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Psychology's Essential Role in Alleviating the Impacts of Climate Change

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Climate change is occurring: where is psychology? The conventional wisdom is that amelioration of the impacts of climate change is a matter for earth and ocean science, economics, technology, and policy-making. This article presents the basis for psychological science as a key part of the solution to the problem and describes the challenges to this both from within psychology and from other points of view. Minimising the personal and environmental damage caused by climate change necessarily is a multidisciplinary task, but one to which psychology not only should, but must contribute more than it has so far.

Keywords: climate change, role of psychology, Canada

By now, the issue of whether or not climate change is occurring has been resolved for quite some time, and the fourth report of the Intergovernmental Panel on Climate Change (IPCC), in November 2007 has reiterated its conclusion. It is happening. Some may wish to debate the relative extent of natural and human causes of the change, but little doubt exists that human activities have been, and continue to be, one important force driving climate change. One can imagine that climate change might have some positive consequences for some people in some places, but according to many experts, climate change already is having, and will have many more, negative consequences for many people in many places.

The present thesis is that psychology, in concert with other disciplines, has an important role to play in easing the pain caused by climate change. Were this thesis widely recognised, the present article would be unnecessary. Unfortunately, the thesis is not broadly acknowledged. Anecdotally, I can report that I sat through a recent meeting of scientists from a variety of disciplines concerned with climate change and heard a leading natural scientist state that the large interdisciplinary grant proposal being discussed should not include any input from "fluff," by which he apparently meant the social sciences. More formally, the emerging discipline of sustainability science, clearly a first cousin to climate-change studies, has been advocated and defined by some authors (e.g., Clark & Dickson, 2003) without the slightest reference to possible contributions by psychologists. Are these assertions and omissions justified?

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A Bit of Background

Each person on the planet, whether as an individual or as part of an organisation, curates a stream of natural resources that are converted into products; the conversion process often creates greenhouse gases. Thus, as psychologists have long recognised, the fundamental unit of analysis for the human-caused portion of climate change is the person (Ehrlich & Kennedy, 2005; Gifford, 1987). Thus, ultimately, amelioration of that part of environmental problems such as climate change over which we have some potential control occurs at the individual level (Clayton & Brook, 2005).

Psychologists have long been concerned with individuals' behaviour that contributes to climate change.[1] In particular, environmental psychology, a child of 1960s idealism, was conceived to solve environment-related problems through scientific evidence-based research. Research on energy conservation and other environmental problems has been going on for 35 years (e.g., Buckhout, 1972; Pallak & Cummings, 1976; Seligman & Darley, 1977). Derived in part from Kurt Lewin's mantra that nothing is so practical as a good theory, it has always been an approach that seeks to combine quality research with applications aimed at personal and organisational change. In doing so, it has developed a wide range of theories, models, and principles that can be used to design action research techniques for changing behaviour (e.g., Bechtel & Churchman, 2002; Gifford, 2007). A stream of special issues in journals on environmental problems has appeared since the 1980s (see Vlek & Steg, 2007, for a list), and they are the tip of an iceberg that includes hundreds of individual journal articles. In 40 years of existence, environmental psychologists have developed an extensive toolbox of ideas and techniques (e.g., Bechtel, Marans, & Michelson, 1987). They are based on hundreds of articles published in its two primary journals, the *Journal of Environmental Psychology* and *Environment and Behaviour*, and

[1] Ironically, this probably precedes the concern for climate change on the part of most of the 2000 or so natural scientists whose work was used by the Intergovernmental Panel on Climate Change, and thus basked in the shared glory of the 2007 Nobel Prize, with the notable exception of Al Gore himself.

numerous allied journals, which form a very extensive information base for designing programmes and solutions to a variety of problems (Gifford, 2002b), including sustainability problems.

So Why Then Has Psychology Not Been a Climate-Change Player?

Discourse on climate change in the media and amongst policy-makers is virtually silent on the role of psychology. The conventional wisdom in the wider world of climate-change thought is that psychology has no important role to play. Why?

First, we must lay the blame in part on ourselves. Psychology, in general, has been accused of ignoring the environment by treating people as if they existed in a vacuum (nicely embodied in the blank four walls of the labouratory). As noted by Kidner (1994), the psychological scientist too often "perpetuates and legitimizes a world view in which the individual is seen as separate from the environment" (p. 362). Even environmental psychologists have largely kept their focus on individual-level influences on environment-related behaviour: values, attitudes, motives, intentions, goals, social comparison, habits, and similar constructs. We have left the making of connexions between these constructs—which *are* important, and policy—which is essential—to others. We write in our discussion sections that "someone" should take into account these important findings of ours. However, unfortunately, for the most part policymakers and natural scientists do not read our discussion sections. This is one reason sustainability science can be defined without reference to psychology.

Second, the kind of effort needed to combat the consequences of climate change do not suit the academic context in which most established psychologists work. In this forum I need not elaborate on the ways and means needed to find an academic position, earn tenure, and win grants: usually it is to conduct many parametric experiments in labouratories with those handy introductory psychology students. This is not to blame graduate students and young PhDs who find themselves in this situation: the levers to success were not created by them.

Third, most policymakers in ministries and departments concerned with environmental problems were not trained in the behavioural sciences. Reser and Bentrupperbaumer (2001) estimate that functionaries in resource-related government agencies and departments trained in the natural sciences outnumber those trained in the social sciences by at least 50 to 1. With less or no social-science experience, these policymakers are unlikely to understand what the social sciences have to offer, and even if they were sympathetic to the idea, they would have difficulty understanding many of the concepts and results. This leads to fundamental misunderstandings of such concepts as values, valuation, and social impacts (Reser & Bentrupperbaumer, 2001). Some excellent but isolated progress has been made toward finding ways for natural and social scientists to communicate (e.g., Miller, 1985), but uneven numbers and inadequate communication and understanding remain serious problems.

Fourth, the role of psychology in climate change has so far been particularly neglected in Canada. Although discourse on the role of psychological science and climate change has been less than robust anywhere, it has at least existed in the United States and Germany (Oskamp, 2000; Schmuck & Schultz, 2002; Stern, 1993), Australia (Reser, 2007), the Netherlands (Vlek, 2000), Sweden (Lundqvist & Biel, 2007), and the United Kingdom (Uzzell, 2007). I am unaware of any substantive previous discussion of psychology's role by a Canadian psychologist concerning the Canadian context. The leading proponent of environmental action in Canada was trained as a geneticist in a fruit-fly lab. How can psychologists expect to be players when we are silent?

The Basis for Psychology's Role

Each person, whether an average citizen or a CEO, has some level of choice and control over sustainability-related behaviours and actions. As Paul Stern (2005) has pointed out, these choices often are heavily constrained by contextual factors and one's own habits. Stern posits a hierarchical set of forces in which structural factors above or external to the individual usually are much more powerful influences on behaviour than individual-level influences.

Although one must acknowledge the power of context, and that Stern's hierarchy often accurately describes environmental behaviour choices, I maintain that individuals truly are the ultimate key to climate-change amelioration: policies, programmes, and regulations themselves do not change anything. For one thing, to be acceptable and efficacious to individuals; policies must be "bought into" by individuals. In short, policy beckons or even commands, but persons accept or refuse its demands. Behavioural change does not occur until this happens.

Many people do resist the temptation to engage in self-serving behaviours that contribute to climate change. Yet, admittedly, many do yield to the temptation. What will it take to change these people's behaviour? As a start—but only a start—understanding environment-related motivations, attitudes, social and organisational perceptions, rationales, biases, habits, barriers to change, life-context, and trust in government will help. Certainly, psychologists are already engaged in the effort on their own. For example, some have investigated the psychological dimensions of global warming (e.g., Dresner, 1989-90; Heath & Gifford, 2006; Nilsson, von Borgstede, & Biel, 2004). However, the major thesis of the present article is that we psychologists must do more.

I do not wish to argue that environmental psychology is, or even could be, a stand-alone panacea. For example, Schmuck and Vlek (2003) advocate that we work more closely with environmental scientists. However, I believe that we must work with at least four other groups to be effective: natural scientists, technical experts, policy experts, and local citizens' committees.

Fortunately, environmental psychologists have a history of interdisciplinary collaboration, beginning with geography and architecture, embodied in the collaborations between Robert Sommer, Humphry Osmond, and Kiyo Izumi in 1950s Saskatchewan (Sommer, 1983), or between Raymond Studer and David Stea in the United States (1966). More recently, and more pertinent to current concerns, fruitful collaborative work is being done in sustainability research (e.g., Schoot Uiterkamp & Vlek, 2007), including some collaborations that represent new bridges. Schoot Uiterkamp and Vlek (2007) describe five instances of collaborations, and their account is particularly valuable for its advice about the practicalities of engaging in multidisciplinary studies. This collaboration trend has been influenced, one suspects, by policies at national and international grant agencies that, for better or worse, virtually require interdisciplinary collaboration. In terms of influencing policy, collaborative efforts not only have "face credibility" based

on the very breadth of their approach, but also success that is legitimately based on the increased validity of policy suggestions that emerge from studying a given problem with multiple valuable perspectives.

Gattig and Hendrickx (2007) bring perspectives from economics and behavioural decision theory into the mix. Discounting, the tendency to reduce the importance of an outcome with greater "distance" (temporally, socially, geographically, and probabilistically), is seen to be an important component of thinking about sustainability-related thinking. Fortunately, environmental problems appear to be less subject to discounting than some other matters. Although they incorporate some concepts from economics, Gattig and Hendrickx demonstrate why using those concepts in the same way that traditional economists do could lead to ineffective policies (cf. Stern, 1986). "Rational" discount rates are not the same as those of the publick which, to its credit, seems to discount environmental impacts less than in other domains. This helps to illustrate why other disciplines need psychology as much as psychology needs them.

Turning the policy issue upside down, some psychologists are examining the effects of policy strategies, as opposed to conducting studies that they hope will inform policy. Jager and Mosler (2007) are amongst those who use modeling to understand the outcomes of different policy choices. This form of active modeling offers the attractive advantage of trying out various policies before they are implemented and understanding why they might or might not work, thereby potentially avoiding expensive mistakes in policy-making. As Jager and Mosler point out, modeling can also be used to train policymakers. The very act of modeling encourages the idea that many policy alternatives exist, when often only a few may occur to a policymaker.

Technosalvation?

Technology is often promoted as the solution to many problems, including those related to climate change. Amongst these are biofuels, wind power, and solar power. Suspicion about the value of technology (e.g., Frank, 1966; Osborn, 1948) is longstanding and is justifiable in part. For example, growing biofuels requires the use of pesticides, reduces biodiversity, creates atmospheric pollution when burned, and has already caused large increases in food prices. Wind power creates noise, kills many birds, is unsightly, and negatively affects the rural lifestyle. Solar power requires the manufacture of photovoltaic cells, which creates a waste stream of cadmium, lead, and other heavy metal by-products. The downside of technology (pollution, health impacts, landfill contributions, accidents, energy consumed in production, and impacts on flora and fauna) is often overlooked in the touting of its benefits. As just one example that is not widely recognised, air pollution kills about 800,000 people each year (Kenworthy & Laube, 2002), and most air pollution is caused by technology in one form or another.

Of course, technology has another side to it, and as Midden, Kaiser, and McCalley (2007) clearly show, psychological scientists must deal with it because it is very unlikely to go away. It will not disappear because, despite its negative effects on people and the environment, it undoubtedly has improved the quality of life for millions of other people, particularly when one thinks in terms of decades and centuries past (Simon, 1981). Assuming individuals have the motivation and appropriate skills, technology can assist in the goal of reducing greenhouse gas emissions. However, Midden et al.'s (2007) quite valid point is that the mere introduction of some new technology does not guarantee that it will be accepted and used by citizens, or that further investigation will not reveal that the cure is worse than the disease. Thus, policies aimed at facilitating the use by citizens of salutary technology must be encouraged, and the basis for such policies lies with research by environmental psychologists, who have the tools to understand why, whether, and when technology is accepted or not by citizens.

Three Models and Some Other Contributions of Psychology to Policy

Environmental psychologists share an interest in modeling with scientists in some other disciplines. The value of models is that they postulate relations amongst key influences and help to represent complex systems in understandable ways. They can stimulate investigation of the properties of the system and suggest predictions of future outcomes.

One such approach, Stern's (2000) values-beliefs-norms model (see Figure 1), postulates that behaviour is determined in part by a causal sequence that begins with deep-seated and quite-stable values, which strongly influence the more-mutable beliefs that one has, which set up the person's behavioural norms.

A second general approach is the social dilemma paradigm, which originated with Robyn Dawes' (1980) seminal article and has been expanded by Charles Vlek (1996). In essence, this paradigm asserts that individuals may act in self-interest or in the

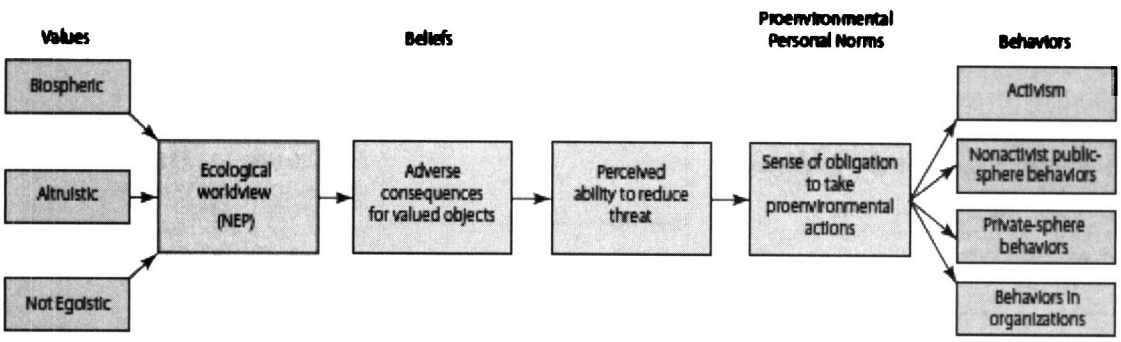

Figure 1. Stern's (2000) values-beliefs-norms model.

community interest; if they are amongst a few who act in self-interest they will prosper, but if many or most people act in self-interest, the environment (and they themselves) will suffer.

For the last several years, I have set myself the goal of integrating the many influences on, and outcomes of, social dilemmas into a coherent and comprehensive model (Gifford, 2002a, 2008). Initially, I considered that influences on proenvironmental behaviour could be grouped into those associated with (a) the natural resource itself, such as its abundance or regeneration rate, (b) the decision-makers, such as their values and experience, (c) relations amongst decision-makers, such as trust and communication, and (d) the structure of the dilemma, such as the rules that govern environment-related actions (Gifford, 1987). Since then, the model has been expanding and relations amongst these categories of influence have been described and investigated (see Figure 2). In a meta-analysis Donald Hine and I (1991) conducted, about 30 different influences could be identified. This gradually led to the attempt to create a more comprehensive and organised model.

The model includes five categories of antecedent influences on a person's decisions, as shown in Figure 2: geophysical, governance (policies), interpersonal, decision-maker characteristics, and problem awareness. These influences are presumed to determine the different strategies or heuristics that individuals as decision-makers actually employ. Finally, two kinds of outcomes may be distinguished: those for decision-makers and their intimates, and those for the environment (the resource itself, the environment in general, and for other people in the community). Each element in the model includes numerous specific influences, which may be

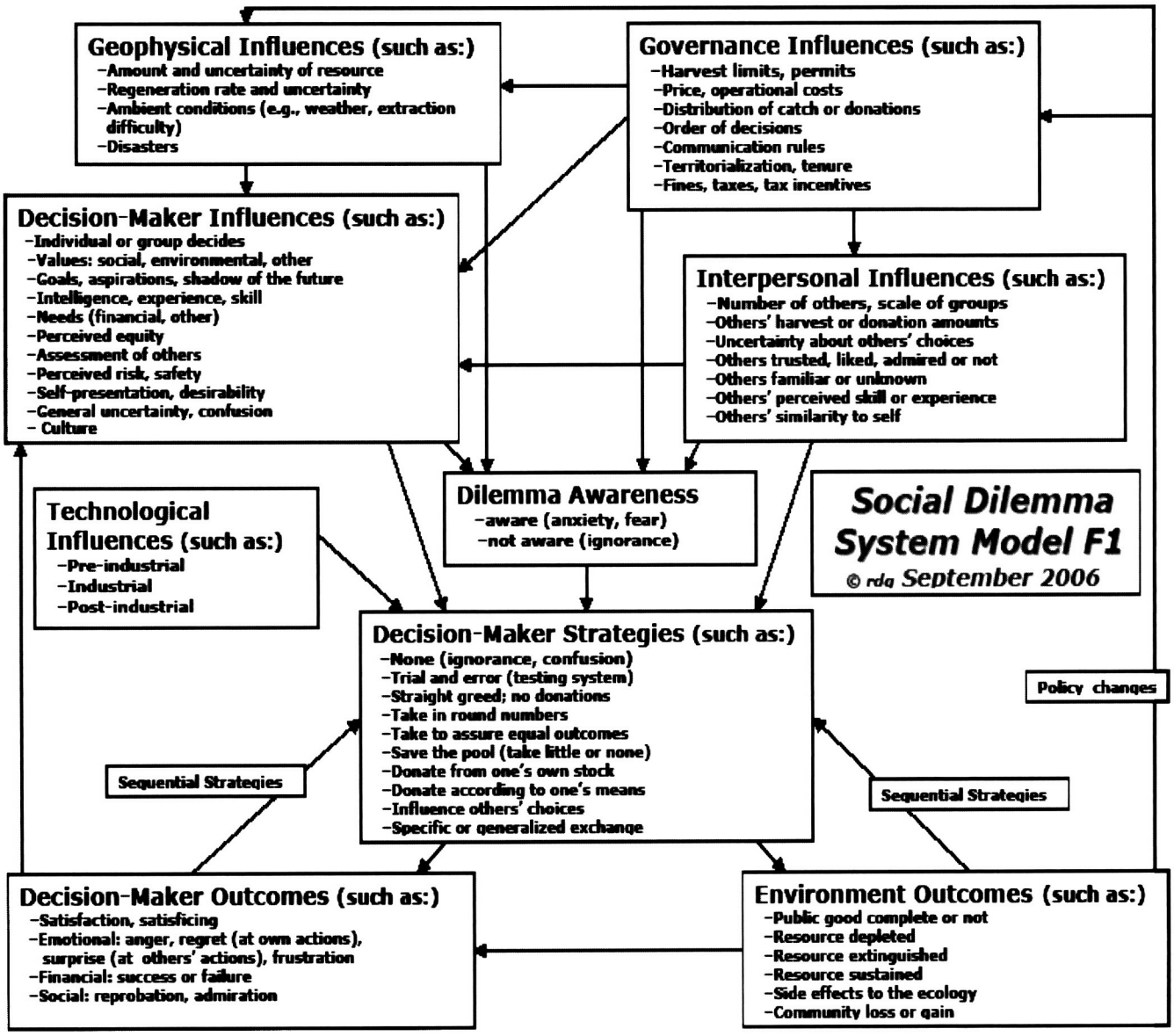

Figure 2. A model of the social dilemma approach to environmental problems that focuses on the decision-making of individuals (Gifford, 2008).

seen in Figure 2. A complete description of these influences may be found elsewhere (Gifford, 2007).

A mere listing of influences and outcomes is fairly straightforward; postulating and testing links amongst them is both more interesting and more challenging. For example, some decision-makers' strategy is geared toward sending a message to other decision-makers; the explicit message of some participants in our resource dilemma studies has been, for example: "Look, I am making sustainable choices, and I want you to do the same." Hence, a causal link exists between decision-maker strategies and interpersonal influences. At the larger social scale, consequences for climate change (environmental outcomes) often are reflected in changes in policies or regulations (governance influences). These hypothesised links between categories, and the conditions under which influence occurs or does not occur, represent the heuristic value of the model. Other direct and feedback links amongst the model's elements could be hypothesised and tested by psychologists, who alone amongst the climate-change players possess the necessary methodological tools to do so.

One recent example of this is provided by the work of Eek and Garling (2008). Social values (decision-maker influences) generally are thought to be associated with cooperative choices in resource dilemmas. One school of thought is that cooperation is actualized by a person's goals or aspirations (another decision-maker influence) that results in maximised outcomes for self and other (decision-maker outcomes). However, Eek and Garling convincingly make the case that a different goal, namely equal outcomes for all decision-makers, often is more influential than the joint maximisation goal. Thus, choices presumably are a function of social values and goals, reflecting the model's implicit assertion that climate-change actions are multidetermined.

Another possibility is that over the course of time, different influences are regnant at different times (Gifford & Hine, 1997). This is reflected in the "sequential strategy" note in the model. Nevertheless, however helpful a comprehensive model might be for visualising the big picture in the model, the challenge for psychologists is to find ways to encourage those influences that promote behaviours that result in less greenhouse gas emissions.

Decision-makers usually are investigated as individuals by environmental psychologists, but in the everyday world decisions are sometimes, perhaps usually, made by groups such as boards of directors or government committees. Groups may be largely unified in their goals and decisions, or not, which opens the door to group dynamics researchers, who often are psychologists. For example, Kazemi and Eek (2008) demonstrate the importance of considering the group as a decision-maker. Group goals (as well as individual goals) can affect the decisions made in the face of environmental problems. Clearly, given the ecological validity of the group as a decision-maker, this is an important direction for research to take. The model's decision-maker influences category obviously must include groups as well as individuals as the decision-makers. Its decision-maker strategies category includes several popular strategies used by decision-makers, and a link is necessary from that category to the interpersonal influences category, thereby postulating that strategies used by decision-makers will influence such within-group factors as trust, admiration, and perceived similarity to self.

The Challenges

Even a sustainability science that does include psychology must deal with several important human-nature challenges. The first is what has been called in other contexts mindlessness (Langer, Blank, & Chanowitz, 1978) or proximal cognition (Björkman, 1984), or what Dawes (1980) described in a more relevant context as limited-processing theory. Each of these constructs broadly asserts that humans often act without much reflection or rational planning. A few years earlier, I reported a little study in which university students were forced to navigate a path through some classroom desks that had been deliberately arranged to be difficult to navigate as they entered and left a classroom. Virtually all the students struggled through the desks, squeezing and turning, but when interviewed afterward, were almost completely unaware of their struggles. Their attention was largely allocated to thinking about the labouratory assignment they were conducting and probably other matters. I called this phenomenon "environmental numbness" (Gifford, 1976).

The notion of environmental numbness probably can be extended to the current climate-change crisis, in that most people, most of the time, simply are not thinking at all about climate change. Instead, they are (understandably) thinking about their work, their friends and family, or the big game. The crucial challenges are to get as many people around the world as possible actively thinking about climate change, and to stimulate informed, evidence-based policy that creates accepted structural solutions, so that greenhouse gas emissions can be reduced whilst the rest of the people march, numb to the environment, through their days.

A second challenging element of the social dilemma is trust, or the lack of it (e.g., Brann & Foddy, 1987; Foddy & Dawes, 2008). When decision-makers remove less of the resource than they could have, or donors make a sizable contribution, many of them are trusting in a norm of fairness and reciprocity that, unfortunately, is not always shared by other decision-makers. Defectors or free-riders sometimes then see an opportunity for personal gain, and by acting in self-interest they harm the climate-change cause. For example, labouratory studies show that stealing from others in the commons is frequent (Edney & Bell, 1984). Lack of trust leads easily to reactance and denial. Read any online newspapers story about climate change, and below it will be comments deriding the scientific consensus that climate change is happening.

Third, a sense of community or group identity is important (Dawes & Messick, 2000). Where it is lacking, and around the globe it is tragically lacking, cooperation in our planetary commons is imperilled. For example, in one lab study, when harvesters thought of themselves more as individuals than as group members, they were more likely to overharvest the resource (Tindall & O'Connor, 1987). Another lab study did suggest that not much is required to create enough group identity to improve cooperation. In it, the only difference between "high-identity" and "low-identity" participants was that the high-identity participants came to the lab and received their instructions as a group (as opposed to singly), yet the high-identity harvesters cooperated more (Samuelson & Hannula, 2001). Unfortunately, given human history and current events, one is forced to wonder about the ecological validity of this encouraging finding. In December, 2007, China was rejecting mandatory emissions cuts because it said that the wealthy nations created the problem (Casey, 2007); this shows that

people can have a strong identity (, e.g., with their nation), but lack sufficient identity with the environment to avoid destructive attitudes and behaviour.

A fourth challenge is that of human aspiration. Before we condemn the defectors and free-riders in our commons, we must confess that self-improvement is an essential part of human nature. This is the motive that Julian Simon (1981) celebrated as the solution to human problems. The "ultimate resource" that he believed in essentially was human ingenuity. When combined with the improvement motive, it has led to all the wonderful inventions that we enjoy today. However, in others, it also leads to venal self-aggrandizement (aided and abetted, of course, by the vast apparatus of persuasion that has been constructed in the modern consumption-oriented society). What to do? Use psychological science to reframe aspiration toward climate-amelioration ends. The other disciplines in sustainability science do not have the tools for this task, so it is up to us.

The fifth serious challenge problem is uncertainty, which can take several forms, such as in the absolute or relative amount of one's greenhouse gas emissions, the intentions of other decision-makers, the number of other decision-makers, the correct cost of a carbon credit, and so forth (e.g., Hine & Gifford, 1997). In fact, uncertainty can be a factor in every part of the model, from uncertainty about geophysical influences to uncertainty about quantitative and qualitative outcomes. For example, if someone drives 100 km in a particular car, it would not be difficult to measure the amount of greenhouse gases emitted. However, uncertainty about the effect of this emission on the atmosphere or whether the driver was wrong to drive at all is not easily decided. In sum, certainty may exist only under highly specific or highly aggregated conditions. For that reason, ecological validity in this area demands more studies of uncertainty in all the categories of the model.

A sixth challenge is that of perceived equity and justice, and the procedures designed to achieve these goals. Probably every researcher in the area, and certainly myself, has heard at least figurative and sometimes literal cries of revenge or anguish from participants who found the actions of others reprehensible. Therefore, justice-related issues cannot be ignored in social dilemma contexts. Four justice systems may be discerned: distributive, procedural, restorative, and retributive (Schroeder, Bembenek, Kinsey, Steel, & Woodell, 2008). Each system may be imposed from above (governance influences), or agreed-upon by decision-makers (interpersonal influences) but then are implemented as rules and regulations, thus creating a link between those two categories. Schroeder et al. (2008) believe that procedural justice systems will be more stable and cooperation-inducing than distributive justice systems, and explicitly argue that although such systems are best created through communication and agreements amongst those most affected (the decision-makers), they should become instituted as structural (i.e., rules and regulations) solutions to the eternal problem of transgressions in the commons. Clayton and Opotow (2003) discuss how justice is related to group and individual identity, and suggest that group identity promotes intergroup conflict, whereas its absence may allow individuals to experience their relation to nature as direct, which should lead to more proenvironmental behaviour.

The seventh challenge is the heavy weight of momentum. Although many people speak of changing their lives, the reality is that many people fail to achieve their goal of altering their behaviour patterns. Habit is not an exciting concept, but it is one important reason for the well-known gap between attitude and behaviour.

The eighth challenge is a widespread lack of a sense of efficacy, or perceived behavioural control. Many are hampered by the belief that they alone cannot change the global situation by anything that they do. Some acknowledge the truth that "every vote counts" without being able to muster the motivation (and often, the increased cost or inconvenience) of changing their behaviour in ways that would help to slow the forces that drive climate change.

The ninth challenge, and a potentially fatal one, is that of population size; this was central to Hardin's (1968) perspective, and current social scientists (e.g., McGinnis & Ostrom, 2008) quite naturally ask whether the often optimistic results obtained by those who work at the small-group level on common-resource problems would apply at larger scales. Of course, this question has been haunting psychologists for many years (e.g., Edney, 1981), particularly when many studies show a decline in cooperation as the size of the harvesting group grows, even in fairly small groups (by societal standards) of 3 versus 7 (e.g., Sato, 1989). Nearly every study of group size has found that behaviour in resource management tends increasingly toward self interest as group size increases. Cooperation declines both as the number of decision-makers rises and as the number of groups within a commons with a constant total membership rises (Komorita & Lapworth, 1982). Good reasons for this are easy to list. As group size increases, the harm from any one participant's greed is spread thinner amongst the other participants: no single other decision-maker is badly hurt. Also, violations of sustainability or failures to donate are often less visible to others in larger groups. In addition, in large groups, the effect of the harm done to other decision-makers often is less visible to the violator (Edney, 1981); it is easier to inflict pain if one does not have to watch the victim experience pain. Finally, negative feedback or sanctions to violators or free-riders are increasingly difficult to manage in larger groups.

The Opportunities and Imperatives

If psychological science is to become recognised as an essential part of sustainability science and as an important player in the struggle to ameliorate the impacts of climate change, it must move toward a more serious engagement with the problem. If we do not, we run the danger of being viewed from the perspective of future citizens as the science that fiddled whilst the planet burned. One can either adopt the pessimistic view expressed by Garrett Hardin (1968) in his famous *Science* article, which most environmental psychologists have implicitly rejected by continuing to try to solve environmental problems, or one can adopt the view expressed in a more recent *Science* piece by Paul Ehrlich and Donald Kennedy (2005) that we "can organise fair and sustainable rules" (p. 563) to solve the problem.

Here is what we should do. First, obviously, we should conduct more research that bears directly on the many problems described above. Probably the central area of psychology for this task is environmental psychology, but we are a small group (about 650 worldwide who self-identify at least in part as environmental psychologists, according to a census I have undertaken this year, with only about two dozen in Canada). Other psychologists can

help: how do people make climate-change-related decisions (cognitive and decision-science psychologists)? How can aspirations be reframed from owning more and more material goods to defining "improvement" as adopting climate-change amelioration behaviours (consumer psychologists)? How can helpful attitudes and lifestyles be more effectively taught (health psychologists)? How is acceptance of change related to the life cycle (life span psychologists)?

Second, we must engage policymakers (Clayton & Brook, 2005). A number of psychologists (e.g., Paul Stern) already are fully occupied in this crucial enterprise, and others have strongly advocated it (e.g., Vlek, 2000), but not enough of us are stepping off campus to do it. Green and green-leaning politicians now exist in much larger numbers in many countries, and these legislators both want and need quantified, substantiated information that they can use to enact more enlightened legislation. "Brown" politicians too should be our targets, perhaps more than green ones. Fritz Steele's (1980) notion of environmental competence includes knowing which political buttons to push, and psychologists have not done much button-pushing on climate change so far. The admirable fad in governments today is "evidence-based" policy (e.g., Davies, Nutley, & Smith, 2000). This new hunger for evidence-based policy is a huge opportunity for psychology, because of our methodological and research experience.

Because much in the way of needed change will occur (or not) at the level of individual citizens, environmental psychology is essential. Psychologists can serve as the key link between individuals—our traditional level of analysis—and policymakers. We can, and should, do the fundamental research on individuals and climate change, assess the acceptability of proposed policy and structural changes, and assess the impact of these changes on the behaviour, well-being, stress, and quality of life of individuals.

Third, we must seek out and interact with the other sustainability science players. We must tell the economists, technologists, and climate modellers what psychology can do. The climate scientists are merely the messengers, the technologists merely make machines, and the economists still think largely in terms of pricing. Without the help of psychological science, these disciplines, although valuable in their own ways, will not be able to ameliorate the impacts of climate change.

Résumé

Le changement climatique est là: Où est la psychologie? Il est communément accepté que la lutte contre le changement climatique est le territoire des sciences de la terre et des océans, des sciences économiques, de la technologie, et des décisions politiques. Cet article présente en quoi la psychologie est aussi une discipline clé pour faire face au problème, et il décrit les défis internes et externes que cette discipline doit relever. Pour minimiser les dégâts causés par le changement climatique à la fois sur les individus et sur l'environnement, les efforts doivent nécessairement émaner de multiples disciplines, et la psychologie peut non seulement s'impliquer bien davantage, mais elle se doit de le faire.

Mots-clés : changement climatique, rôle de la psychologie, Canada

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