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Towards a new model for communicating climate change

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Abstract:

While nearly 20 years of public communication about climate change has undoubtedly raised international awareness and concern, large-scale behavioural change has not followed. The aim of the current paper is therefore twofold, namely; (a) to provide an extensive review of the theoretical and empirical evidence on which past and current climate change campaigns are based and (b) to advance a new communication model. With regard to the former, it is argued that the evolution of public climate change campaigns can be delineated according to the following typology; (1) *'the cognitive-analytical type'*, (2) the *'affective-experiential type'* and (3) *'the social-normative type'*. In addition, three major explanations are offered for the relative ineffectiveness of past campaigns: (a) while human behaviour is often the result of complexly integrated behavioural processes, most public climate change campaigns ought to be, but are unfortunately not, designed in an integrative manner, (b) public campaigns do not pay sufficient attention to the psychological determinants of the behaviours that they are trying to change and (c) often fail to make the climate change context explicit. Based on these shortcomings, an integrated conceptual framework is advanced to guide the design of future public interventions and to help narrow the gap between communicating climate change and changing individual behaviour.

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Introduction

It has been well documented that for most people, the media is a prominent and integral source for acquiring information about climate change (e.g. Ungar, 2000; Boykoff & Rajan, 2007). Moreover, the way that information about climate change is framed and communicated can significantly influence the public's knowledge, attitude and perception (e.g. Weingart, Engels & Pansegrau, 2000; Stamm et al., 2002; Sampei & Aoyagi-Usui, 2009; Sharples, 2010). As a result, a popular strategy for inducing behavioural change has been the deployment of persuasion techniques embedded in communication strategies. To this extent, a major area of concern is the apparent disparity between public communication and the lack of actualized behavioural change observed in the general public (Whitmarsh, O'Neill & Lorenzoni, 2008). While public polls often indicate that people express general awareness and concern (e.g. Globescan, 2000, 2006), individuals remain reluctant to take personal action. This has also been dubbed the '*value-action*' gap (e.g. Kollmus & Agyeman, 2002), '*attitude-behaviour*' gap or '*intention-behaviour*' gap (e.g. Sheeran, 2002) depending on where the focus is applied. Traditionally, most communication campaigns have tried to address this gap by providing people with more information, a strategy that has become better known as the '*information-deficit*' model of human behaviour.

In fact, a content analysis by Devine-Wright (2004) suggests that a deficit model of human behaviour has played a predominant role in past public behavioural change campaigns and continues to do so at present. Yet, on the whole, public interventional campaigns only seem to produce modest behavioural changes (Steg, 2008). For example, a 1999 mass public media campaign in the UK; '*Are you doing your bit*' only elicited small consequent changes in attitudes and behaviours (O'Neill & Hulme, 2009). Similar disappointing findings have been observed in The Netherlands (e.g. Staats et al., 1996). While new communication strategies have been undertaken in recent years, more substantial analyses of such campaigns

often remain elusive (i.e. those that go beyond media hits and broad-opinion brushes), making it hard to identify benefits and limitations (Steg & Vlek, 2009; Moser, 2010). Recent research is increasingly pointing out that communication interventions need to be made more locally relevant and designed in such a way that they meaningfully involve and engage the public with climate change (Moser 2006; O'Neill & Nicholson-Cole, 2009). Moser (2006, p.3) defines 'effective communication' as; *'any form of public engagement that actually facilitates an intended behavioural, organizational, political or other social change consistent with identified mitigation and adaptation goals'*.

While there certainly has been no shortage in the number of publications that offer 'practical' short-lists for effective climate change communication (Futerra, 2005; CRED, 2009; Moser, 2010; CCCAG, 2010), there is currently no systematic overview of the theoretical and empirical pathways that explain how to get from merely communicating information to actually changing people's behaviour. Moreover, while behavioural change is of course, to a certain extent, a practical matter, a more theory-driven perspective is generally welcomed by behavioural researchers (Steg and Vlek, 2009.) Attaining a more holistic understanding of the link between designing persuasive messages, the communication and processing of that information on one hand and eliciting behavioural change on the other inevitably begs for the integration of insights from all relevant disciplines that deal with the subject matter. Indeed, integrative theoretical research can help synthesize, connect and combine dispersed research findings from various disciplines to advance new insights and improve current knowledge and understanding. Yet, in order to validate the value of a new integrative communication model, it is pivotal to first discuss the theoretical and empirical evidence of past models as well as their limitations. In an attempt to provide a more systematic overview, the current paper delineates the 'evolution' of public climate change campaigns according to the following typology:

- (1) The '*cognitive-analytical*' type (consistent with the traditional knowledge-attitude-behaviour model)
- (2) The '*affective-experiential*' type (congruent with the 'risk-as-feelings' framework and the use of negative emotional appeals such as fear and guilt messaging)
- (3) The '*social-normative*' type (consistent with the 'normative' paradigm - which seeks to leverage the persuasive potential of social and moral norms on behaviour)

In addition, three major short-comings of past and current public communication interventions are identified:

- (1) Most public interventions ought to be, but are not designed in an integrative manner
- (2) Current campaigns do not sufficiently target specific behaviours nor pay sufficient attention to the psychological determinants of the behaviours that they are trying to change
- (3) Public campaigns often fail to make the climate change context explicit

In the first section of this paper, the theoretical and empirical evidence for each of the three public communication strategies is critically discussed. In the following section, a more integrated understanding of human behaviour and decision-making is advanced by looking at the combined influence of cognitive, experiential and normative influences on behaviour. In addition, the importance of understanding psychological determinants of environmental behaviour (e.g. knowledge, social norms) is outlined for both, the communication process as well as its integral role in eliciting behavioural change. Finally, a new integrative conceptual framework is proposed in an attempt to advance current understanding of how to transition from merely communicating information about climate change to actually changing individual behaviour.

1.0 The Cognitive-Analytical Approach

1.1 *The Homo Logicus?*

'I know that you believe you understand what you think I said, but I'm not sure you realize that what you heard is not what I meant' – Robert McCloskey

Until recently, the tradition has been to communicate information about climate change in a relatively scientific and analytical format (CRED, 2009), operating under the assumption that people process (uncertain) information predominantly in an analytical matter (Marx et al., 2007). As a result, technical terms such as 'stratospheric ozone depletion', 'anthropogenic climate change' and 'significant probability' have often been used in communicating information about the long-term developments in the earth's climate. Yet, whether or not cognitive reasoning abilities in humans are really that well developed is questioned by both comparative neuroanatomical work as well as cognitive psychology. In particular, it has been argued that the 'neocortex' (the rational, higher functioning) part of the brain was developed last in the chain of human evolution and is in fact the least developed part of the brain (Maclean, 1990). Similarly, in their heuristics and biases approach, Kahneman, Slovic & Tversky (1982) have highlighted that, when forming judgments under uncertainty, people employ relatively simple heuristics and cognitive short cuts that may lead to erroneous and biased decision making strategies. In short, recent research has questioned how proficient individuals are in dealing with abstract, descriptive and analytical information about climate change (Marx et al., 2007).

Because climate change is such a complex and elusive global hazard, the concept is difficult to communicate to various publics (Moser and Dilling, 2004). This process is even further complicated by the fact that people tend to process information so that it is congruent

with their pre-existing beliefs. Selectively attending to evidence that confirms pre-existing beliefs and the negligence, re-interpretation as well as distortion of information to the contrary is generally referred to as 'confirmation bias' (Lewicka, 1998). In fact, most information that is eventually retained in an individual's memory tends to be information that supports pre-existing thoughts and beliefs. For example, in one US study increased levels of knowledge seemed to increase concern for some people (e.g. Democrats) but not for those (e.g. Republicans) that were already skeptical about climate change from the outset (Malka et al., 2009). Similarly, in a study where US farmers were asked to recall weather statistics, those who believed that their region was undergoing climate change recalled weather statistics consistent with those beliefs while farmers that believed that their region had a constant climate recalled weather statistics congruent with those beliefs (Weber & Sonka, 2004). In sum, the way in which people process information and structurally organize their knowledge can have significant impacts on their behaviour. Yet, how do people cognitively understand climate change? And to what extent does more knowledge of the climate change problem affect people's behaviour?

1.2 Information Processing and the Structural Organization of Knowledge

Cognitive psychologists have often described the way in which individuals process and organize incoming information as an elaborate network of mental structures that represents an individual's understanding of the external world, perhaps better known as 'schema theory' (Anderson, 1977). More recently, the study of 'mental models' has gained increased attention. Essentially, a mental model is a person's internal, personalized, intuitive and contextual understanding of how something works (Kearney & Kaplan, 1997). What is important to take away from this is that mental models basically carry three important functions; (1) they serve as a framework into which people fit new information (2) they

define how individuals approach and solve problems and perhaps most important (3) they help formulate actions and behaviour (Carey, 1986; Morgan et al., 2002). The majority of research on mental models and individual knowledge has identified several fundamental gaps in the public's knowledge and understanding of climate change. For example, the American Psychological Association concluded in a recent report that the understanding of climate change, both in its causes and in its likely effects by the average citizen around the world is limited (APA, 2010). Nationally representative surveys in the US point out that climate literacy seems to be low in general (e.g. Leiserowitz, Smith & Marlon, 2010). In particular, people do not seem to understand the human causes that contribute to climate change nor the scientific consensus on this matter (Leiserowitz, 2007). In some cases, people even perceive a few degrees increase in global mean temperature as something rather pleasant, not understanding the potentially large harmful geophysical consequences (Meijnders, 1998). Despite widespread media coverage of climate change and related issues, typical mental models of global climate change tend to suffer from several severe fundamental misconceptions (Bostrom et al., 1994).

For example, most explanations given of the physical mechanisms underlying global climate change are inconsistent and incomplete. Kempton et al. (1995) found that Americans assimilated information about global climate change into pre-existing mental models of ozone depletion. In particular, people mistakenly believe that ozone depletion is a cause of climate change (Meijnders, 1998). This is not just the case in the US: a survey performed by GlobeScan in 1999 (covering 25 countries) found that people worldwide (mistakenly) identified 'depletion of the earth's ozone layer' as a main cause. This development has led to much confusion between the two issues. A likely explanation is that the hole in ozone layer has been scientifically well documented over the years and is much easier to imagine and remember (Ungar, 2000). It is interesting to observe that this was pointed out by Bostrom et

al. (1994) and by Kempton et al. (1995) and yet again some 11 years later by Lorenzoni et al. (2006), suggesting that despite past efforts, this popular misconception still persists.

People also tend to have difficulty understanding the difference between climate change and other environmental problems (Heskes, 1998; Read et al., 1994). In particular, it is hard for people to differentiate between good environmental conduct more generally and specific actions that help reduce climate change. Often measures such as not buying aerosol spray cans, recycling and reducing waste are mentioned as effective strategies for mitigating climate change, possibly because such apposite behaviours are generally known to be harmful to the environment (Bostrom et al., 1994; Read et al., 1994; Leiserowitz, Smith & Marlon, 2010). In addition, misconceptions about the relative importance of the various causes of climate change are also widespread. Particularly, people tend to overweigh the effects of deforestation and non-recycling and underestimate the effects of fossil fuel consumption (Bostrom et al., 1994; Whitmarsh, 2009). This also becomes evident from the fact that the general public remains mostly unaware of the link between air travel and climate change (Gössling et al., 2006; Becken, 2007; Gössling & Peeters, 2007; Cohen & Higham, 2011) or meat consumption and climate change (de Boer, Schösler & Boersema, 2012).

Occasionally, some local studies find that people are relatively well informed about basic concepts (e.g. Lorenzoni & Langford, 2001; Truelove, 2009). Although, on net, improvement seems to be slow and while awareness of climate change is relatively high a more sophisticated understanding still appears to be random and inconsistent (Anable, Lane & Kelay, 2006). Furthermore, it would be erroneous to suggest that a flawed understanding of climate change solely exists among the 'lay' or general public. In fact, Sterman and Booth Sweeney (2002; 2007) and Sterman (2008) conducted a series of experiments that identified widespread incorrect beliefs about climate change among highly educated MIT science and engineering majors. In particular, the students were unable to correctly describe the process

mechanisms that underlie climate change. Sterman and Booth Sweeney (2007) hypothesized that these deep-seated misperceptions arise as a limitation of people's mental model with regard to the relationship between concepts of stock and flow in phenomena of accumulation (Sterman & Booth Sweeney, 2007). In conclusion, public understanding of climate change still reveals great diversity, confusion and often ignorance. Understanding the way that individuals' process, classify and organize new information is important because incorrect mental representations of climate change are likely to contribute to a 'wait and see' attitude (Xiang, 2011).

1.3 Does knowing make a difference? The relationship between knowledge and behaviour

Based on the evidence review above, it would not be unreasonable to conclude that there is still widespread misunderstanding about (1) *the process mechanisms of climate change*, (2) *its underlying causes* and (3) *effective response behaviours*. In the face of addressing these issues, there are varying theoretical assumptions concerning the role of knowledge in behaviour. Knowledge is often believed to be a background factor that influences a person's attitude toward a certain behaviour (Ajzen, 1991) and given the known association between attitude and behaviour (Armitage & Connor, 2001), knowledge is then assumed to influence behaviour through a mediating variable. The idea behind the attitude-behaviour relationship is that the more people know about and understand the connections between their own behaviour and a range of environmental threats, the more likely it is a person will adjust their behaviour accordingly. Such models essentially assume a linear progression from increased knowledge to a favourable change in attitude which in turn is thought to produce a change in behaviour - a framework that has become better known as the Knowledge-Attitude-Behaviour (KAB) model (Kollmus & Agyeman, 2002).

While there is little doubt about the fact that environmental attitudes correlate significantly with environmental behaviour, the 'KAB' model has received fierce criticism in recent years. For example, Bulkeley (2000, p. 314) states: '*recent research challenges the assumption that public confusion and an apparent gap between stated beliefs and action, arises from a deficit in public knowledge and understanding of environment issues*'. Similarly, Moser (2006) and Kollmus and Agyeman (2002) criticise information-based campaigns for being too rationalist and outdated. While it is certainly true that knowledge is a necessary but not sufficient condition for behavioural change, it would be erroneous to suggest that the role of knowledge is outdated or not important. In fact, the role of knowledge in environmental behaviour is important but often underestimated (Kaiser & Fuhrer, 2003), particularly because researchers fail to make a distinction between three *converging* types of environmental knowledge, namely; *declarative* knowledge (i.e. factual knowledge), *procedural knowledge* (i.e. knowledge of appropriate courses of action) and *effectiveness* knowledge (i.e. knowledge of how effective each course of action is). To illustrate, information about the causes of climate change (e.g. CO₂ emissions) can help create a better understanding of appropriate response behaviours (e.g. reducing energy consumption) and vice versa. While Kollmus and Agyeman (2002) state that only a small fraction of environmental behaviour can directly be explained by environmental knowledge, this argument neglects to consider that the effect of knowledge is often overlooked because it is mediated by other important psychological processes (Kaiser et al., 1999).

For example, one of the first studies that systematically reviewed the psychological determinants of environmental behaviour (Hines, Hungerford & Tomera, 1986) reported positive and significant correlations between environmental knowledge and environmental behaviour ($r = 0.30-0.37$, $p < 0.001$). Building on their work, a more recent and extensive meta-review conducted by Bamberg and Moser (2007) found these findings (largely) to be

still accurate. Other studies have corroborated these findings. For example, a study by Meinhold and Malkus (2005) supports the theory that there exists a linear relationship between environmental knowledge, attitude and behaviour. In particular, environmental knowledge was found to moderate the attitude-behaviour relationship, where strong pro-environmental attitudes and high environmental knowledge predicted significantly more environmentally friendly behaviours. Other critics have argued that if individual knowledge about climate change is generally limited then knowledge should not be able to explain much of the variance in response behaviours (Maibach, Roser-Renouf & Leiserowitz, 2008).

It is worth noting here that predicting specific climate change mitigation behaviours (e.g. air travel) based on general environmental knowledge and attitudes may sometimes (unsurprisingly) cause distortion in measurements (Kaiser et al., 1999; Bamberg, 2003; Whitmarsh, 2009) - as someone can hold general pro-environmental knowledge and beliefs but still maintain different attitudes toward specific behaviours. For these reasons, it is perhaps more appropriate to review to what extent knowledge about climate change is able to predict specific climate change mitigation behaviours. To this extent, some evaluative studies have found that general knowledge about climate change is only weakly related to actual self-reported behaviours (e.g. Staats et al., 1996). Yet, research by Bord, O'Connor and Fisher (2000) and O'Connor et al. (1999) provides evidence that knowledge is in fact an important predictor. In both studies, knowledge about climate change kept its statistical validity as an independent predictor of behavioural intentions (even after controlling for general environmental attitudes). In fact, knowledge was the strongest relative predictor of intentions, explaining 11 per cent of the variance to take voluntary action and 20 per cent of the variance to support new government policies (Bord, O'Connor & Fisher, 2000). Similarly, Ngo, West and Calkins (2009) also found that knowledge successfully predicted a range of climate change mitigation behaviours.

While knowledge of climate change *impacts* has also been implicated in eliciting behavioural change (e.g. Nillson & Kuller, 2000), Truelove (2009) found that knowledge of appropriate *response behaviours* was the strongest predictor of mitigating intentions. Similarly, research by Semenza et al. (2008) and Hounsam (2006) found that the most popular self-reported barrier to behavioural change was simply the fact that people did not know how to change their behaviour to reduce their own contribution to climate change.

In conclusion, knowledge can be considered as a necessary condition for behavioural change, given that knowledge about the causes, consequences and solutions to climate change have all been implicated as significant predictors of behavioural outcomes. Yet, in order to maximize the effect of environmental knowledge on behaviour, knowledge must converge (Kaiser & Fuhrer, 2003). Thus, popular recommendations that public campaigns should prioritize one type of knowledge (e.g. response strategies) over another (e.g. understanding process mechanisms) must be exercised with caution as they may neglect the interdependent relationship that exists among these knowledge structures in some cases.

2.0 The Affective-Experiential Approach

2.1 The Homo Expertus?

'A man who carries a cat by the tail learns something he can learn in no other way' – Mark Twain

What Mark Twain jokingly points out is an important fact of life: knowledge and cognition can only do so much for human learning and understanding. Humans have inherited a well-equipped sensory system, and, through interaction with our natural and social environments we are able to learn and understand things in a way that abstract knowledge is unable to provide. While traditional cognitive-knowledge based approaches assume that the

public is not changing their behaviour because they fail to understand the issue (Lorenzoni, Nicholson-Cole & Whitmarsh, 2007), scholars are increasingly pointing out that highlighting scientific narratives in the media is unlikely to elicit more engagement (Hargreaves et al., 2003), particularly because of the 'yawn factor' that science tends to have on non-experts (Abbasi, 2006). In addition, several recent studies have shown that climate change is a temporally and spatially distant phenomenon for most individuals (Maibach, Roser-Renouf & Leiserowitz, 2008; O'Neill & Nicholson-Cole, 2009; Spence, Poortinga & Pidgeon, 2012).

One reason for this is that individuals have difficulty visualizing future periods (Tonn, Hemrick & Conrad, 2006). For example, a study by O'Neill and Nicholson-Cole (2009) indicated that respondents could not really articulate what climate change might mean for the United Kingdom. Individuals also tend to display an unrealistic sense of optimism (Weinstein, 1980), particularly to the extent that climate change is likely to affect others (e.g. the third world) but not the individual in question (O'Neill & Nicholson-Cole, 2009) Because climate change cannot be experienced directly, it is likely that individuals will continue to distance themselves psychologically (Lorenzoni & Pidgeon, 2005). Yet, a study covering 34 countries found that the majority of people in each country believed that climate change was a somewhat to very serious problem (GlobeScan, 2000). In 2006, GlobeScan repeated the study and found that the percentage of respondents that believed that climate change was a 'very serious threat' increased significantly in most countries (GlobeScan, 2006). Similarly, a study performed in the UK also indicated that over 80 per cent of the respondents reported to be concerned about climate change (Poortinga et al., 2006). Yet some researchers have argued that there is an issue with the way this apparent 'concern' is conceptualized. Because there is no one coherent method of how an individual's risk perception is assessed, measures vary greatly and the terms 'concern', 'worry' and 'perceived seriousness' are often used interchangeably. Yet, the literature often fails to note that these terms mean slightly different

things. To illustrate, it is possible to have general concern for an issue without actively worrying about it. Worry is then considered to be a much more active emotional state and a stronger predictor of behaviour than either 'concern' or perceived 'seriousness' (Leiserowitz, 2007). For example, a survey by the Pew Global Attitudes Project (2006) found that, while varying among countries, personal levels of worry about climate change are generally lower than perceived seriousness or general stated concern. Thus, while general concern about climate change seems to be well established among the general public, the same cannot be said for personal worry.

It is also questionable whether stated concern is related to the perception that the problem of climate change is urgent or of high priority. For example, while many people are concerned about climate change, they rank it as less important than many other social issues such as terrorism, health care and the economy (Krosnick et al., 2006). Similar evidence is provided by Poortinga and Pidgeon (2003), based on 1,547 face-to-face interviews the researchers found that while there was some moderate concern for all environmental risks mentioned in the study, climate change was ranked among the least important issues. This evidence leads to the conclusion that although general concern is expressed, there is also a dominant belief that climate change is a distant, non-urgent and non-personal threat (Darnton, 2005), possibly hindering proactive behavioural responses (Lorenzoni & Langford, 2001). These findings have lent support for the hypothesis that if general concern can somehow be transformed into personal worry then perhaps people are more likely to change their behaviour accordingly.

2.2 Risk as Feeling

It has become increasingly apparent that individuals have a hard time relating to technical, descriptive and abstract risk messages. In fact, the public may not act upon simple information about probabilities unless this information is given emotional meaning (Slovic et

al, 2004). Accordingly, converging evidence from cognitive, social and clinical psychology has indicated that human perceptions of risk (across domains) are very much influenced by affective and emotion-driven processes (Chaiken & Trope, 1999; Esptein, 1994; Sloman, 1996; Loewenstein et al., 2001; Slovic et al., 2006; Weber, 2006). At this point it is perhaps warranted to make a conceptual distinction between ‘emotion’ and ‘affect’. Perhaps a definition encompassing the most pivotal characteristics of emotion states that; ‘*emotion is a complex state of feeling that results in psychophysiological changes that influence thought and behaviour*’ (Myers, 2004, p.500). Emotions can be regarded as relatively transient and tied to a particular stimulus or event, manifesting in a specific state such as fear or happiness. *Affect* is a more subtle form of emotion defined specifically as a positive (like) or negative (dislike) evaluative feeling towards an external stimulus (Slovic, 1999).

For example, affective images can be regarded as a broad construct to which positive and negative feeling states have become attached through learning and experience (Slovic et al., 1998). Thus, while emotions are more complex in-depth feelings that cause psychophysiological changes, affect is a rather fast, specific and automatic evaluation of a stimulus object. In the context of climate change, Leiserowitz (2006) and Smith & Leiserowitz (2012) found that negative affect and imagery toward climate change were the strongest predictors of risk perception. More specifically, the research indicated that people tend to display a strong negative affective feeling towards the term ‘global warming’. Similar findings were reported in a study by O’Neill and Nicholson-Cole (2009): while respondents seemed to have a wide range of imaginations and mental visions related to the concept of global warming, most of them were negative and bleak.

Thus, negative affective imagery towards climate change seems to be widespread. Yet, to what extent do (negative) affect and emotions affect willingness to help reduce climate change? According to Böhm (2003), environmental behaviours are guided by so-

called ‘prospective’ and ‘retrospective’ consequence based emotions, such as fear and worry, which also happen to be the most intense emotions associated with environmental risks. In fact, Böhm and Pfister (2000) theorized that feelings of fear and worry over consequences should lead people to prevent and reduce environmental damage. In line with this train of thought, a large amount of research has been directed towards eliciting ‘fear’ - with the underlying hope that fear will serve as a strong motivator for behavioural change.

2.3 The link between personal experience, risk perception and behavioural change

While it is well known that emotions are an important and significant predictor of environmental behaviour in general (Maloney, Ward & Braucht, 1975; Grob, 1995), less is known about the specific relationship between experience, emotion, risk perception and behaviour in the context of climate change. Direct experience is thought to influence risk perception and behaviour (Whitmarsh, 2008), in particular, because experiences can invoke strong memorable feelings, possibly making them more dominant in processing (Loewenstein et al., 2001). Consider an individual that encounters an approaching tornado. Such a direct threat can elicit strong instinctive emotions such as fear and anxiety that subsequently guide immediate behaviour, the so-called *fear-flight response*. These instinctive emotions primarily arise in the brain’s limbic system, an evolutionary older part of the brain that guides behaviour through fast and automatic responses, especially in reaction to threats (Maclean, 1990).

Yet, it is unclear to what extent this model applies to the context of climate change. For example, a sensible response to flooding would be moving away from the danger zone or perhaps buying flooding insurance (i.e. adaptation measures). In fact, instinctively, the goal of the response behaviour is to mitigate immediate threats (not climate change as a broader concept in itself). It is not at all obvious that whenever a person's house floods, that person is

actively going to diminish his or her carbon footprint in response, unless that person explicitly links the flooding event to climate change (Helgeson, van der Linden & Chabay, 2012) - which is not always the case. For example, a study by Whitmarsh (2008) reported no difference in risk perceptions of climate change between respondents that had experienced flooding before and those who had not.

Yet, people who live in low-lying coastal areas do tend to have a heightened sense of personal risk (Brody et al., 2008) and a recent study by Spence et al. (2011) did find that past flooding experiences were significantly related to increased preparedness to reduce energy use. In particular, past flooding experiences mediated onto level of concern and perceived local vulnerability, which in turn, increased individual preparedness. Moreover, a significant amount of studies indicate that risk perception is an important predictor of individual willingness to help reduce climate change (e.g. O'Connor et al., 1999; Leiserowitz, 2006; Heath & Gifford, 2006; Semenza et al., 2008; Ngo, West & Calkins, 2009; Hidalgo & Pisano, 2010). Yet, a second issue revolves around the idea that even if direct experience does matter, there is a disassociation between the cognitive information that informs individuals that there is in fact a risk to be worried about and the inability for many people to observe or experience this risk in their direct environment (Weber, 2006). This lack of personal experience with the potentially negative consequences of climate change is causing a lower level of individual concern than advisable (Weber, 2006; APA, 2010). Thus, although 'experience' may indeed raise level of concern to what is considered a more appropriate level of personal 'worry', direct experience with the effects of climate change is generally lacking.

A potential solution to this problem has been to try and inflate personal worry among the general public through measures that do not require actual personal experience. One such measure is the use of negative emotional appeals, where the centre of focus revolves around '*fear-appeals*' (Stiff & Mongeau, 2003). This approach has gained popularity in climate

change communication (Moser & Dilling 2004; O'Neill & Nicholson-Cole, 2009) as the advertisement of extreme events is thought to do better than the idea of slow on going change (Brönnimann, 2002). To understand why fear appeals are often believed to work (at least in theory) it is helpful to briefly consider the development of various theories in the field of persuasive communication.

To start with, the experience of 'fear' is a negatively valenced emotion accompanied by a high level of arousal and is elicited by a threat that is perceived to be significant and personally relevant (Witte, 2000). In particular, fear appeals are a method of communication that attempts to influence attitudes and behaviours through the threat of some danger (Tanner, Day & Crask, 1989). A large amount of research has been performed over the years concerning the role of negative threat-related emotion in communication, yet largely inconclusive about its general effectiveness. One of the earliest theories on fear appraisal was put forth by Janis (1967), who proposed that the relation between fear and attitude change is curvilinear (U shaped). In effect, the theory suggests that moderate levels of fear are more persuasive than lower or higher levels.

More specifically, Janis's drive theory argues that fear arousal is needed to elicit a motivational drive state (i.e. tension) that individuals seek to resolve. From this point of view, for fear-appealing communication to be persuasive two requirements have to be met; (1) the level of fear induced by communication must be sufficiently high to function as a drive state and (2) recommendations have to be included in the communication as to how to reduce this drive state. Unpleasant emotional tension can be resolved by individuals through either 'adaptive responses' (i.e. useful behavioural changes) or through 'maladaptive responses'. For example, Leventhal (1970) made a distinction between an internal 'fear control' process and an external 'danger control' process. Maladaptive behaviours are targeted at controlling the fear response (e.g. through denial) but they often leave the actual threat (e.g. climate

change) intact. Rogers' (1975, 1983) protection motivation model (PMM) has arguably been one of the most applied theories to understand fear appeals (Witte, 1992). The PMM basically states that a threat related message will only be effective if (1) it convinces the reader that he or she is seriously threatened (threat appraisal) and (2) actually capable of averting the threat (coping response). In particular, Rogers (1983) postulated that people continue to engage in maladaptive behaviours (e.g. 'binge flying') if the rewards (convenience) of that behaviour exceed both the perceived severity of the threat (e.g. climate change) and the individual's perceived susceptibility to that particular threat (low). The intention to protect one's self then depends on four factors: (1) a threat's malignancy (2) its probability of occurrence, (3) the effectiveness of a coping response (i.e. response efficacy) and (4) an individual's ability to perform the response (i.e. self-efficacy).

2.4 Scaring people, does it work?

Empirical evidence supporting either Janis (1967) or McQuire's (1969) model has been lacking (Sutton, 1982; Higbee, 1969). Furthermore Leventhal's (1970) and Roger's (1975) models have been criticized for being imprecise (e.g. Witte, 1992). In general, the empirical evidence for the 'fear' approach is mixed. While some meta-reviews point out that a positive linear relationship is found between the level of fear and a change in behavioural measures (Boster & Mongeau, 1984; Sutton, 1982) this does not mean that a curvilinear relationship should be rejected (Meijnders, 1998). More generally, Boster and Mongeau (1984) found that fear appeals are modestly correlated with attitudes and to a lesser extent with intention and behaviour. Yet, overall, it is generally agreed upon that without *efficacy* messaging (i.e. an individual's perceived capability to avert the threat), fear appeals tend to be rather unsuccessful (O'Neill and Nicholson-Cole, 2009). Indeed, if anything can be learned from 50 years of theory development, it is that *strong fear appeals with high efficacy*

messaging produce the highest level of behavioural change whereas *strong fear appeals with low efficacy messaging* produce the most maladaptive responses (Witte, 2000).

However, much of the research on fear appeals has been conducted on health risks, which are both personal and direct (de Hoog et al., 2005) - two important conditions that are perceived to be absent in the context of climate change. Yet, there is some evidence available on the use of fear appeals in the context of climate change. For example, Meijnders et al. (2001a, 2001b) found that moderate fear messages related to global warming induced more systematic processing of the perceived risks as well as more favourable attitudes toward energy conservation (when compared to the low-fear condition). Lowe et al. (2006) carried out a pre/post-test study after individuals had watched the climate change disaster movie '*The Day After Tomorrow*' (Emmerich, 2004). Although a majority of the respondents (67 per cent) were in agreement that everyone needs to do something about climate change, this sense of urgency quickly faded in a focus group meeting a month after the screening.

However, very different results were presented by Leiserowitz (2004). In a similar study concerning the same movie, the author found that movie-watchers versus non-watchers showed higher levels of both concern and worry, estimated various impacts on the US more likely and significantly increased their intentions (in all stated categories) to engage in personal action to address climate change (Leiserowitz, 2004). Similarly, Jacobson (2011) used a spatial-econometric analysis to measure increases in the purchase of voluntary carbon offsets within a 10 mile radius of US movie theatres after the release of Al Gore's '*An Inconvenient Truth*' (Guggenheim, 2006). Shortly after the release, the purchase of carbon offsets went up as far as 50 per cent, yet no renewals were recorded in subsequent years. O'Neill and Nicholson-Cole (2009) conclude that dramatic, sensational, fearful and shocking representations of climate change (both visual and iconic) can successfully capture people's attention and drive a general sense of urgency to the issue (O'Neill & Nicholson-Cole, 2009).

Yet, the same researchers also found that while capturing attention and raising concern, fear messaging disengages people from climate change and renders them feeling hopeless and overwhelmed. The authors further mention that catastrophic and fearful representations of climate change are unlikely to motivate a sense of personal engagement and can possibly trigger psychological barriers such as anxiety, apathy, paralysis and denial (Lorenzoni et al., 2007; Moser & Drilling, 2007). Consistent with these claims, other research has found that fear messaging can have different impacts on different audiences. For example, individuals with strong 'just-world' beliefs tend to resort to maladaptive responses (e.g. denial) when faced with fear-messages about climate change, leading to a negative effect on intentions to curb carbon footprints (Feinberg & Miller, 2011). The authors recommend that messages should include sufficient information on potential solutions, which is consistent with the idea that a message is more persuasive when negative emotions about one's vulnerability are coupled with positive thoughts about potential solutions (Das, de Wit & Stroebe, 2003).

All in all, these findings point to one (of several) potential problem(s) that characterize the 'fear' approach. To start with, it is likely that fear appeals have a rather short-term effect. In fact, Weber (1997) coined the term 'single action bias' to explain the tendency for individuals to only take a single action to reduce a perceived threat and subsequently neglect further steps that would provide incremental protection. For instance, a 2008 poll in the United States indicated that while 28 per cent of Americans thought the environment was getting better, after having elected President Barack Obama in 2009, this number rose to 49 per cent (Silver, 2009). A possible explanation for the single action bias is that the first measure people take often sufficiently reduces the active level of worry / vulnerability. An additional shortcoming is that fear appeals offer diminishing returns (Hastings et al., 2004). That is, communicators run the risk of desensitizing or 'emotionally numbing' people

to the risks involved, as familiarity with a risk reduces its salience (Fischhoff et al., 1978). Furthermore, the *'finite pool of worry'* hypothesis states that people can only worry about a limited number of problems at any given time. As a result, increased concern for one risk (e.g. economic crisis) might decrease concern for other risks such as climate change (Hansen, Marx & Weber, 2004).

In conclusion, 'fear as a motivator' should be used with caution (Futurra, 2005). While fear messaging definitely has its place in the communication strategy mix (capturing attention and breeding concern), it will be difficult to retain such level of interest and arousal as people need a reason to stay engaged and often quickly shift their attention. Furthermore, when using narratives of an impending 'catastrophic' and 'looming disaster' without promoting actions that can help reduce the threat, fear messages are likely to trigger maladaptive coping responses and leave people feeling disempowered and disengaged. In the words of O'Neill and Nicholson-Cole (2009): 'depicting a state of crisis does not sit comfortably with the suggestion of individual action' (p. 376).

3.0 The Social-Normative Approach

3.1 The Homo Sociologicus?

'No man is an island, entire of itself; every man is a piece of the continent, a part of the main'. – John Donne

In addition to cognitive and experiential processing, human behaviour is also shaped by a wide range of normative factors. In fact, social-psychological research that explores the effect of social influences on behaviour is pervasive - as it is through social comparison with referent others that people validate the correctness of their opinions and decisions (Festinger, 1954). People derive descriptive and prescriptive social norms from observing others (Heath

& Gifford, 2002), apply a logic of appropriateness in unfamiliar situations (March, 1994) and unsurprisingly, tend to behave as their friends and peers (Cialdini et al., 1999). There are many examples of how social factors influence environmental behaviour. For example, people's energy use tends to decrease when they are told that their neighbours are conserving energy as well. People tend to alter their use of energy more generally to conform to the group-norm (e.g. Schultz et al., 2007). Usually a distinction is made between *descriptive* and *prescriptive* social norms. While prescriptive norms contain information about how others think how someone *ought* to behave, descriptive norms merely *describe* how others are behaving (Cialdini et al., 1991). When communicating social information it is important to understand the relation between these two concepts. For example, merely describing that CO2 emissions are increasing because a lot of people are increasingly choosing to fly short distances instead of using alternative modes of transportation (a descriptive norm) may have unintended effects if it is not clearly mentioned that this behaviour is in fact undesirable (prescriptive norm). In other words, it should be made clear that people *ought* to avoid flying short distances, otherwise the message is easily misread as; '*it's okay because everyone's doing it*'.

Another important question is how moral norms are theoretically distinct from social norms. Moral norms refer to the idea that some behaviours are just inherently right or wrong regardless of their personal or social consequences (Manstead, 2000). While there certainly is a strong link between social and moral norms, it is nevertheless possible that a person's moral convictions do not coincide with the expectations that exist in that person's social environment. One way to think of the relationship between these two concepts is that both cultural and social learning play an important role in acquiring moral beliefs (Krebs & Janicki 2002), as social reference groups deliver standards for what is viewed as right or wrong. It is over time, when people have internalized social norms that they become a (personal) moral

norm. Moral norms are then considered to be the link between internalized (general) values and more specific opinions and expectations about how to behave in a tangible situation (Schwartz, 1977). Thus, even though moral norms may originate from social group norms, once they have become internalized, they exercise influence over an individual's behaviour independently from any immediate social context (Manstead 2000).

Similarly, Bicchieri (2006) highlights that while social norms are followed conditionally upon the satisfaction of expectations of others, moral norms are followed unconditionally based on internal (emotional) processes. Moral norms have always played a central role in explaining pro-environmental behaviour. A particularly influential framework is Stern et al.'s (1999) *Value-Belief-Norm* (VBN) theory. According to the VBN, people's motivation for caring about the environment can be traced back to a specific set of personal values. For example, someone could be aware of the potentially negative consequences of climate change because they wonder how it might affect them personally (i.e. *egoistic values*), how it will affect other humans (*altruistic values*) or how it will affect the earth more generally (*biospheric values*). These values are then thought to influence more specific belief structures about human-environment interactions (a person's ecological worldview) which in turn determines the extent to which people are *aware of consequences* (AC) and *ascribe responsibility to their own actions* (AR) – eventually leading to an activation of an individual's moral norm, which is thought to be the main driver of pro-environmental behaviour.

3.2 Evidence for the role of normative influences on environmental behaviour

Empirical evidence for the persuasive power of normative influences on behaviour is growing. A frequently quoted study concerns a conservation experiment on hotel towel reuse. In the experiment, a simple 'normative' prompt (i.e. *'75 per cent of guests in this room reuse*

their towel when asked') significantly increased the reuse of towels (Goldstein, Cialdini & Griskevicius, 2008) - illustrating the potential of behavioural change through the communication of social information. A range of other studies that have used social norm manipulations in the context of energy conservation have showed similar positive results (e.g. Schultz et al., 2007; Dolan & Metcalfe, 2012). In addition to social pressure, moral norms are an equally (if not more) powerful tool for encouraging pro-environmental behaviour (Markowitz & Shariff, 2012). To this extent, a recent field experiment by Bolderdijk et al. (2013) set out to explore what message frame is most successful when asking drivers to pull over to get their tire pressure checked. Results strongly indicated that a moral message frame was most effective. Similarly, other recent research found that both moral and social norms are significant predictors of consumer decisions to purchase carbon offsets (Blasch and Farsi, 2012).

Yet, there are a number of identifiable problems inherent to the 'normative' approach. Firstly, observed effect sizes are typically small and short-lived (John et al., 2011). The latter is particularly true for social norms, since they are conditional upon the existence of steady exogenous social pressure (extrinsic motivation) while moral norms elicit motivation from internal processes (i.e. intrinsic motivation). A second problem concerns the use of 'guilt appeals'. Guilt usually arises as a result of violating some moral or social norm (Baumeister, 1998). In theory, guilt is thought to be a motivator of pro-environmental behaviour because guilt often leads to a moral obligation to compensate for any caused damages (Bamberg & Moser, 2007). Studies show that under certain conditions guilt can be effective in changing behaviour (O'Keefe, 2002) and some support is found in the context of climate change, for example, Ferguson and Branscombe (2010) illustrate that feelings of guilt mediated beliefs about global warming and willingness to engage in mitigation behaviours. Truelove (2009) comments however, that similar to the case of 'fear appeals', the associated drawbacks are

significant. A particular drawback is the risk of eliciting negative emotions (such as anger toward the guilt-inducer) as this can potentially undermine the technique's overall effectiveness. It is also interesting to note that in survey studies, social norms are often identified as one of the weakest predictors of behaviour (e.g. Armitage & Connor, 2001). A potential explanation for this is that it may very well be the case that the effect of social norms on behaviour is systematically under detected because people display a strong tendency to underestimate the extent to which they are subject to social influences (Griskevicius, Cialdini & Goldstein, 2008). Yet, in a similar manner it can be argued that the positive results found in many experimental studies is simply the result of artificially inflated social pressure. In fact, it is crucial to understand that in order for social norms to affect behaviour, they must first be activated and made salient (Cialdini et al., 1999).

Unfortunately, strong social norms are generally absent for most pro-social behaviours (van der Linden, 2011). In fact, negative social identities associated with performing environmentally unfriendly behaviours are currently not very well articulated. Thus, throwing a few numbers at people for social comparison purposes is not going to have much effect when there is no negative social identity to leverage in the first place (Corner, 2011). As a result, while social and moral norms may affect behaviour, in order to leverage their full potential, a strong pro-environmental norm must first be established. Several governmental advisory bodies have recently advised the UK government to use more 'deep-frames' in their communication. This entails a community-based approach where the discourse is shifted from 'you' to 'we' and from 'I' to 'us', encouraging the elicitation of moral values, collectivism and social identity (CCCA, 2010). For example, the UK government is currently actively trying to harness the persuasive potential of social norms in their design of large-scale behavioural change campaigns (Cabinet Office, 2011). Yet, empirical evaluations still remain elusive.

4.0 Towards a new framework for communicating climate change

4.1 Building an integrated understanding: theories of dual-processing in the brain

'Information's pretty thin stuff unless mixed with experience' – Clarence Day

So far, all three major approaches to public climate change campaigns have been considered in isolation. Yet, cognitive, experiential and normative influences do not affect human behaviour independently of each other - on the contrary, most behaviour is the result of carefully integrated neurological processes. The ancient Greek philosophers Plato and Aristotle long debated the intricacies of the fine line between passion and reason and ever since, a substantial amount of research in social, cognitive and neuropsychology has lend its support for a theory of 'dual-processing' in the brain. Either a distinction is made between cognitive and affective processing (e.g. Epstein, 1994; Zajonc, 1998; Damasio, 1994; LeDoux, 1996) or between controlled and automated processes (e.g. Schneider & Shiffrin; Sloman, 1996; Kahneman, 2003).

It is important to realize that these processing systems do not function independently from each other. Instead, they operate in parallel and continuously interact with each other, where higher analytical reasoning may evoke strong (basic) emotions and simple reflexes can be triggered by higher functioning neocortical processes (Weber, 2006; Marx et al. 2007). In fact, rational decision making cannot be effective unless it is guided by emotion and affect (Damasio, 1994; 1999), moreover, without emotions, humans are not able to learn effectively at all (Baumeister & Bushman, 2008). While dual-process theories aid conceptual understanding, they often provide an overly simplified understanding of neurological functioning. Cameron, Loewenstein and Prelec (2003) present a more useful categorization of human neural functioning (table 1).

	Cognitive Processes	Affective Processes
Controlled Processes (e.g. effortful, evoked deliberately, serial)	I	II
Automated Processes (e.g. effortless, reflexive, parallel)	III	IV

Table 1: Categorization of human neural functioning. Adopted from Cameron, Loewenstein and Prelec (2003).

To illustrate how these four quadrants (table 1) operate in relation to everyday consumer behaviour, consider the following example: let's assume that a customer walks into a travel agency and wants to book a well-deserved exotic vacation. Upon entering the store, the customer's attention is immediately drawn to a big fancy flyer displaying the ultimate vacation, including a sunny location, palm trees, white sandy beaches and a breath-taking turquoise sea. The brain's motor cortex will guide that person's arm to reach for the flyer drawing on two processes, namely the *cognitive and automatic* quadrant III (reaching) and the *affective and automatic* quadrant IV (pleasure and enjoyment). However, at the same time higher level processing might occur in the brain. For example, it could be that this particular person has recently been exposed to a documentary on sustainable tourism and anticipates that going on this holiday would perhaps disappoint important family members who recommended watching the documentary. These processes (*explicit memory*) and anticipation (*planning*) draw on two areas of the brain; the hippocampus and the prefrontal cortex, which are involved in controlled cognitive (quadrant I) and controlled affective (quadrant 2) processing. To keep things relatively simple, no social context was made explicit. Yet, it

should already become clear from this hypothetical example that in most realistic decision-environments, all four neurological quadrants can potentially be activated (and interact) in a matter of seconds. A clear implication of a more advanced understanding of human behaviour is that in order to make communication efforts more effective, substantial efforts should be directed towards integrating *cognitive*, *experiential* and *normative* aspects of climate change communication. Particularly, increased cognitive understanding can help make behavioural change more sustainable in the long-term while experiential approaches can help elicit affective associations and facilitate learning and understanding through visualization of the information presented.

For example, research by Marx, Shome and Weber (2006) indicated that people retain more factual information about climate change when that information is presented in an experiential format. In addition, the overall message should be designed and framed in a context that illustrates that other people are also acting sustainably and that a strong pro-environmental norm is both expected, desired and rewarded. In conclusion, knowing how information is processed and integrated in the brain and how this subsequently affects behaviour should lead to the understanding that communication designs that take into account positive interactive feedback loops between, cognitive, experiential and normative processes are likely to be more effective than ‘either / or’ type strategies.

4.2 The pivotal role of determinants of behaviour in communicating change

While the previous section has established that cognitive, experiential and normative processes often operate simultaneously and affect environmental behaviour in an integrative manner, the relative importance (or contribution) of each factor is not always known. To this extent, it is useful to introduce a distinction between *theories of change* and *models of behaviour*. While models of behaviour aid in understanding specific behaviours by

identifying the underlying psychological factors that influence them, theories of change show how behaviours can be changed and / or change over time (Darnton, 2008). Thus, while theories of change generally describe more generic processes, models of behaviour are diagnostic and help illuminate the psychological determinants that explain and predict a given behaviour (van der Linden, 2012). For example, both the role and relative importance of cognitive (knowledge), experiential (affect) and normative (moral norms) factors in explaining mobility behaviours is currently an active area of research (c.f. Bamberg & Schmidt, 2001, 2003; Bamberg, Hunecke & Blöbaum, 2007; Steg, 2005).

It should be noted that while theories of change and models of behaviour have distinct purposes, they are also highly complementary. In fact, it is argued here that the ineffectiveness of climate change campaigns can, in part, be attributed to the fact that most interventions pay little to no attention to the psychological determinants of the behaviours that they are trying to change. For example, public campaigns that promote sustainable lifestyles and ‘good environmental conduct’ across the board (e.g. Doyle, 2011) do not take into account the different determinants of various environmental behaviours. When campaigns do get specific, for example, in the case of meat consumption (Peta2, 2008; Meat Free Monday, 2010), little attention is paid to the social-psychological determinants of the behaviour. In fact, a report by the Government Communication Network (2009) points out that attaining a better understanding of how relevant behaviours are determined and influenced should be considered a prerequisite for the design of effective communication campaigns (GCN, 2009). It is important for evaluators to not only look at behavioural outcomes, as it is from studying the psychological determinants of behaviour that we gain understanding of why certain interventions were successful or not (Steg & Vlek, 2009). In short, successfully trying to change any given behaviour involves a thorough understanding of all the factors that determine and influence the behaviour under investigation.

4.3 A new framework for communicating climate change

A conceptual framework to help guide the design of public climate change campaigns is presented in figure 1. The central argument behind the framework is that persuasive communication is only persuasive (i.e. likely to elicit behavioural change) if it is based on an integrated understanding of the psychological processes that underlie and influence pro-environmental behaviour. In order to achieve this, three criteria need to be met; (1) interventions should design *integrative* communication messages that appeal to cognitive, experiential as well as normative dimensions of human behaviour, (2) the *context* and *relevance* of climate change needs to be made explicit and (3) *specific* behaviours should be targeted, paying close attention to the psychological *determinants* of the behaviours that need to be changed.

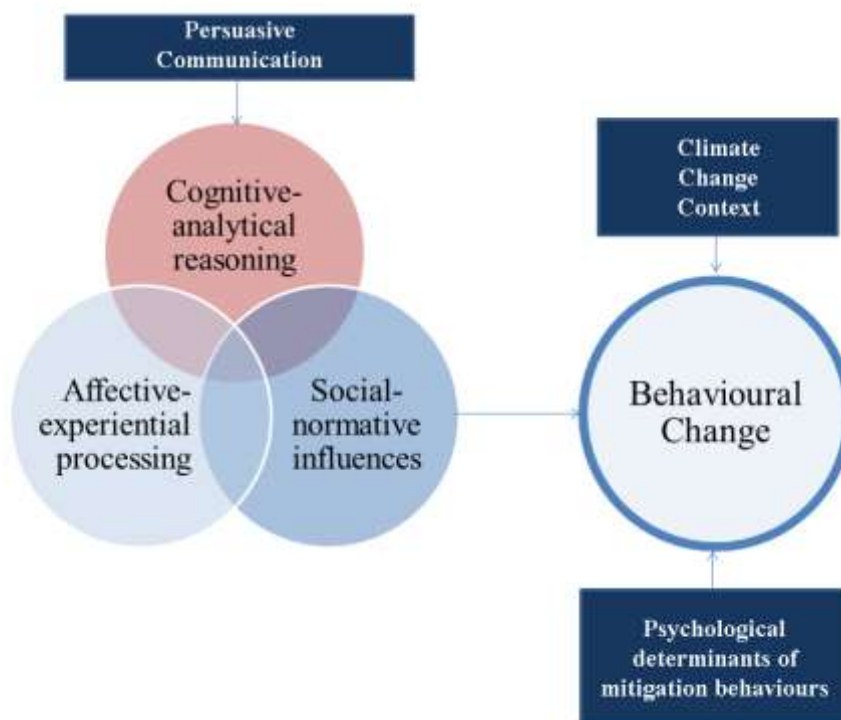


Figure 1: An Integrated Framework for Public Communication Interventions. Source: Author.

To illustrate that little of these criteria are typically met in practice, consider the following three illustrative cases. One of the earlier large-scale information-based campaigns on climate change was conducted in the Netherlands in 1996 and evaluated by Staats et al. (1996). The campaign employed a wide range of media tools, including billboards, posters, television commercials and information pamphlets. The aim of the campaign was to raise knowledge and awareness about the causes, consequences and solutions to climate change. Two strong points of the campaign were the strong explicit focus on climate change and a link was made between the greenhouse effect, climate change and relevant behaviours. Nevertheless, being one of the earlier campaigns, the intervention was nearly entirely focused on cognitive information and knowledge based factors (although some imagery was used to symbolically illustrate the greenhouse effect). Yet, only marginal focus was applied paid to 'affective and experiential' processes and no attention was paid to 'normative' influences. In fact, in their evaluation, Staats et al. (1996) highlight that the disappointing results of the campaign can be attributed to the fact that little attention was paid to social-normative factors. In addition, no effort was made to research the psychological determinants of the target behaviours.

More than 10 years later, the 'Act on Co2' (2009) campaign in the UK featured an advertisement where a little girl is read a scary bedtime story by her father about the potentially horrible consequences of climate change. While the commercial did feature some knowledge/information, the content was predominantly controlled by a 'fear frame' - focusing on the negative, scary and threatening consequences of climate change in the form of a cartoon that depicted 'climate monsters' and drowning people. The cartoon implied that a 'happy ending' is uncertain (hinting that a happy ending is dependent on people changing their behaviour). Falling prey to all the common pitfalls associated with the use of guilt and fear appeals (see section 2.3), the advertisement was not well received by the public as

thousands of complaints were submitted to the UK Advertising Standards Authority (Sweney, 2010). The focus of the commercial was predominantly geared towards the affective and experiential domain of human behaviour neglecting both normative influences on behaviour as well as important informational aspects. While the link between climate change and energy consumption was made explicit, no attention was paid to the psychological determinants of the behaviours in question (car use).

Finally, more recently, the American 'Wasting Water is Weird' (2011) video campaign was released featuring a character called 'Rip'. In the video, the Rip character visits people that are clearly wasting water (e.g. brushing their teeth with the tap running) and sarcastically illustrates that 'they're weird' for wasting water. By trying to associate a negative social identity with wasting water, the commercial fully relies on normative influences on behaviour. Therefore, while zooming in on a particular behaviour (e.g. dishwashing), a major drawback of the campaign is that no attention is paid to cognitive or experiential processes and no contextual link is made to climate change. It is important to make the climate change context *explicit*, primarily because if people engage in conservation behaviours for hedonic or cost reasons, they are likely to stop doing so once the behaviour is no longer attractive or cost-effective - environmental motives have proven more robust against such changes (Steg, 2008). Finally, no effort was made to research the psychological determinants of residential water usage. If research had been conducted, it perhaps would have been more apparent that providing information on alternative courses of action is an important aspect of trying to change unsustainable behaviours that have a strong habitual component (Gregory & Di Leo, 2003). In conclusion, climate change campaigns often adopt an 'either / or' approach, appealing to only one aspect of human behaviour, thereby failing to consider other important psychological processes. Unsurprisingly, on the whole, evaluations of past public climate change campaigns have been disappointing at best (Steg, 2008; O'Neill and Hulme, 2009).

Figure 1 illustrates that in order for communication to be *persuasive*, it should take into account the interrelation between cognitive, experiential and normative influences on behaviour. Recent experimental evidence supports this notion. For example, Dolan and Metcalfe (2012) comment that little is known (empirically) about the interaction between social norms and basic information provision. Based on a large-scale energy conservation study, the authors conclude that, compared to only using a social norm prime, providing information *alongside* social norm messages is key to the success of behavioural change interventions - as it doubled the rate of energy conservation (Dolan & Metcalfe, 2012). Similarly, a recent field study by De Groot, Abrahamse and Jones (2013) showed that the *combination* of different normative appeals reduced the use of plastic bags in supermarkets significantly more compared to when the messages were administered individually. It is no surprise that integrating these theoretical dimensions can help guide the practical design of public climate change interventions. To illustrate, consider that it is well documented that human attitudes encompass both cognitive and affective dimensions (Albarracín et al., 2005), especially in the context of climate change (Lorenzoni et al., 2006).

As a result, creating negative attitudes towards climate change draws on the interaction of both cognitive and affective processes. In addition, while knowledge about the potential consequences of climate change has been implicated in achieving behavioural change this effect is enhanced when knowledge about consequences interacts with a feeling of personal and moral responsibility for those consequences (Joireman et al., 2004; Wall, 2005; Bamberg & Möser, 2007). Furthermore, it is important that individuals believe that engaging in the target behaviour is the right thing to do (i.e. *moral norm activation*) but this feeling is more easily elicited when people are under the impression that the target behaviour is also being performed by important referent individuals (i.e. *social norm activation*). Because individual beliefs are often a function of the social group to which the individual

belongs, an informational message is expected to be more persuasive if the right in-group source and context is provided (Mackie, Worth & Asuncion, 1990; Van Knippenberg, Lossie & Wilke, 1994). In sum, recent research is increasingly validating the importance of exploring interactions between cognitive, experiential and normative influences on behaviour.

4.4 Conclusions

The aim of this paper has been twofold. Firstly, to evaluate the theoretical and empirical evidence for three major approaches to public change communication (cognitive, experiential and normative) and secondly, to provide a new communication model that is more likely to effectively encourage the behavioural shifts that climate change necessitates. It is concluded that in isolation, cognitive, experiential and normative approaches are unlikely to induce behavioural change. Instead, a new framework for communicating information about climate change is presented. It is argued that future interventions are more likely to reduce the gap between public communication and behavioural change when public campaigns: (1) effectively integrate cognitive, experiential and normative aspects of human behaviour in their message design (2) make the climate change context explicit and (3) foster a strong link between the behaviours that need to be changed and their psychological determinants.

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