exposed to it. But these distal defences can lead to materialistic consumption behaviour that runs counter to the desired pro-environmental behaviour. This effect depends directly on people's cultural worldview, which thus becomes a moderating (but also disruptive) factor for the effectiveness of communication combating CC. In the next two sections we detail the conceptual model and the experimental protocol enabling us to test the various relationships between communication countering CC, MS, the cultural worldview and (pro-materialistic vs pro-environmental) consumption behaviours.

### **Conceptual model of the research and corpus of hypotheses**

Our conceptual model (see Figure 2) draws on a number of previous studies investigating (1) the behavioural effects of MS generated by anxiogenic communication (e.g. Dar-Nimrod, 2012; Mandel and Heine, 1999), (2) the role of distal defence mechanisms in reducing anxiety about death (e.g. Arndt et al., 2003; Solomon et al., 2004) and (3) the effects of these defence mechanisms (i.e. validation of the cultural worldview and enhancement of self-esteem) on pro-environmental (e.g. Fritsche et al., 2010; Vess

**Table 1.** Behavioural effects of mortality salience.

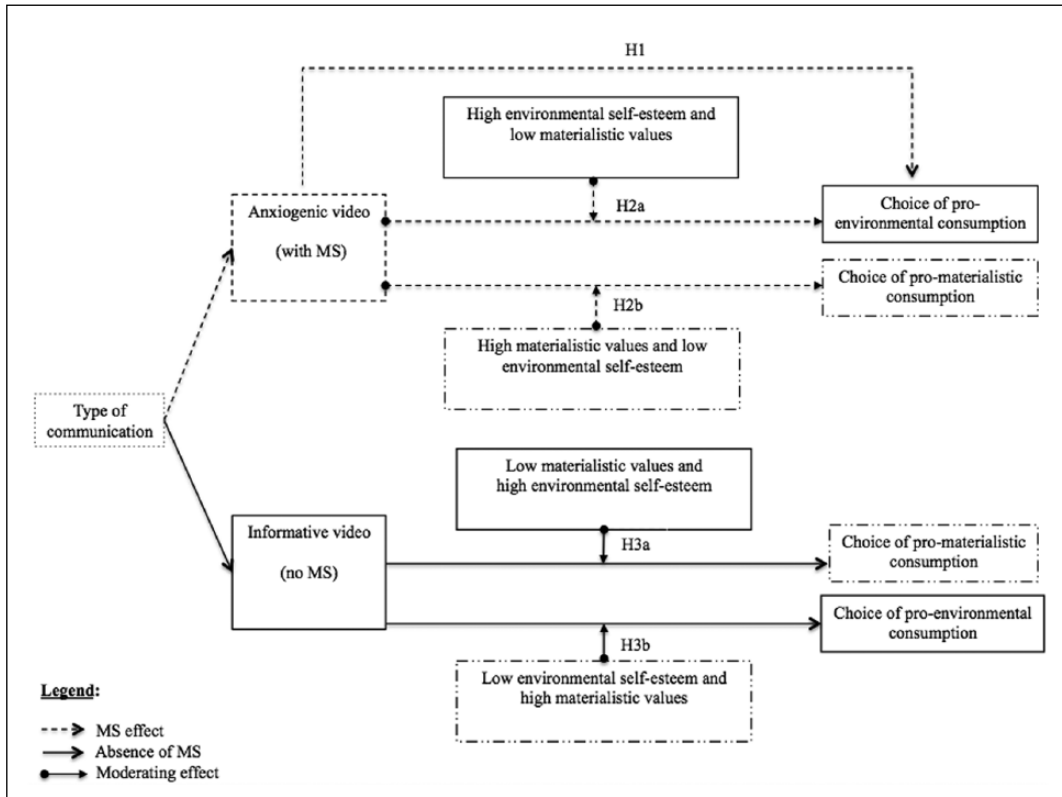
Behavioural variety	Result(s) of the research	Independent variable(s)	Dependent variable(s)	Methodological detail(s)	Author(s)
Materialistic behaviour	<p>Mortality salience increases interest in the acquisition of high-end products (e.g. Rolex and Lexus) to the detriment of low-end products (e.g. Chevrolet and Pringles).</p> <p>Acquisition of material objects reinforces self-esteem in the face of existential anxiety.</p> <p>Feeling of insecurity associated with MS induces materialistic behaviour.</p> <p>Experiment 1: MS increases financial expectations in the long term (regarding areas such as wage rises, property values and recreation costs).</p> <p>Experiment 2: MS induces greediness, greed and less concern for the environment (CE).</p> <p>Experiment 1: MS reinforces the attractiveness of materialistic products (e.g. BMW, Mercedes, McDonalds) presented in TV spots.</p> <p>Experiment 2: visualization of death on TV increases the attractiveness of the products offered and the desire to consume them (Apple, Guess, Dove, etc.).</p>	<p>Mortality salience (vs absence of mortality salience)</p> <p>Mortality salience (vs absence of mortality salience)</p> <p>Mortality salience (vs absence of mortality salience)</p>	<p>Perception of products (high-end vs low-end)</p> <p>Effectiveness of the ad</p> <p>Interest by purchase</p> <p>Purchase intention</p> <p>Financial and consumption expectations regarding natural resources</p> <p>Attraction of products</p>	<p>74 students</p> <p>Experiment 1: 60 students</p> <p>Experiment 2: 73 students</p> <p>Experiment 1: 107 students</p> <p>Experiment 2: 120 students</p>	<p>Mandel and Heine (1999)</p> <p>Kasser and Sheldon (2000)</p> <p>Dar-Nimrod (2012)</p> <p>Vess and Arndt (2008)</p>
Environmentally virtuous behaviour	<p>MS enhances CE for people with a environment-related cultural worldview.</p> <p>MS reduces CE for people who do not derive their self-esteem from environmental action.</p>	<p>Mortality salience (vs absence of mortality salience)</p>	<p>CE</p>	<p>60 students</p>	<p>(Continued)</p>

**Table 1.** (Continued)

Behavioural variety	Result(s) of the research	Independent variable(s)	Dependent variable(s)	Methodological detail(s)	Author(s)
	<p>Experiment 1: coupling of MS and a pro-environmental norm leads to pro-environmental intentions (e.g. low-carbon car) and the search for information on the environment (e.g. DVDs on the environment) for individuals whose self-esteem is based on adhering to salient pro-environmental standards.</p> <p>Participants are more attracted to the Toyota Prius (vs Ford Expedition SUV) after the MS manipulation.</p> <p>Experiment 2: coupling of MS and a pro-environmental norm leads to improvement in sustainable cooperative management of a public good through the adoption of sustainable behaviours (preservation of natural resources).</p> <p>Experiment 3: coupling of MS and a pro-environmental standard leads to use of pro-environmental products (re-usable cup vs disposable cup) when the pro-environmental standard was salient (vs pro-environmental standard not salient).</p>	<p>Mortality salience (vs absence of mortality salience)</p>	<p>Experiment 1: environmental intentions</p> <p>Information on the environment</p> <p>Experiment 2: intentions to conserve shared environmental resources</p> <p>Experiment 3: pro-environmental behaviour</p>	<p>Experiment 1: 85 students</p> <p>Experiment 2: 104 students</p> <p>Experiment 3: 127 students</p>	<p>Fritzsche et al. (2010)</p>

MS: mortality salience.





**Figure 2.** Conceptual model of the research and experiment (with the associated hypotheses).

and Arndt, 2008) and pro-materialist consumption behaviour (Arndt et al., 2004; Rindfleisch and Burroughs, 2004). We use this model to construct our experiment, the aim of which is to measure, on one hand, consumption choices in response to anxiety-inducing communication on CC and, on the other, the relationship between environmental self-esteem, materialistic values and consumption choices. With regard to the latter, the aim is more precisely to identify the moderating effects of environmental self-esteem and materialistic values – which stem from the cultural worldview (as means of protection against MS) on the consumption choices (pro-materialistic vs pro-environmental) in response to communication on CC (presence vs absence of MS). This research tests only the impact of communication on variables considered to be distal defences (i.e. consumption choices) and excludes proximal defences (i.e. immediate reactions to the removal of existential anxiety). This decision is justified, first of all, by the

limited research carried out to date on distal defence the mechanisms, whether in a French context or not (Partouche-Sebban, 2013; Urien, 2003) and in relation to the CC issue (Bunting, 2011; O'Neill and Nicholson-Cole, 2009). Second, the concept of distal defence, although under-explored, tends to play a key role in relation to CC: it influences consumption choices, which in turn can have a negative or positive impact on CC (Wells et al., 2010). It is therefore appropriate to examine and explain these relationships through an experimental study. Certain variables were not included in our model, for example, the respondents' emotional state before exposure to experimental stimuli, their perception of CC and the perceived time horizon. The choice not to include these variables, despite their being of interest, was motivated by the wish (1) to focus mainly on the effect of the cultural worldview on the link between MS and consumer choices, (2) to lighten the proposed theoretical model to make it easier to interpret

and (3) to simplify the study's experimental procedure. It should be noted, however, that several variables were measured for purposes of experimental control, namely, the emotional state of participants after exposure to the experimental stimuli, age, gender, Socio-Professional Category (SPC), income and family status. Controlling for these variables is linked to the fact that they are likely to influence the relationship between the 'type of communication on CC' variable and the 'consumption choice' variable. The conceptual model on which our experimental study is based is presented in Figure 2 below.

In general, research on TMT shows that an MS situation generated by anxiogenic messages affects behavioural choices with regard to consumption (Choi et al., 2007; Dar-Nimrod, 2012). These choices are influenced by the consumer's cultural worldview (Arndt et al., 2004). Consumers generally consume culturally valued products, the possession of which reflects an image of cultural enhancement and high symbolic immortality value (Dechesne et al., 2003; Pyszczynski et al., 2015). From these theoretical considerations, we derive hypothesis H1 on the impact of the dominant cultural worldview in society on consumption choices related to existential anxiety, such as that caused by extreme climatic events, which bring to mind the idea of the person's own death (e.g. Pyszczynski et al., 2015). We anticipate that participants exposed to anxiety-inducing communication will choose pro-materialist products. We derive this expectation from the fact that the dominant cultural worldview in western society is based on materialism (Fransen et al., 2008). For many people, materialistic consumption defines their cultural worldview (Solomon et al., 2004). The possession of material objects then increases self-esteem in the face of existential anxiety (Dar-Nimrod, 2012). The cultural worldview, which is a key aspect of distal defence mechanisms in relation to MS, is assumed to have a moderating effect on consumption (see Maheswaran and Agrawal, 2004; Vess and Arndt, 2008). Accordingly, we hypothesize that the more importance individuals attach to materialistic values, the more their consumption choices turn towards pro-materialistic products in the face of MS (H2a). Furthermore, we propose that anxiety-inducing communication will increase pro-environmental

consumption choices if people's self-esteem is linked to other values and norms present in society, such as environmentalism (H2b). The reason for this is that environmental consumption embodies the idea of spirituality and self-preservation (Fritsche et al., 2010; Fritsche and Häfner, 2012). Finally, various studies have shown that informative communication on CC is more effective in a Western context than anxiety-inducing communication (Feinberg and Willer, 2011; O'Neill and Nicholson-Cole, 2009). On the basis of these studies and the theoretical considerations mentioned above, particularly those that reveal the interaction between materialistic values and consumption choices, we put forward hypotheses H3a and H3b. The hypotheses tested in experimental studies and the main academic articles associated with them are reported in Table 2.

## Methodology

### *Design, participants and experimental procedures*

The experiment is based on a single factor. For the manipulated variable (i.e. communication on CC), we provided two types of videos: anxiogenic versus informative. The aim of the manipulation was to test the impact of these two types of communication on consumption choices. Drawing on experimental protocols that implement TMT, the experiment carried out here involves one experimental group that is exposed to MS and another that is not exposed, to examine the behavioural effect of these two types of communication. The participants were divided into two groups, one of which was assigned to the anxiogenic video ( $N=66$ ) and the other to the informative video ( $N=66$ ). Participants who were exposed to the anxiogenic video were warned of its emotional content in advance. In all, 132 adult volunteers (73 women;  $M_{age}=22.84$ ; standard deviation ( $SD$ )=2.88) participated in this experiment. Research in social psychology to measure the behavioural effects of MS generally uses individuals with this age profile (e.g. Arndt et al., 2009).

Participants were informed that the purpose of the experiment was to examine their knowledge of

**Table 2.** Corpus of hypotheses and main academic studies associated with them.

Hypotheses	Main associated academic studies
H1: In a situation with MS (i.e. exposure to anxiogenic communication), individuals are predominantly inclined towards pro-materialistic consumer choices.	Arndt et al. (2004); Maheswaran and Agrawal (2004); Rindfleisch et al. (2009)
H2a: In a situation with MS, individuals with predominantly materialistic values are inclined towards pro-materialist rather than pro-environmental consumption choices.	Choi et al. (2007); Dar-Nimrod (2012); Mandel and Heine (1999)
H2b: In a situation with MS, individuals deriving self-esteem from environmental actions are more likely to opt for pro-environmental rather than pro-materialist consumption choices.	Fritsche et al. (2010); Fritsche and Häfner (2012); Vess and Arndt (2008)
H3a: In the absence of MS (i.e. exposure to informative communication), individuals deriving self-esteem from environmental actions are less inclined towards pro-environmental consumption choices compared to a situation with MS.	Fritsche et al. (2010); Kasser and Sheldon (2000); Vess and Arndt (2008)
H3b: In the absence of MS, individuals with predominantly materialistic values are less inclined towards pro-materialistic consumption choices compared to a situation with MS.	Fritsche et al. (2010); Kasser and Sheldon (2000); Vess and Arndt (2008); Vess et al. (2011)

MS: mortality salience.

CC. First, we asked participants to fill in the Brook's (2005) Environmental Contingencies of Self-Worth (ECSW) scale and the Ladwein's (2005) materialism scale in order to ascertain the source of their cultural worldview. They were then randomly assigned to the two experimental groups and were shown the videos on CC. Immediately after watching the videos, participants completed the Positive and Negative Affect Schedule (PANAS) of Watson et al. (1988) and played a 'word search game' to determine their emotional state. At the end of this distraction phase, which lasted between 3 and 5 minutes, the participants filled in a questionnaire asking them to make consumption choices between baskets of pro-materialistic products and services and baskets of pro-environmental products and services. Participants also provided information on their socio-demographic profile: age, gender, SPC, income and family status.

### *Manipulated, moderating and controlled variables*

*Independent variable.* The experiment's manipulated variable is the 'type of communication' on CC and it has two modalities. The first type of communication is an 'anxiogenic' video that generates negative emotions related to death. In describing

the risks and disastrous consequences of CC, the video uses expressions, images and music linked to the theme of death. These act as a stimulus whose objective is to create an MS situation. This video is a montage of apocalyptic, anxiety-inducing extracts involving CC that have been widely disseminated in the media. Various feature films and documentaries were drawn on to assemble these excerpts, which can be seen on YouTube, including *The Last Day* (2009), *The Day After Tomorrow* (2004), *An Inconvenient Truth* (2009), *After Earth* (2013) and *Les images du tsunami, catastrophe intime* (2015). The second type of communication is an 'informative' video which, in the context of our experiment using TMT, is the second experimental condition. In this case, participants are not exposed to MS (see Kasser and Sheldon, 2000). Hence, this informative video does not generate any negative emotions and does not include any words, expressions or images that evoke or refer to death (i.e. MS is absent). This video offers a realistic representation of CC and suggests ways of combating it. Compiled from a video education programme on the environment (available on *Climate Insights 101*), it shows how people can reduce their carbon footprint through straightforward actions in everyday life. We also controlled for several external variables related to the videos that could affect the results of the

experiment. In addition, we took into consideration and standardized various technical and scientific criteria in assembling these two videos (e.g. duration, tone, sound quality, brightness of the image, translation and writing the scripts).

**Manipulation of MS.** TMT requires various protocols to create and manipulate MS. These protocols have been clearly defined and widely presented by TMT theorists (see Greenberg, 2011). According to these protocols, manipulation of MS is carried out as follows: the researchers ask the participants to answer two (imaginary and open) questions<sup>1</sup> about their own deaths, before presenting them with the main questions (this is the protocol most often used by researchers). The researchers carry out the experiment in a place associated with and evocative of death (e.g. a funeral home or cemetery) and expose the participants to visual messages (e.g. images of a bad car crash and terrorist attacks) or textual messages (puzzles or word association games) related to death. The researchers then ask participants to fill in a measurement scale of anxiety in relation to death. This involves, first, verifying that MS has generated the behaviour expected by the experimenter, and second, comparing these behavioural effects with those observed in the other experimental condition(s). The second group was interviewed after being exposed to questions or messages that were emotionally ‘neutral’, that is, not generative of thoughts related to death. The choice of using videos about CC seemed best suited to our experiment, for two main reasons: (1) it reduced the risk of a refusal to participate in an experiment directly concerned with death and (2) it ensured consistency between the materials used to conduct the experiment (i.e. videos) and the fact that the most common representation of CC in the media is visual. A pre-test ( $N=150$ ) was carried out through two questionnaires to determine the degree to which the two modalities of the variable ‘type of communication’ induced MS (i.e. to examine differences in perception; see Appendix 1). The first group (group 1,  $N=50$ ), which was shown the anxiogenic video, was asked to answer the following question: ‘Having watched the ‘climate change’ documentary, how do you react to it? Read each item, then tick the appropriate box’. Response options ranged from 1 *not at all distressing* to 5 *extremely distressing*. The

findings for this group show that the anxiogenic video significantly induced anxiety related to death ( $M_{\text{anxiogenic video-anxiety level}}=4.46$ ;  $SD=0.65$ ). Two other groups of individuals (groups 2 and 3) took part in this pre-test and we showed the informative video. The respondents in group 2 ( $N=50$ ) were asked to evaluate the informative video on the following mono-item scale: ‘Having watched the documentary “What you can do about climate change,” how do you evaluate it? Read each item, then tick the appropriate box’. Response options ranged from 1 *not at all educational* and 5 *extremely educational*.

The results show that the informative video was clearly perceived as educational by group 2 ( $M_{\text{informative video-educational level}}=4.37$ ;  $SD=0.78$ ). Finally, individuals in group 3 ( $N=50$ ) were asked to rate the anxiety-inducing level of the informative video. The results from the data collected on group 3 clearly show that the informative video was perceived as non-anxiogenic ( $M_{\text{informative video-anxiety level}}=1.64$ ,  $SD=0.72$ ). In a follow-up to these findings, we carried a supplementary statistical analysis to verify the correct manipulation of our independent variable. Here the aim was to show that the average level of anxiety generated by the anxiogenic video among the members of group 1 was significantly higher than the average level of anxiety generated by the informative video among the members of group 3. The results of the difference of means test on independent samples that we conducted confirm this:  $M_{\text{informative video-anxiety level}}=1.64 < M_{\text{anxiogenic video-anxiety level}}=4.46$ ,  $t=20.594$ ,  $p=0.000$ . The two videos were therefore perceived differently, but in the direction expected by our experimental manipulations. In view of these results, we therefore used these videos for our experiment and concluded that anxiogenic video could be used as a way to manipulate MS (i.e. generative of thoughts about death) or as a stimulus equivalent to the standard ways of manipulating MS (see Greenberg et al., 1997).

**Materialistic values and environmental self-esteem.** Before screening the videos, data on the participants’ materialistic values and environmental self-esteem were collated to estimate their moderating effect. Taking these measurements into account in our experimental protocol seemed essential, since

the extended sources of self-esteem and enhancement of cultural values are likely to influence consumer behaviour in an MS situation (Fritsche et al., 2010; Vess and Arndt, 2008). These variables were measured (see Appendix 4) by means of Brook's (2005) ECSW scale and Ladwein's (2005) materialism scale. Participants responded to these two scales through a 5-point Likert scale (ranging from 1 *strongly disagree* to 5 *strongly agree*). These measurements reveal to what extent individuals choose pro-materialistic or pro-environmental products, in this case as a mechanism for defending a cultural worldview and for enhancing their self-esteem (e.g. Greenberg et al., 1993). We opted for these scales mainly because they have been validated and exploited in previous studies that have examined the role of the cultural worldview as a moderating variable of behavioural effects in relation to MS (Vess et al., 2011). These scales are stable and can be adapted to the research context (Ladwein, 2005; Vess and Arndt, 2008). They are also relevant because of their ease of handling and their statistical reliability: the results of applying Cronbach's alpha confirm this methodological choice ( $\alpha=0.812$  for ECSW and 0.853 for the materialism scale).

**Affect and distraction phase after exposure.** Immediately after exposure to the video, the experimental subjects were asked to carry out two tasks. First, the participants filled out the PANAS affect measurement scale created by Watson et al. (1988) and translated into French by Caci and Baylé (2007). By means of this 20-item scale, subjects are able to describe their emotional state using a series of adjectives. The two positive and negative dimensions are evaluated separately over 10 items. Each of these is measured with a 5-point Likert scale specifying the intensity of emotional reaction experienced felt (ranging from 1 *very little or not at all* to 5 *very often or very much*). The process of completing this scale was a distraction phase following exposure to the video, thus making it a way of controlling for affect. This method was used, within the framework of TMT, to displace death-related thoughts away from the subjects' focus of attention. The second task was to fill in a word search grid. The objective here was twofold. On one hand, it constituted a distraction phase between exposure to

the video and responding to the dependent variable and, on the other, it again shifted the participants' focus of attention away from MS (see Vess and Arndt, 2008). The reason for using two distraction tasks rather than one was that we wanted to make sure that that distal defences were fully activated.<sup>2</sup> Indeed, when death-related thoughts are the focus of attention, MS does not arouse distal defences (Greenberg, 2011; Pyszczynski et al., 2015). We, however, were mainly interested in studying the behavioural effects of MS at the distal level.

### *Dependent variable*

The objective is to evaluate consumption choices (pro-materialistic and/or pro-environmental) in response to a communication on CC. 'Pro-environmental behaviour' refers to any action that does not harm or negatively impact the environment, and 'materialistic behaviour' refers any action aimed at acquiring material goods with no concern for the environment. Following exposure to the videos and the distraction phase, participants were asked to choose between the following consumption options: trips to Dubai and Disneyland versus nature hiking in Thailand and Morocco; buying bottles of French branded water versus drinking filtered tap water in a carafe; training in finance to increase their income versus learning how to play a musical instrument. The choices that the participants were asked to make were introduced by the following question: 'Suppose that you won the lottery, which basket would you choose? Choose a basket each time'. The products and services in the various baskets were selected on the basis of three criteria: first, their importance, experimentally revealed as sources of self-esteem in relation to strong social values (see Fritsche et al., 2010); second, their environmentally friendly nature or not (see Giannelloni, 1998) and third, their degree of familiarity and practicality for the individuals in our sample. We coded the responses as follows: in each case, '1' if participants chose the materialistic product/service and '2' if they opted for the pro-environmental product/service. We also carried out pre-test ( $N=86$ ) on the types of products and services chosen by subjects in the experiment. Participants in this pre-test were asked

to answer the following question: 'For each of the following offers, please say whether the products and services are linked to materialism or the environment. Answer 1 if they are associated with materialism and 2 if they are associated with the environment'. The results of this pre-test, detailed in Appendix 2, confirmed our classification of products and services. For example, participants in the pre-test said that 'learning a musical instrument' was a consumption choice favouring the environment ( $E=78$ ,  $P=90.7\%$ ).

## Findings

The statistical treatment aimed to reveal the influence of the two types of video on consumption choices. The aim was also to show the moderating role of the cultural worldview. Given the qualitative nature of our dependent variable (dichotomous, coded 1 or 2), we used  $\chi^2$  tests. We also transformed the data collected for the moderating variables (i.e. environmental self-esteem and materialistic values), by discretization of these metric data into binomial data coded 0 or 1: '0' if the participant's answer was  $<2.5$  and '1' if the participant's answer was  $\geq 2.5$ . For example, if the response to the ECSW scale lies between 2.5 and 5, the participant places greater emphasis on environmental norms and values – that is, the environment is a source of enhanced self-esteem. Although they have limitations, these transformations allow us to evaluate the moderating links between these two variables on the relationship between the type of communication and consumption choices (also non-metric variables). As shown in Table 3, all our hypotheses were confirmed.

### Effects of MS, environmental self-esteem and materialistic values on consumption choices

The results of this research show that anxiety-inducing communication on CC placed the participants in a situation of MS, which generated both pro-environmental and pro-materialistic consumption choices. The difference between these two consumption choices was moderated by the participants' self-esteem and cultural values. Exposed to this

anxiety-including communication, the majority of participants opted for rather materialistic consumption choices ( $P=62.63\%$ ,  $p<0.05$ ). This observation can be explained by what hypothesis H1 proposes, that is, that materialistic cultural values are dominant in our study population compared to environmental self-esteem. Indeed, the participants declared that their self-esteem was derived from materialistic values rather than from environmental norms ( $M_{materialistic\ values}=3.04$ ,  $SD=0.73$ ,  $\alpha=0.853$  vs  $M_{environmental\ self-esteem}=2.74$ ,  $SD=0.74$ ,  $\alpha=0.812$ ). This dominant cultural view positively influences pro-materialist consumption in a situation of MS. This finding corroborates those of earlier studies that have shown that in Western societies materialistic consumption – which is highly valued – defines many people's cultural worldview (Arndt et al., 2004). Materialistic consumption is a positive manifestation of an enhancement of self-esteem, which aims to reduce the anxiety associated with ideas about death by means of a distal defence mechanism. Moreover, our analyses show that at a high level of materialistic values, anxiety-inducing communication leads participants to opt for pro-materialistic products ( $\chi^2_{Dubai\ and\ Disneyland}=21.059$ ,  $p=0.000$ ;  $\chi^2_{bottled\ water}=14.639$ ,  $p=0.000$ ;  $\chi^2_{financial\ information}=21.945$ ,  $p=0.000$ ). On the other hand, when people's environmental self-esteem is high, anxiety-inducing communication leads instead to pro-environmental choices ( $\chi^2_{hiking}=3.921$ ,  $p=0.042$ ;  $\chi^2_{filtered\ tap\ water}=8.703$ ,  $p=0.003$ ;  $\chi^2_{musical\ training}=8.195$ ,  $p=0.004$ ). MS decreases environmental consumption choices for participants with low environmental self-esteem ( $\chi^2_{hiking}=21.344$ ,  $p=0.000$ ;  $\chi^2_{filtered\ tap\ water}=16.762$ ,  $p=0.000$ ,  $\chi^2_{musical\ training}=28.725$ ,  $p=0.000$ ). The same applies to the materialist consumption choices of participants for whom materialistic values are of little importance ( $\chi^2_{Dubai\ and\ Disneyland}=10.261$ ,  $p=0.001$ ;  $\chi^2_{bottled\ water}=16.295$ ,  $p=0.000$ ;  $\chi^2_{financial\ training}=13.157$ ,  $p=0.000$ ). In the MS situation, consumer choices are thus positively influenced by the source of the enhanced self-esteem and the valorization of cultural values. These results support hypotheses H2a and H2b.

**Table 3.** Results of tests of hypotheses.

Hypotheses	Results of statistical tests	Confirmed
H1: In a situation with MS (i.e. exposure to anxiogenic communication), individuals are predominantly inclined towards pro-materialistic consumer choices.	$\chi^2_{\text{Dubai and Disneyland}} = 24.92, p=0.000;$ $\chi^2_{\text{bottled water}} = 5.17, p=0.022;$ $\chi^2_{\text{financial training}} = 9.41, p=0.002$	Yes
H2a: In a situation with MS, individuals with predominantly materialistic values are inclined towards pro-materialist rather than pro-environmental consumption choices.	$\chi^2_{\text{Dubai and Disneyland}} = 21.059, p=0.000;$ $\chi^2_{\text{bottled water}} = 14.639, p=0.000;$ $\chi^2_{\text{financial training}} = 21.945, p=0.000$	Yes
H2b: In a situation with MS, individuals deriving self-esteem from environmental actions are more likely to opt for pro-environmental rather than pro-materialist consumption choices.	$\chi^2_{\text{hiking}} = 3.921, p=0.042;$ $\chi^2_{\text{filtered tap water}} = 8.703, p=0.003;$ $\chi^2_{\text{musical training}} = 8.195, p=0.004$	Yes
H3a: In the absence of MS (i.e. exposure to informative communication), individuals deriving self-esteem from environmental actions are less inclined towards pro-environmental consumption choices compared to a situation with MS.	$\chi^2_{\text{hiking}} = 9.310, p=0.002;$ $\chi^2_{\text{filtered tap water}} = 8.735, p=0.003;$ $\chi^2_{\text{musical training}} = 11.830, p=0.001$	Yes
H3b: In the absence of MS, individuals with predominantly materialistic values are less inclined towards pro-materialistic consumption choices compared to a situation with MS.	$\chi^2_{\text{Dubai and Disneyland}} = 9.581, p=0.002;$ $\chi^2_{\text{bottled water}} = 7.443, p=0.006;$ $\chi^2_{\text{financial training}} = 5.274, p=0.020$	Yes

MS: mortality salience.

Exposure to the informative video reduces pro-materialistic consumption choices ( $\chi^2_{\text{Dubai and Disneyland}} = 9.581, p=0.002;$   $\chi^2_{\text{bottled water}} = 7.443, p=0.006;$   $\chi^2_{\text{financial training}} = 5.274, p=0.020$ ) and pro-environmental choices ( $\chi^2_{\text{hiking}} = 9.310, p=0.003, p=0.001;$   $\chi^2_{\text{filtered tap water}} = 8.735, p=0.003;$   $\chi^2_{\text{musical training}} = 11.830, p=0.001$ ) for individuals characterized by a high level of materialistic values and environmental self-esteem. Conversely, this video increases the pro-environmental consumption choices ( $\chi^2_{\text{hiking}} = 19.582, p=0.000,$   $\chi^2_{\text{filtered tap water}} = 14.639, p=0.000;$   $\chi^2_{\text{formation musicale}} = 17.044, p=0.000$ ) and pro-materialistic choices ( $\chi^2_{\text{Dubai and Disneyland}} = 11.848, p=0.001,$   $\chi^2_{\text{bottled water}} = 16.603, p=0.000;$   $\chi^2_{\text{financial training}} = 15.244, p=0.000$ ) of people whose

environmental self-esteem and materialistic values are low. These results confirm hypotheses H3a and H3b.

### *The effect of the distraction phase, affect and gender*

According to previous research on TMT, no differences in affect should be observed between the two experimental conditions (e.g. Greenberg et al., 1997). Two analyses of variance (ANOVAs) were carried to ensure that consumption choices were not due to conscious emotional responses (see Appendix 3). The results of the ANOVA linked to PANAS tend to confirm this, since they show that MS from the anxiety-inducing video does not elicit more affective reactions than the informative video. For the positive affect ( $F(1.131)=1.395, p=0.240;$   $M_{\text{anxiogenic video positive affect}}=33.26, SD=3.42$  vs

$M_{\text{informative video positive affect}} = 32.60$ ,  $SD = 3.05$ ) or for the negative affect ( $F(1.131) = 1.278$ ,  $p = 0.260$ ,  $M_{\text{anxiogenic video negative affect}} = 17.18$ ,  $SD = 2.93$  vs  $M_{\text{informative video negative affect}} = 17.73$ ,  $SD = 2.60$ ). These results also show that the effects of MS occur only when thoughts related to death are displaced outside the focus of attention, that is, after the distraction phases. Some studies have shown that messages inducing negative emotions are perceived more favourably by women than men (Dobscha and Ozanne, 2001; Florian et al., 2001; Rossiter and Thornton, 2004; Urien, 2003; Wells et al., 2010). Consequently, we checked whether gender had affected consumer choices in the face of MS. Unlike previous research, the results of our  $\chi^2$  tests suggest that gender does not moderate the relationship between the type of communication and the three consumption choices ( $\chi^2_{\text{choice 1}} = 1.097$ ,  $p = 0.213$ ;  $\chi^2_{\text{choice 2}} = 0.207$ ,  $p = 0.419$ ;  $\chi^2_{\text{choice 3}} = 1.523$ ,  $p = 0.167$ ).

## Discussion and conclusion

CC is having harmful ecological, economic and socio-political effects. It is thus one of the greatest factors contributing to existential anxiety (Myers et al., 2014: 62). To encourage people to combat CC, negative affects stemming largely from anxiety are mobilized in communications (Kerr, 2007; Leviston et al., 2014). According to some researchers, the use of such a harrowing discourse to communicate about CC is fully justified (e.g. Meijnders et al., 2001). The emotions targeted must be negative and, more particularly, should induce fear. For other researchers, on the contrary (e.g. Manzo, 2010), these emotions should be positive. In particular, it is important to bear in mind that fear, which is a persuasion factor, may lead, as a psychological defence, to the rejection of messages calling for behavioural changes (Shehryar and Hunt, 2011). In this debate, the main interest of TMT is its introduction of the concept of distal defence.

For the most part, studies of psychological defences against MS induced by CC have focussed on proximal defences – thus pointing to the development of denial of its existence, denial of its anthropogenic character, downplaying its importance or

projecting its consequences in the future (Dickinson, 2009). Distal defences have been very little studied. They are, however, of primary importance: what TMT predicts is that individuals are not so much motivated by the adoption of behaviours that minimize the physical risk of their own death as by the pursuit of strategies allowing, in the field of the symbolic, an increase in self-esteem. What happens may be the opposite of what is expected. Previous research shows, moreover, that other factors accentuate the risk of the counter-productiveness of anxiety induced by anxiogenic communication (here, on CC): people's perceived feeling of powerlessness in relation to the magnitude of the problem, perceptual distance from the risk engendered by the problem, evasion of responsibility for the consequences and inequality of action (see Akil et al., 2017; Hoijer, 2010; Lorenzoni et al., 2007; Nicholson-Cole, 2005).

## Theoretical, methodological and operational contributions

This research is original in several ways. First, few studies have empirically shown the impact of MS on low-carbon behaviour, taking into account the role of the cultural worldview (Bunting, 2011; Vess and Arndt, 2008). Second, research on the behavioural effects of mortality reminders is still in its early stages, despite the importance of the work done (Fransen et al., 2008: 1054). Finally, very little research has investigated behavioural responses to anxiogenic communications on CC. The same applies to research on the impact on culturally valued consumption (pro-materialist vs pro-environmental) of reminders of mortality conveyed by anxiogenic communications on CC.

To our knowledge, the research we have undertaken is the first to mobilize environmental self-esteem and materialistic values to study the behavioural effects of an anxiety-inducing message on CC. In this respect, our investigations are a valuable complement to the previous studies drawing on TMT. Our research deals with a sensitive subject, namely, death and the temporality of the climate problem. It seeks to show that the exploitation of death in the context of communication on low-carbon consumption can be either a 'good' or 'bad' stimulus, depending on receiver's



cultural worldview. Finally, our study complements previous research in social psychology on the psychological barriers that limit environmental action. It shows that the cultural worldview is a determinant of commitment to low-carbon behaviour.

In terms of results, our study offers lessons that are all the more interesting because they are counter-intuitive. The 'blackwashing' currently found in communication practices encouraging consumers to fight CC has no relevance whatsoever, and it may even have consequences that run counter to those intended – with a detrimental effect on the climate by inducing increased consumption.

Through its empirical evidence, this research reinforces the idea previously suggested by Arndt et al. (2004) that MS augments the 'desire to consume', and that TMT should therefore be included in the study of consumer behaviour, due to the interest it arouses. Our findings confirm that for subjects exhibiting a materialistic cultural worldview, the acquisition or possession of a product typically alleviates the anxiety induced by reminders of their mortality. Equally, our findings show that for subjects with a pro-environmental cultural worldview, acting on behalf of the environment helps reduce the existential anxiety induced by MS. Thus, depending on whether its orientation is materialistic or ecological, consumers' cultural worldview affects their reactions to anxiogenic communication on CC in opposite ways.

At the managerial level, our results are worrying from the standpoint of the dominant logic of CC communication, which remains indifferent to consumers' axiological profiles. It is important to communicate in different ways with regard to CC in accordance with consumers' profiles. Blackwashing can only work if the public is segmented on the basis of pro-environmental versus pro-materialistic values. It is thus important to avoid using an anxiety-inducing discourse for people whose goal in life is the possession and consumption of goods. On the other hand, it seems appropriate to develop this type of communication for those whose cultural worldview values the state of the environment. This conclusion, emphasizing the need for the profiling of audiences, needs to be seen in the context of recent work advocating positive

communication to counter CC – drawing this time on the concept of self-affirmation (see Sherman, 2013). If the initial work along these lines concluded that self-assertion motivates action to combat CC (Sparks et al., 2010), subsequent studies have seen the relationship as more complex. Self-affirmation can lead to pro-environmental action on the part of people with pro-environmental worldviews. Conversely, it tends to diminish such action in the case of those with environmentally negative worldviews (Van Prooijen et al., 2013). This study also detects this same sensitivity to values, the moderating role of which is far from sufficiently taken into account in combating CC.

Moreover, the idea of segmentation of the public according to pro-materialistic or pro-environmental values should also be considered in terms of the societal and communication context. Societal, first, because the struggle against CC is one aspect of our 'risk society' (see Beck, [1986] 2001), characterized by difficulties in formulating and implementing collective responses to common challenges. However, with regard to the CC issue, it appears that public policies are supported by civil society, all the more so because they emphasize affective and cultural dimensions close to people's own experience (Leiserowitz, 2006). Second, with regard to communication, because the profiling of individuals according to their cultural worldview cannot be envisaged independently of digital channels. In view of the hyperconnectedness and over-solicitation of internet users, there is a real risk of diluting communication campaigns against CC on the Web (Lörcher and Neverla, 2015; O'Neill and Boykoff, 2011). To avoid this risk, the deployment of content marketing whose forms would vary according to the cultural values of Internet users proves to be essential. In the same way, the identification of pro-environmental and pro-materialistic values should be included in systems for monitoring 'ecological' and 'consumption' virtual communities.

For management, the findings of this study will help the actors involved in the fight against the CC (e.g. companies, NGOs, large distributors) to design communications that are more effective for the target audience. In terms of methodology, the study contributes to the process of renewal, within TMT, of the traditional protocols of production of MS.

The use of a video on CC to stimulate or to generate and manipulate MS marks a significant difference from traditional research in TMT. The manipulation of MS is usually carried out by means of verbal questions or measurement scales associated with death. Compared to these techniques, using video has the advantage, thanks to the vividness of the images, of presenting situations to the participants that generate forceful reminders of mortality (Dar-Nimrod, 2012). Visual stimuli also minimize the risk of immediate rejection by respondents (Partouche-Sebban, 2013) and give access to the desired behavioural effects (distal defences).

### *Limitations*

The belief in the CC is very labile. In particular, it is a function of variation in ambient temperatures. A very cold winter thus causes a significant decrease in belief in its existence (see Chylek et al., 2010); conversely, simply priming people with cognitions of heat increases belief in global warming (Joireman et al., 2010). Rising temperatures can even induce a positive perception of CC in northern countries (Durand, 2012). Any investigation of the perception of CC needs to be attentive to the influence of the meteorological situation when the experiments are conducted, but very few take this into account or report on it. With regard to this study, two points should be noted. First, the participants interviewed are all inhabitants of western France – a region significantly less affected by CC than others. The anxiety-inducing character of CC may thus be relatively low. Second, the study was carried out over a period without any extreme weather events.

Another limitation is that materialism, as a worldview, has no universal definition. This problem is often masked in work seeking to show empirically that MS (the socio-cultural prevalence of an anxiety-inducing imaginary) may be an antecedent of materialism (Urien and Kilbourne, 2008). Otherwise, the treatment of this problem is usually superficial. Although Rindfleisch et al. (2009) point out that their research, having been developed in the United States, is marked by a local cultural context, whose axiological particularities limit the generalization of its findings to non-Western cultures, the idea that there may be variations even in the West is

not mentioned. In this respect, Ladwein's cautions (2005: 62) need to be taken into consideration. In his view, the approach to materialism adopted by Richins and Dawson (1992), often viewed as a benchmark, is culturally specific: 'The characteristic dimensions of materialism are very much marked by a quantitative approach, summed up in the idea that having more material goods is necessarily the best way of succeeding in life' (p. 62).

One final limitation is that the method used lies within an experimental paradigm of choosing between baskets of products in the context of MS. We rely on intended choices and on preference measures, not on actual choices involving real financial commitment.

Moreover, the discretization of variables related to materialistic values and environmental self-esteem, to show the moderating effect of these two factors on the three consumption choices, may possibly weaken the internal validity of our study. Thus, in subsequent experiments using the TMT framework and incorporating the same type of variables, the moderating effects of materialistic values and environmental self-esteem could be extended and deepened by more advanced statistical analysis – such as discrete choice models or logistic regression (Cadario and Parguel, 2014). A further methodological improvement would concern the experimental condition that does not provide the participants with a reminder of mortality (i.e. condition 2 in our experiment). Indeed, although the informative video does not include MS, it is nevertheless not entirely 'neutral'. It too is essentially a way of presenting the climate problem and is therefore capable of exerting a distinct influence on people's commitment in the fight against CC. In terms of the internal validity of the study, this may prove problematic insofar as the impact of confounding factors is not sufficiently taken into account in the experimental design (e.g. Pelham and Blanton, 2012; Thye, 2014). One possible extension of our research could therefore be to replicate the experiment with a video that is seen as even more 'neutral' than the informative video.

### *Future research*

The various limitations that we have just mentioned give rise to new research perspectives. In

addition to these limitations, there are others to consider. One of them concerns the risk of inducing, by means of an anxiogenic imaginary, counterproductive interpersonal conflicts. Indeed, TMT predicts that in response to MS, people's cultural worldviews become polarized (Cutright et al., 2011); they enhance their self-esteem by living in accordance with the norms of their worldview (Pyszczynski et al., 2015). Hence, apocalyptic communication on the effects of CC may accentuate the divide. One indicator of this risk is the rapid development of the American anti-environmental 'coal rolling' movement. Against the normative pressure from environmentalists calling for a low-carbon economy, the members of this activist community modify their cars to make them visibly polluting and to generate the maximum CO<sub>2</sub>. In France, this type of conflict in which environmentalists are challenged culturally (though in less extreme ways) also occurs (see Monnot and Reniou, 2013). Limiting these frictions is an important operational issue: it is a matter of making environmentalism reconcilable with other worldviews.

Another research perspective arises from the potential for intrapersonal conflict. TMT predicts that individuals exposed to MS live in accordance with their cultural norms. Yet the multiplicity of cultural worldviews means everyone adheres to more than one, as is reflected in particular by 'environmentalist-materialistic' cultural bipolarization (Dickinson, 2009). As a consequence of the sensitivity to the context of responses induced by MS, in certain situations altruistic behaviour involving donation and generosity towards local charities increases (Cai and Wyer, 2015), while donation to foreign charities decreases (Jonas et al., 2013). In other situations, this sensitivity leads to increased selfishness and greed (Dechesne et al., 2003; Kasser and Sheldon, 2000). This contradictory variability of behaviour is explained by the fact that social norms are salient and dominant in varying degrees, depending on the context. Predicting and guiding behaviour involves not only the definition of social norms that are activated from time to time (Jonas et al., 2008, 2013) but also identification of the context in which they are situated.

Another type of response to MS can also be envisaged (Cozzolino, 2006). If a brief and superficial reminder of mortality can lead to the types of response suggested by TMT, a high-intensity reminder could lead to responses other than the mobilization of defences within a logic of symbolic immortality, namely, those involving positive personal development (Frias et al., 2011). This line of thinking merits investigation. From the perspective of meaning management theory (MMT), the meaning of death is linked to the meaning of life (Neimeyer, 2005). Whereas from the perspective of TMT, the individual reminded of his or her mortality unconsciously deploys defensive strategies that minimize his or her anxiety, from the perspective of MMT he or she maximizes the acceptance of death through proactive positive strategies and self-fulfilment, personal growth and accomplishment. The strategy of defending against MS here consists in acquiring wisdom regarding life (Wong, 2000). As noted by Vail et al. (2012), MS can improve people's lives. Used well, it can have positive effects; it can encourage the development of ethical, ecologically virtuous, other-oriented behaviours (in the case of CC, for example, preserving the environment for future generations). Thus, the use of mortality saliency appears to be more widespread in the field of study concerned with the generation of prosocial behaviours. Such generation cannot be reduced solely to the optimization of the communication strategies that support it. As with other methods (e.g. nudging, fear appeals), the effectiveness of MS at the distal level needs to be addressed by integrating various factors that explain prosocial behaviour – personal, contextual, motivational and especially cultural. From this standpoint, a theoretical deepening of the concepts of 'cultural worldview' and 'source of self-esteem', which are central in the mechanisms brought to light by TMT, is unquestionably called for.

Finally, we have focused our investigation of the effects of blackwashing on MS – while being aware, as stated earlier, that other negative emotions, such as guilt, anger, shame, and so on, can also be generated by the exploitation of this discursive register. These emotions, which are not dealt with here, have been insufficiently discussed in the marketing literature, as Becheur and Valette-Florence (2014) also

point out. A conceptual and experimental investigation of their implications and behavioural effects in communication on CC is therefore strongly recommended.

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### Notes

1. The researchers asked participants to answer these two open-ended questions about their own death to create an MS situation, before moving on to the main questions: (1) Could you briefly describe the emotions evoked by the idea of your own death? and (2) What will become of you personally when you physically die?
2. Most experimental studies drawing on terror management theory (TMT) are limited to a single distraction task, usually asking participants to fill in the Positive and Negative Affect Schedule (PANAS) scale. The duration recommended for this task is in most cases between 3 and 5 minutes (Arndt et al., 2009; Harmon-Jones et al., 1997). The duration of the distraction phase used in our study was approximately 4–5 minutes, which is the time needed to complete the PANAS scale and fill in the word search grid.

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### Appendix 1. Content of videos used.

Experimental condition	Anxiogenic video	Informative video
Theme(s) of videos	Presence of MS	Absence of MS
Measurement	$N = 50$ $M_{\text{anxiogenic video}} = 4.45$ $SD = 0.65$	$N = 50$ $M_{\text{informative video}} = 4.37$ $SD = 0.78$ $N = 50$ $M_{\text{informative video} - \text{anxiety level}} = 1.64$ $SD = 0.72$ $N = 50$

MS: mortality salience; SD: standard deviation.

### Appendix 2. Pre-test of consumption choices.

	Dubai		Disneyland		Hiking in Thailand		Hiking in desert		Bottled water		Filtered tap water		Financial training		Musical training	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
Linked to materialism	81	94.2	82	88.4	18	20.9	16	18.6	78	90.7	4	4.7	83	96.5	8	9.3
Linked to the environment	5	5.8	4	11.6	68	79.1	70	81.4	8	9.3	82	95.3	3	3.5	78	90.7
Total	86	100	86	100	86	100	86	100	86	100	86	100	86	100	86	100

E: number; P: percentage.

**Appendix 3.** Descriptive statistics linked to ANOVA.

	Sum of squares	<i>df</i>	Mean square	<i>F</i>	Sig.
Positive affect					
Intergroup	14.667	1	14.667	1.395	.240
Intragroup	1366.576	130	10.512		
Total	1381.242	131			
Negative affect					
Intergroup	9.818	1	9.818	1.278	.260
Intragroup	998.909	130	7.684		
Total	1008.727	131			

*df*: degree of freedom; ANOVA: analysis of variance.

**Appendix 4.** Measurement scales used.

Concepts	Scales used	Structure of scales
Environmental self-esteem	Scale developed by Brook (2005)	5 items
Materialism	Scale developed by Ladwein (2005)	9 items
Emotions	PANAS scale developed by Watson et al. (1988)	20 items
	Strongly disagree	Neither agree nor disagree
	Slightly disagree	Slightly agree
	Strongly disagree	Strongly agree
	1	2
	3	4
	5	5
<ul style="list-style-type: none"> <li>• Brook scale (2005)           <ol style="list-style-type: none"> <li>1. Self-esteem is influenced by being a good or bad environmentalist.</li> <li>2. Supporting environmental causes enhances my self-esteem.</li> <li>3. I feel bad when I think about how my lifestyle damages the environment.</li> <li>4. Self-esteem is increased when I feel I'm being a good environmentalist.</li> <li>5. Being an environmentalist is linked to my sense of self-esteem.</li> </ol> </li> <li>• Ladwein scale (2005)           <ol style="list-style-type: none"> <li>1. One of the most important goals in life is to acquire possessions.</li> <li>2. I think that having lots of possessions is a sign of success.</li> <li>3. What I own says a lot about how I have succeeded in my life.</li> <li>4. In general I but only what I really need.</li> <li>5. From a material point of view, I always try to keep my life simple.</li> <li>6. I don't really like spending money on things that are particularly useful.</li> <li>7. My life would be happier if I possessed things I don't have now.</li> <li>8. It would make me happier if I possessed beautiful things.</li> <li>9. I'd be happier if I could buy more things for myself.</li> </ol> </li> </ul>		

(Continued)

**Appendix 4. (Continued)**

	Very little or not at all	Sometimes or Slightly	From time to time or moderately	Often or very much	Very often or completely
	1	2	3	4	5
• Watson et al. scale (1988)					
1. Interested					
2. Upset					
3. Excited					
4. Distressed					
5. Strongly					
6. Guilty					
7. Scared					
8. Hostile					
9. Enthusiastic					
10. Proud					
11. Irritable					
12. Vigilant					
13. Ashamed					
14. Inspired					
15. Tense					
16. Determine					
17. Attentive					
18. Agitated					
19. Active					
20. Frightened					

PANAS: Positive and Negative Affect Schedule.