
Editors' Introduction to the Special Issue: Behavioural Origins and Solutions of Environmental Problems

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Abstract

With this special issue, *CJBS* joins several journals in focussing on environmental problems and their relation to human behaviours. The six research papers by Canadian researchers in this issue are grouped into three areas: environmentally responsible behaviours, managed resource use, and community problems. An invited essay by the Minister of Environment, the Honourable Sergio Marchi, P.C., M.P., concludes this issue with a call for psychological research targeted to the needs of policy-makers and legislators. This introduction sets these articles in the context of environmental psychology research, defined as a perspective on psychological research in which the focus is on transactions between people and their physical surroundings.

Résumé

Dans ce numéro spécial, la Revue canadienne des sciences du comportement rejoint plusieurs autres revues qui se préoccupent des problèmes environnementaux et leur incidence sur les comportements humains. Des chercheurs canadiens nous y présente six rapports de recherche dans trois domaines connexes : les comportements attribuables à l'environnement, l'utilisation de ressources administrées et les problèmes locaux. En guise de conclusion, le ministre de l'Environnement, l'honorable Sergio Marchi souhaite que la recherche psychologique s'oriente davantage sur les besoins des décideurs et législateurs. L'introduction situe ces articles dans le contexte de la recherche en psychologie environnementale laquelle y est définie comme une perspective de recherche axée sur l'interrelation entre les gens et leur environnement physique.

Environmental and social justice issues have been at the heart of environmental psychology since its emergence in the 1960s (Stokols & Altman, 1987). Craik (1973), in the first *Annual Review* chapter describing the field, identified a dozen topics of current interest, of which two (environmental decision-making and public attitudes toward the

environment) directly reflect concern for deteriorating environmental conditions caused by human behaviour. Rather than resting as objective investigators of these problems, environmental psychologists tend also to work as agents of change. For example, Saegert (1987) characterised environmental psychologists as "self-consciously...changing the relationship of people as individuals and in groups with their environments" (p. 99).

Research concerning environmental problems is not confined to investigators who identify themselves as environmental psychologists. In recent years, diverse journals have published special issues in this domain: *Journal of Environmental Psychology* (Gifford, 1995); *Environment and Behavior* (Cope, 1995), *Journal of Social Issues* (McKenzie-Mohr & Oskamp, 1995), *Psychology and Marketing* (Unnava, 1994), and *Counseling Psychologist* (Howard, 1993). This special issue of the *Canadian Journal of Behavioural Science* on "Behavioural Origins and Solutions of Environmental Problems" highlights Canadian research on environmental problems.

This editorial introduction presents the context for this set of papers in the broad domain of environmental psychology and in the context of research and public policy debates concerning environmental problems. One of our goals for this special issue is to create links in the literature between closely-related topics whose investigators, nonetheless, appear unaware of one another's work. It is our hope that this will lead to more widespread interest in researching environmental problems among psychologists generally, and to more effective applications of this work outside the disciplinary bounds.

Scope of Environmental Psychology

We define environmental psychology as a perspective on the study of human behaviour in which the focus is on transactions between people and their physical surroundings (Gifford, 1997; Russell & Ward, 1982). Environmental psychologists, often in conjunction with

architects, urban planners, geographers, sociologists, ecologists, and other psychologists, study such diverse topics as aesthetic appraisals, spatial cognition, ergonomics, and environmental dispositions, as well as the applied problems that are the focus of this special issue. Their comfort with multidisciplinary work may, in fact, have contributed to the relative obscurity of environmental psychologists within psychology generally (Stokols, 1995).

Environmental psychology has always incorporated a range of theoretical structures and research methods. Craik (1977) identified six scientific paradigms then in use: ecological psychology, environmental perception, environmental assessment, personality and environment, environmental cognition, and functional adaptation. This theoretical range demands diversity of methods, both quantitative (Marans & Ahrentzen, 1987) and qualitative (Low, 1987), as the need requires. Methods as diverse as psychophysics and experimental social psychology have their place (Baird & Berglund, 1989). More recent developments include contextual and transactional approaches that emphasise temporal, as well as spatial, contextual (Stokols, 1987), and developmental changes in organisms through reciprocal action (Altman & Rogoff, 1987).

Although Stokols noted in 1983 a tendency for paradigm-merging, the field remains polyglot in nature. Stokols (1995) analysed the diffusion of environmental psychology into other parts of psychology and allied disciplines. The subsequent commentary on his analysis illustrates the diverse nature of environmental psychology (Bechtel, 1996; Craik, 1996; Stokols, 1996). Craik (1996) characterised environmental psychology as being at the core of fundamental psychological inquiry; whereas, Bechtel (1996) emphasised its application to architecture and design through post-occupancy evaluation. Stokols (1996) replied that the diversity of their responses underscored his characterisation of the field as diffuse: Environmental psychology blends applied concerns with theoretical advances, but its subject matter is always the interactions of people and their surroundings.

Canadian Contributions in this Issue

This issue does not exhaustively catalogue Canadian psychology research on environmental problems, but the work includes a diversity of topic, theory, and research methods. In that sense, the contents of this issue are typical of environmental psychology research more generally. We have grouped the papers into three categories: Environmentally-Responsible Behaviours; Managed Resource Use; and, Community Problems. The research papers are followed by a summary essay on public policy by the Minister of the Environment, which is discussed below in the section "Research and Public Policy".

ENVIRONMENTALLY-RESPONSIBLE BEHAVIOURS

The dominant model to explain environmentally-respon-

sible behaviours such as recycling, purchasing recycled products, and using public transit, has been the Theory of Reasoned Action (Ajzen & Fishbein, 1977). According to this theory, behavioural intentions initiate actions; attitudes, founded on beliefs, underlie behavioural intentions. General attitudes, however, do not predict specific behaviours (Ajzen & Fishbein, 1977). Thus, attitudes about global environmental problems do not predict environmentally concerned behaviours (Axelrod & Lehman, 1993; Samuelson & Biek, 1991).

Specific attitudes about recycling, however, consistently predict recycling behaviours (Schultz, Oskamp, & Mainieri, 1995). At least with respect to recycling, other consistent predictors of desirable behaviours are convenience or ease, (Brothers, Krantz, & McClannahan, 1994; Lee, De Young, & Marans, 1995; Schultz et al., 1995), public commitment (Lee et al., 1995; Schultz et al., 1995), and prompts (Brothers et al., 1994; Schultz et al., 1995).

Pragmatic reasons underlie a shift in research focus from immediate to longer-term behaviour change. Incentive-based programs, although demonstrated effective in producing behaviour change (Geller, 1987; Schultz et al., 1995), are expensive at the community-wide level. Furthermore, in some cases, economic incentives appear to interfere with existing commitment to environmentally-responsible behaviours (Lee et al., 1995). Thøgerson (1996) argued that over-reliance on theoretical models based on the assumption that personal utility is a prime motivator overlooks the importance of moral beliefs in explaining recycling. His analysis concluded that for the purposes of policy development and environmental preservation, models based on intrinsic motivation and altruistic behaviours offer greater promise.

The two papers in this section take precisely this approach, applying Deci and Ryan's (1985) self-determination theory to the study of environmentally-responsible behaviours. Pelletier, Green-Demers, and Béland (this issue) present the French-Canadian Motivation Towards the Environment Scale (MTES; Échelle de Motivation vis-à-vis les Comportements Écologiques, EMCE). This scale, like its English counterpart, consists of six subscales measuring aspects of intrinsic motivation, extrinsic motivation, and amotivation; the authors report its development and validation, relating the subscales in predictable ways to environmental variables such as conservation, environmental activism, and feelings about the environment.

Green-Demers, Pelletier, and Ménard (this issue) investigate the relationships between the perceived difficulty of environmental behaviours, environmental self-determination, and the occurrence of environmental behaviours. As expected, they report that self-determination predicts environmentally-responsible behaviours. Interestingly, they found that the relationship increases in size with the difficulty of the behaviour. More difficult

environmental behaviours are more likely to occur in intrinsically-motivated individuals. With further development and refinement, this line of investigation holds promise as a new direction for policy development to tackle the most challenging environmental problems.

MANAGED RESOURCE USE

Garrett Hardin (1968) is well-remembered for drawing attention to the similarity between managing Earth's finite resources and the historical problem of shared grazing land. This social dilemma is characterised by higher immediate rewards for individuals if they fail to co-operate, but long-term rewards (or survival) if everyone co-operates (Dawes, 1980). Canadians are familiar with the consequences of failed co-operation in the form of closed Atlantic fisheries, which no longer have cod stocks sufficient to supply the employment needs of Maritime residents.

Dilemma games have been the most popular research approach to commons problems (e.g., Dawes, 1980). These experimental simulations are easy to run in the laboratory, can be computer-generated, and allow a wide variety of manipulations to study the effects of various combinations of rewards for co-operative or competitive responses, information about fellow participants, feedback about resource status, invocations of conscience and norms, and other variables. The central question for human survival is: How can we elicit co-operation, and suppress competition, to prevent overuse of the commons?

In this issue, Gifford and Hine review the literature concerning co-operation using both qualitative and quantitative review methods, and propose an innovative, contextual approach that is consistent with current trends in environmental psychology theory (Altman & Rogoff, 1987; Stokols, 1987, 1995). Gifford and Hine conclude that time and resource context, as well as known individual and group characteristics and dynamics, influence the occurrence of co-operation; for example, co-operation is more likely when information about the resource pool is provided. They propose that researchers should turn to a sequential influence approach and contextual definitions of individual and group harvesting decisions, and they propose new, mathematical formulations of individual and group co-operation that would allow for comparison across studies. This approach would focus on changes in resource-use decisions over time, with experience and knowledge of the resource pool, its status, and group and individual characteristics.

Given the serious consequences of resource depletion, which have no obvious laboratory analogue, laboratory simulations alone are unlikely to give an adequate understanding of commons dilemmas. Hine and Gifford (this issue) offer a laboratory-based demonstration of a novel methodology that might address this limitation, given appropriate samples and settings. Participants in

a computer-generated dilemma game described their ongoing reasoning on audiotape, providing verbal protocols for their behaviour. Grounded theory analyses of these protocols allowed identification of five categories of cognitive and motivational mediators of the resource decisions and information about changing expectancies and cognition over the simulation trials.

These two papers challenge psychologists, proposing new theory and new methods for an old, and as yet unsolved, problem. Grounded theory and its methodology allows the researcher to follow changes in cognition over time in a particularly rich fashion that can generate testable hypotheses for further research of a more traditional nature. Studies of individual and group resource decisions, using sharp measures of co-operation, can improve our understanding of our own resource choices and their cumulative effects in a manner that will help to define sustainable and non-sustainable choices.

COMMUNITY PROBLEMS

Environmental problems can lead to community conflict when interests collide. Complex ethical issues emerge that policy-makers must address. For example, with the closure of the Atlantic cod fishery came the need to find work for thousands of displaced workers whose careers no longer existed. When sides are chosen, political processes engage as sides attempt to maintain their positions in an attempt to influence decisions (cf. Satterfield, 1996). Environmental psychologists have the knowledge and skills to contribute to the resolution of such conflicts (Stokols, 1995, 1996). Such problems have many faces, of which only two are considered in this special issue.

Lavallee and Suedfeld (this issue) use quantitative content analysis to analyse the information campaigns of groups involved in the Clayoquot Sound land-use debate in British Columbia. This issue has attracted the involvement of the logging industry, governments, environmental advocacy groups, and residents of the affected area. During this long-standing debate, conflicts have run high. The content analysis found that the information of all parties was low in integrative complexity, which the authors suggest might contribute to the difficulty of resolving such a multifaceted problem. With little overlap in values or motivation between involved groups, there is less opportunity to jointly discover innovative solutions, and more scope for disagreement and hostility. Development of a database incorporating such analyses for a variety of resource conflicts would permit systematic tests directed at identifying factors predictive of successful conflict resolution.

Nuclear waste siting, the focal issue for Summers and Hine (this issue), is another emotional issue that involves choices between employment and environmental preservation. In the case of logging, there is little immediate risk of personal harm, but a longer-term (and more uncertain) risk associated with deforestation. In the case

of nuclear waste, personal risk to health complicates the community decision about whether or not to accept a nuclear waste disposal facility that would provide continuing employment. The ethical implications of the actions of regulatory agencies are of particular concern to these authors. Monetary compensation has little effect on the acceptability of nuclear waste; but regulators might attempt to tip the balance by increasing the economic rewards of accepting the risky alternative.

As Summers and Hine (this issue) observe, disposal of nuclear waste is essential, not optional. However, public concern about the consequences of exposure to nuclear radiation may be disproportionate to the risks. Both for ethical and pragmatic reasons (funding for monetary compensation is another non-renewable resource) rational means to evaluate risks and benefits are needed, as are communication strategies to present such risk-benefit analyses to citizens.

Such strategies will succeed to the extent to which the source of the information is trusted and the information is believed to be reliable; otherwise, it is not irrational for citizens to view the risk as unacceptable (Wandersman & Hallman, 1993). As the two papers in this section illustrate, psychologists have roles to play in understanding public perceptions of risk and in understanding and, ultimately, in managing intergroup relations to prevent conflicts and encourage the development of solutions to environmental problems.

Research and Public Policy

There is little question that human behaviours have environmental consequences. Consumption of non-renewable resources and overconsumption of renewable ones leaves less for future generations. Fossil fuel combustion in industrial processes, electric generation, and transportation causes the increased levels of ground-level ozone, sulphur oxides, nitrogen oxides, carbon monoxide, and particulates commonly known as "smog". Chlorofluorocarbons in the upper atmosphere lead to chemical processes that destroy ozone; diminished stratospheric ozone allows greater transmission of solar ultraviolet radiation.

To most readers, it probably seems that the environmental news is getting worse. Indeed, as this issue goes to press, record flooding of unprecedented proportions in Manitoba's Red River Valley has caused the evacuation of some 20,000 residents and threatens parts of the City of Winnipeg. News reports chronicle threats to such Canadian symbols as the loon (threatened by mercury poisoning) (Mittlestaedt, 1997), and British Columbia forests (threatened by global warming) (Pynn, 1997). Arctic ozone levels reached record lows in the winter of 1997 ("Ozone levels", 1997), despite sharp reductions in chlorofluorocarbon use. Nor are the threats limited to remote regions and other species. For example:

"It started with one of the longest winters on record, lasting from Halloween 1995, to early April 1996. Then the summer saw baseball-sized hailstones pound Winnipeg and Calgary in mid-July just before the heaviest rain-storm in Canadian history brought devastating floods to the Saguenay region of Quebec. Tornadoes, as if inspired by the Hollywood movie *Twister*, touched down in southern Ontario, Saskatchewan and Alberta, causing injury and millions of dollars of property damage, and Hortense was the first hurricane to hit land in Atlantic Canada in 20 years....'Wet, cool and extreme' are the words Phillips uses to describe the past year and though he says he can't make a direct link, this could be a sign of climate change caused by global warming. (Duplisea, 1996).

Natural disasters have widespread effects that ripple through the economy. For example, winter flooding in the midwestern United States and in western Canada could delay spring planting, which might result in lower yields for the 1997 crop. This possibility has already raised wheat prices on commodities exchanges ("Flood threat", 1997). Higher wheat prices can lead to higher prices for meat and other grocery items. The insurance industry also feels the effects of natural disasters. In Canada, claims for damages resulting from natural disasters in 1996 have reached unprecedented levels ("Disasters hurt", 1997; Yellin, 1996). These insurance claims enable people and businesses to rebuild what was lost; but such experiences may leave insurers wary of bearing such risks in future.

Despite these and many other news reports, citizens might feel comfortable dismissing environmental news as normal events reported with a dire slant. The link between carbon dioxide emissions, increasing atmospheric temperatures, and weather patterns is unproved because meteorological models have been unable to predict cloud activity (Cole, 1996). This leaves readers, and policy-makers, with the hope that fears of ecological collapse will prove ungrounded.

To counter this uncertain optimism, some scientists are calling for bold action. At the 1997 convention of the American Association for the Advancement of Science, its president and other scientists said "that the world's scientific community, governments and the public must act quickly to avoid an impending economic and environmental crisis" (Haysom, 1997). They argued that science has failed to co-operate with governments to address environmental problems, and characterised the level of concern among scientists as "indifference". Among the actions that they advocated was the use of economic indicators of the worth of the environment in order to communicate the economic, health, and social consequences of environmental problems, in terms useful to policy-makers.

Whereas some argue that the only means to prevent ecological collapse is a complete overhaul of the con-

sumption practices of developed countries (e.g., Clark, 1995), others argue that our economic system is the best tool for change (Munro, 1997). Critical examination of three ideologies – technology, economics, and religion – led Axelrod and Suedfeld (1995) to conclude that each has contributed to environmental degradation, but also that any attempt to force people to abandon existing ideologies would be futile. They argued instead for an integration of science and folk wisdom in which the hazards of environmental degradation are recognised, and self-interest motivates the adoption of means to prevent such events.

The efforts of scientists and engineers begin to mirror this integration. They are proceeding to develop energy-efficient technologies (e.g., Kamal, 1997), power plants fuelled by solid waste (Haneda, 1995), and automated energy management systems for houses (O'Connell, 1994). Only a few instances exist outside mainstream psychology journals in which the psychological contribution to the study is clear (e.g., Beckstead & Boyce, 1992; Mansouri, Newborough, & Probert, 1996). More often, policy analyses discuss the merits and pitfalls of regulation, taxation, and incentive programs designed to encourage the adoption of these technologies (e.g., Hollander & Schneider, 1996; Scheraga, 1994), and sometimes include economic analyses to demonstrate their value (e.g., Kamal, 1997), but do not recognise that they are applying the principles of operant conditioning, persuasion, and attitude change.

Psychologists' limited penetration into the general discussion of environmental issues has many causes. Environmental issues often involve complex technologies that are unfamiliar to behavioural scientists, which implies that psychologists must work in multidisciplinary teams that extend beyond the behavioural or social sciences (Stern & Gardner, 1981; Stern & Oskamp, 1987). The reward structure of academia and the challenge of obtaining research funding also mitigate against psychology research on environmental problems (Stern & Oskamp, 1987). Archer, Pettigrew, and Aronson (1992) reported that severe culture conflict between academic, corporate, and regulatory agency cultures threatened the success of their contributions to programs designed to change energy-use attitudes and behaviours.

Several prominent writers have advocated increased involvement by psychologists in public policy development about environmental issue (e.g., Kempton, Darley, & Stern, 1992; Oskamp, 1995; Stern & Oskamp, 1987; Wandersman & Hallman, 1993), but one voice that is rarely heard is that of policy-makers. In this special issue we take one small step to remedy that situation. In a concluding essay, the Minister of the Environment, the Honourable Sergio Marchi, P.C., M.P. (this issue) challenges psychologists to contribute in four specific ways to the work of engaging citizens in environmental action: improving environmental education; research concerning

the relationships between public policy and individual behaviour; conflict resolution; and, encouraging community participation.

Conclusion

We can offer no simple behavioural solutions to environmental problems. The problems themselves are complex, as are the behavioural antecedents. What is clear, however, is that psychology has much to contribute to the work before us all. Among the challenges is to carry the message far beyond the traditional bounds of psychology or of the behavioural sciences – in Miller's (1969) terms, to "give psychology away" to the general public. In this introductory essay, we have drawn links between areas of research that rarely are cited together. We hope that it, and this special issue, will prove inspirational, provoking a renaissance in Canadian environmental psychology research and application that will be reflected in future issues of the *Canadian Journal of Behavioural Science*.

We would like to express our gratitude to the invited editorial review board, and to Richard Clément (Editor-in-Chief of *CJBS*) and Stuart Hickox (Managing Editor), for their help with the creation and production of this special issue.

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Received and Accepted
May 4, 1997