Connecting Rather than Confusing: Climate Change Communication

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Abstract

In the context of increasing focus on sustainability and climate change issues, we provide a critical analysis of policy assumptions regarding information provision and its links to behaviour change. We identify a number of barriers to effective communication that must be overcome before behaviour change interventions can be implemented.

Introduction

Sustainability and climate change pose major challenges to current lifestyles (Peattie & Peattie, 2009). It is suggested, furthermore, that "the world has three choices in dealing with climate change: mitigation, adaptation and suffering" (Moser, 2012: 165). Human activity has disrupted ecological systems; continued pursuit of economic growth based on exploiting finite resources is unsustainable and '*avoiding dangerous climate change will require lifestyle changes'* (Gowdy, 2008: 64). "Curbing consumer demand for energy through behavioural interventions is an essential component of efforts to reduce greenhouse gas emissions, particularly in the short term" (Carrico & Riemer, 2011: 1). While the potential effects of climate change and the need for sustainability are widely but not universally accepted, there is a lack of clarity and clear communication of what action should be taken and by whom. Policy makers assume, without evidence, that 'spillover effects' will occur, i.e., small behaviour changes will lead to larger change and catalysts for other changes, but there is evidence that this does not automatically occur and that doing one pro-environmental behaviour may be seen as compensating for other environmentally detrimental behaviours (Corner & Randall, 2011). These authors note the expectation that social marketing interventions will be employed to address climate change challenges. We discuss the factors that should be taken into account in designing effective sustainability and climate change adaptation interventions.

Attitude-behaviour gap and the Deficit Model of Information Provision

While lack of knowledge (i.e., 'information deficit') is cited as causing misconceptions and apathy (Owens & Driffill, 2008) and is therefore suggested as an impediment both to attitude and to meaningful behavioural change (Semenza et al., 2008) a gap between reported attitudes towards environmental issues and actual behaviours is well documented in the literature (Ockwell et al., 2009). Attitudes are multi-factored and interact with a number of other key factors in influencing behaviour, especially norms (Fishbein & Capella, 2006), and self efficacy (Fishbein, 2008). However, attitude change alone is unlikely to be effective in achieving sustained behaviour change as focus on individual voluntary change ignores social, environmental, structural and institutional barriers to behaviour change (Ockwell et al., 2009). Behaviour change, or lack of it, may be driven by factors other than attitudes; for example, financial constraints Lorenzoni et al., 2007). Kollmuss and Agyeman (2002) suggest that external incentives can encourage attitudes to become actions. A further barrier to change may also be a perception that changing one's own behaviour will not make any difference to the impact of climate change (Semenza et al., 2008).

The weakness of the 'information deficit' model in terms of failure to recognise the complex interaction of values, experience and other factors in achieving (or not achieving) successful and sustained behaviour change is discussed in the extant literature, together with the

inadequacies of many current theories in capturing and charting the interaction of these factors across different population groups (Lorenzoni et al., 2007). The way that climate change science is communicated has been criticised, with the suggestion that current strategies result in "islands of knowledge in a sea of ignorance" (Meinke et al, 2006: 101); there is a need for salience, legitimacy and credibility to also be considered in communicating climate change science. Other factors that makes comprehension difficult for those who lack specialised scientific knowledge include:(a) the invisibility of climate change causes; (b) a tendency to discount the impact of distant events; (c) lack of immediacy; (d) disbelief about the impact of people overall and the efficacy of any individual action; (e) uncertainty; (f) perceptual limits; and (g) self-interest (Moser, 2010). Furthermore, there are counter messages being distributed by interest groups who are promoting 'climate change Scepticism'. Climate change denial messages, communicated largely through the mass media, have been found to lead to developing attitudes on the issue (Boykoff and Boykoff, 2007).

This presents several challenges. News media tend to be alarmist when reporting climate change topics and magnifies issues in the interests of newsworthiness (O'Neill & Nicholson-Cole, 2009). There is an assumption that the media will provide accurate and uncritical information transmission of 'facts', yet there is evidence from the US of sensationalism, amplification of risks and emotional aspects such as individual cases and speculation on worst-case scenarios (Dudo et al., 2007), thus the media's impact may not always be in line with majority expert opinion or possibly even in the public's overall interest. Of concern in the climate change sector is that there is evidence that "the public learns a large amount about science through consuming mass media news (Boykoff & Roberts, 2007). This alarming in light of analysis of news coverage of climate change in New Zealand which found significant misreporting in 1/6 of stories (Bell, 1994). There is evidence that the media can negatively impact climate change communication by giving equal time to climate change warnings and competing / dissenting views in the interests of journalistic fairness. Such 'even handedness', commonplace in the media (Moser & Dilling, 2004), serves to reinforce perceptions of uncertainty and generates confusion (Boykoff & Boykoff, 2007).

Functional Literacy

A further concern is that material may be provided that is too complex for a substantial portion of the population to understand. For example, the OECD defines functional literacy in terms of whether or not a person is able to understand and employ printed information in daily life, at home, at work and in the community(Nutbeam, 2008). Varying definitions of literacy make cross-study comparisons difficult but there appears to be general agreement that some 20% of the population of most developed countries have severe literacy problems and a further 20% have limited literacy (Adkins & Ozanne, 2005). The 2006 Australian Bureau of Statistics' Adult Literacy and Life Skills Survey gives cause for concern. The five-level assessment of literacy, for which Level 3 is regarded as the "minimum required for individuals to meet the complex demands of everyday life and work in the emerging knowledge-based economy" (ABS, 2006) gives the following estimates (Table 1). There also exists an additional group that could be classed as 'alliterate', in that they are able to read but choose not to, and rely on television rather than print media for news. More importantly, they learn through trial and error rather than by reading instructions (Wallendorf, 2001). The specific needs of these groups must be taken into account, acknowledging their difficulties but avoiding appearing condescending in the design and delivery of appropriate interventions (Guttman & Salmon, 2004).

We evaluated a range of climate change material using the SMOG readability index (McLaughlin, 1969) to determine the reading level. The SMOG index was selected because of its proven accuracy, correlation with other readability formulae and subsequent widespread use in the academic literature (Aldridge, 2004: Wallace & Lemon, 2004; Mumford, 1997).

Table 1: Summary of Functional Literacy Levels Australians aged 15 – 74 years (2006):

Domains Measured	Domain Definition	% with scores falling in the lowest two quintile levels
Prose literacy	The ability to understand and use information from various kinds of narrative texts, including texts from newspapers, magazines and brochures.	46
Document literacy	The knowledge and skills required to locate and use information contained in various formats including job applications, payroll forms, transportation schedules, maps, tables and charts.	47
Numeracy	The knowledge and skills required to effectively manage and respond to the mathematical demands of diverse situations.	53
Problem Solving	goal-directed thinking and action in situations for which no routine solution is available.	70

The method used for the SMOG calculations followed the methodology in the literature. SMOG calculations were calculated manually, three groups of 10 consecutive sentences at the beginning, middle and end of a document were selected, giving a total of 30 sentences. Following this, all words with three or more syllables within these selected sentences were counted and the square root of the total was then calculated and rounded to the nearest integer. Finally, the number 3 was added to the integer to obtain the grade level of the document. We compared manually calculated results with those derived from the internet version (http://wordscount.info/wc/jsp/clear/analyze_smog.jsp.) and found no difference between them. SMOG measures only the likely reading level required for comprehension of the material and not other aspects such as readability and suitability which could be assessed using other tools such as the Readability Assessment Instrument (RAIN) (Adkins, Elkins & Singh, 2001) or the Suitability Assessment of Materials measurement (SAM) (Doak, Doak & Root, 1985) but which are beyond the scope of this paper. It should be noted that the average adult reading skill level is 3 - 5 grades below the level expected at the end of formal education (Shea et al, 2004) as those who do not read regularly lose reading skills. Grade 12 relates to the end of High School with 15 representing a Bachelor's degree.

As can be seen from Table 2, official climate change reports are written at a level that is likely to be comprehended only by those with postgraduate qualifications. News items are also written at a level above that of a large percentage of the population – who therefore may skim the headlines and draw conclusions that may not be consistent with the actual body of the article. By contrast, climate change sceptic blogs are written at a level that is within the capacity of most of the population.

Table 2: SMOG reading level scores for the range of climate change reports, mass media coverage and web-based information assessed.

Material	SMOG
Cleugh, H., Smith, M. S., Battaglia, M., & Graham, P. (Eds.). (2011). *Climate Change Science and Solutions for Australia*. Canberra: Commonwealth Scientific and Industrial Research Organisation (CSIRO).	18
The Royal Society. (2010). *Climate Change: A Summary of the Science*. London: The Royal Society.	15
Mass Media	
Black, R. (2011). Climate Change Boon to UK Seafood. Retrieved from: http://www.bbc.co.uk/news/science-environment-14930989	15
International Business Times (2011) Deep Oceans Able to Mask Global Warming for Decades. Retrieved from: http://www.ibtimes.com/articles/216223/20110919/deep-oceans-able-to-mask-global-warming-for-decades.htm	13

Climate Sceptic Blogs	
Felix, R. (2011). Glaciers Growing on Mt Shasta. Retrieved from: http://www.iceagenow.com/Glaciers_growing_on_Mt_Shasta.htm	10

The extant research also contains minimal data on how individuals and groups access information and from what sources, whether information is actively sought or passively required through mere exposure to information. There also has not been a thorough investigation into the messages that both climate change scientists and climate change sceptics are sending; this represents a significant gap in knowledge surrounding this social marketing intervention strategy. However, in an examination of the gap between environmental knowledge and behaviours the contrary messages being delivered through mass communication rather than scientific reports must be considered.

In a review of major frameworks that have been used to explain the gap between environmental knowledge and behaviours, it is noted that "[while] developing a model that incorporates all the factors behind pro-environmental behaviour might neither be feasible nor useful, we do find diagrams that serve as visual aids in clarifying and categorizing such factors helpful" (Kollmus & Agyemann, 2002:256). Behavioural theories provide valuable insights into the potential drivers of, and barriers to, behaviour change but are of limited assistance in developing communications strategies: "Behavioural theories do not tell us how best to design messages so that they will be attended to, accepted, and yielded to. We would argue that this is the role of theories of communication" (Fishbein & Capella, 2006: S14) .

This presents a challenge as traditional communications theories and models such as Hierarchy of Effects models no longer offer complete explanations of communication processes (e.g., AIDA, originally developed a century ago in the personal selling domain) (Barrry & Howard, 1990). Later models such as DAGMAR (Defining Advertising Goals for Measured Advertising Response) (Colley, 1962) expanded AIDA to include additional steps, i.e., Awareness, Involvement, Comprehension, Conviction and Action. These traditional models were developed within an advertising context and predicated on marketer originated and controlled one-way information flow, and became prominent during an era in which mass media were dominant and the prevailing belief, particularly in the USA, was that advertising was a strongly persuasive force and people passive recipients of communication messages.

Consumers no longer use individual media, but rather multiple media simultaneously (Ewing, 2009). Furthermore, consumers - rather than behaviour change intervention developers - integrate messages from numerous sources and may incorporate material such as word-of-mouth, news stories and other non-marketer originated material as well as personal experience and situational factors (Finne & Gronroos, 2009). Intervention developers face the implications of a communications environment in which they no longer control all communications. For example, within social networks, marketers cannot control the direction or outcome of discussions; anyone can post opinions and readers may find it difficult to judge factors such as credibility (Campbell et al, 2011). Behaviour change messages do not occur in isolation, but instead are subject to a range of competing messages and social encouragement or discouragement (peer and family influences, perceived and actual behavioural norms).

The aim of intervention communications is to increase the strengths of beliefs that will increase positive behaviours while reducing the strength of beliefs that promote negative behaviours (Fishbein & Cappella, 2006). A key factor that needs to be considered in terms of facilitating effective communications is whether messages are framed in terms of potential losses or gains to an individual; conversely, factors such as reactance, unrealistic optimism

and risk denial are significant barriers to behaviour change. No one single framing approach is applicable across all intervention types. In low-involvement conditions positive messages appear more effective, whereas the reverse is true for high-involvement conditions (Donovan & Jalleh, 1999). The uncertainty of climate change impact (Adger et al., 2009) means that the outcomes of individual actions are also uncertain; people are reluctant to act in response to information that contains ambiguity or uncertainty (Morton et al., 2011). While positive framing fosters greater self-efficacy, in health contexts it can have a boomerang effect if the message conflicts with pre-existing knowledge, attitudes and beliefs (Wolburg, 2006). We are unable to locate any studies that have tested for these effects within climate change /environmental contexts. Those who respond positively to fear-based interventions are better educated and more affluent, and are better able to respond to persuasive messages (de Hoog et al., 2005). Fear appeal effectiveness may erode over time or lead to heightened anxiety and many *unintended* effects of interventions are attributable to such appeals (Guttman & Salmon, 2004). For climate change and environmental protection messages, fear is effective only when they convey *personal* relevance and a sense of *personal* vulnerability.

Communities themselves may vary widely in terms of their ability to adapt to change (Ivey et al., 2004), with some authors suggesting classifications ranging from 'powerless spectators' who lack capacity, skills and resources, through 'coping actors' who have the capacity to adapt but who may not be doing so effectively, to 'adaptive manager' communities who have high levels of both adaptive and governance capacity (Fabricus et al., 2007). The most effective methods of assisting communities to achieve adaptive manager status are not clear, although the capacity for social learning has received some discussion (Ison, 2007).

Conclusion

Before an understanding of how to improve sustainability and climate change adaption interventions can be made it is necessary to improve understanding of: (a) the content of messages being sent by both the climate change lobbyists and those promoting an adaptation approach, (b) how these messages are accessed and synthesised, and (c) how to reduce the complexity of the messages being sent by the climate change advocates. This will inform advice on how to recast climate change adaption interventions. This is the next step in our research.

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