ELSEVIER

Ecological Economics 32 (2000) 27–41

ECOLOGICAL ECONOMICS

www.elsevier.com/locate/ecolecon

SURVEY

What can be done to reduce overconsumption?

Paul M. Brown [a,b,*], Linda D. Cameron [b]

[a] *Department of Community Health, Medicine and Health Science Campus, The University of Auckland, Auckland, New Zealand*
[b] *Department of Psychology, Division of Science and Technology (Tamaki Campus), The University of Auckland, Auckland, New Zealand*

Received 14 October 1996; received in revised form 22 January 1999; accepted 14 July 1999

Abstract

Overconsumption of natural resources is frequently portrayed as a significant environmental threat. This paper addresses overconsumption from the individual level, discussing the problems associated with identifying overconsumption and identifying general approaches that can he used to reduce consumption. A behavioral approach to understanding resource consumption is presented, with the existing literature reviewed as it applies to this approach. Using this framework, we identify key issues requiring empirical attention and note the important contribution that ecologists, economists, and other behavioral scientists can make in research and intervention efforts aimed at reducing resource consumption. By discussing what is known to be effective in reducing consumption and some questions that remain unanswered, this review aims to assist researchers and those designing intervention programs in developing programs and policies that reflect the behavioral complexities associated with reducing resource consumption.

Keywords: Intervention programs; Overconsumption; Resources

1. Introduction

Overconsumption of natural resources is portrayed as a major threat to the sustainability of the world's environmental systems (Commoner, 1990; Durning, 1992), and calls to reduce consumption levels appear with increasing frequency in the popular press (e.g. Durning, 1991; Schmookler, 1991; Dominguez and Robin, 1996; Montivalli, 1996) and over the airwaves (e.g. the radio shows 'Living on Earth' and 'E-Town' heard in the US). Resource consumption is recognized by social scientists as a critical factor contributing to environmental damage, and previous attempts have addressed ways to reduce consumption of a number of different resources (such as petroleum products or aluminum cans). However, relatively little research has focused on the broader question of how to motivate people to

* Corresponding author.
E-mail address: pm.brown@auckland.ac.nz (P.M. Brown)

0921-8009/00/$ - see front matter
PII: S0921-8009(99)00093-2

alter their lifestyles so that they use fewer resources in general. One likely reason for this paucity of research is that social scientists lack a framework that integrates potential economic, social, and psychological factors contributing to resource consumption behavior. Such a framework is necessary to organize existing knowledge, identify hypotheses requiring empirical assessment, and promote the development of sound interventions and policies for resource conservation.

This paper discusses problems associated with understanding overconsumption of natural resources and advocates the use of a behavioral framework of resource consumption (Stern et al., 1995). Using this framework we identify key issues requiring empirical attention, and note the important contributions that economists can make in research and intervention efforts aimed at reducing resource consumption.

We focus primarily on individual behavior because programs and policies aimed at reducing consumption ultimately must alter the consumption decisions made by individuals. A central tenet of our thesis is that programs aimed solely at altering consumption attitudes or behaviors are likely to meet with limited success. Instead, reducing resource consumption will require a fundamental shift away from self-interested, consumer-oriented values, and toward a prosocial value orientation that motivates efforts to limit consumption in the interest of environmental sustainability and fosters the development and acceptance of economic and social policies aimed at curbing consumption levels. Although many environmentalists agree with the overall goal of promoting a pro-environmental ethic, there is little systematic research regarding methods for instilling such shifts in social values. Using the proposed behavioral framework, we identify the role of social values in determining consumption behavior, the conditions for promoting a shift towards pro-environmental social values, and important issues requiring empirical attention.

We begin in Section 2 with a discussion of the difficulties in defining and identifying overconsumption. Emerging from our discussion is an identification of overconsumption as a common pool resource dilemma with several unique characteristics. Section 3 then discusses several tactics for resolving this type of resource dilemma and the critical role of social values in determining their success. Section 4 and Section 5 describe consumeristic value orientations and prosocial/proenvironmental value orientations within the context of a behavioral framework of consumption behavior. This framework identifies the different socio-political and psychological levels of factors influencing consumption behavior, and illustrates how initiatives aimed at reducing consumption levels will vary in their impact depending on the level at which they effect change. Based on this framework we propose that interventions promoting prosocial value orientations will be most effective in reducing resource overconsumption. Section 6 considers the implications of the framework for empirical research and intervention programs aimed at reducing consumption. Important issues facing future research efforts and the collaborative roles of ecologists, economists and other social scientists are discussed in Section 7.

2. Overconsumption: a definition

Much of the previous literature on overconsumption has addressed the issue within the context of a social criticism of the 'consumeristic society' (Goodwin et al., 1997), in which the primary focus is on challenging the notion that consumption of material goods is a primary method of achieving happiness. Within this context, overconsumption is defined as the excessive use of goods and services arising from a mistaken belief that '...the possession and use of an increasing number and variety of goods and services is the principal cultural aspiration and the surest perceived route to personal happiness, social status, and national success' (Elkins, 1991). Identifying whether an individual's consumption level is excessive would therefore require assessing whether his or her quest for material goods and services will truly lead to fulfillment and happiness.

When discussing overconsumption from an environmental standpoint, the emphasis changes

from the consumption of goods and services to the use of natural resources. Although the two views of overconsumption are related, they are distinct in important ways. For example, people can aspire to achieve happiness through the use of goods produced from resources that are plentiful or the acquisition of goods that use very few natural resources. In such instances, they may overconsume goods and services without overconsuming natural resources.[1] Similarly, people might satisfy subsistence needs through moderate consumption of goods made out of scarce natural resources (e.g. sea turtle soup). In these instances, people do not consume a good at levels in excess of what is needed for subsistence or at excessive levels in misguided attempts to achieve happiness, but their actions still contribute to a significant depletion of the resource.

Determining whether or not an individual's consumption pattern is excessive in terms of overusing natural resources requires an understanding of three issues: (a) the total amount of resources that society should consume within a given timeframe; (b) the individual's share of those resources; and (c) the types and quantities of resources used in the production of goods and services. Each of these issues presents a number of problems, and we will discuss them in turn.

In order to identify the total amount of resources to be used by present society, we must determine the consumption patterns that will be sustainable, with sustainable consumption being broadly deemed as '....the amount of consumption that can be continued indefinitely without degrading capital stocks including natural stocks' (Costanza et al., 1991 p. 8). Determining the sustainable-resource basket requires addressing a number of technical issues such as understanding the inter-linkages within and between ecosystems, identifying the capacity of ecosystems to respond to changes in their environment, and anticipating the future technology by which resources will be translated into final goods and services. It also will be necessary to anticipate the preferences of future generations and to reconcile differences among societal members as to what resources are to be preserved (see Vadnjal and O'Connor, 1994).[2] Because such issues are not likely to be resolved in the near future, the current environment is such that societal members must make their consumption decisions without understanding which resources must be protected or the appropriate consumption levels for ensuring sustainability.

The second issue, determining an individual's share of the resource basket, presents significant problems concerning how to allocate resources to members of society. The prevailing view that problems involving excessive resource consumption are generally associated with the wealthy, industrialized countries (in which 15% of the world's population consumes an estimated 71% of the world's output; World Bank, 1992: Table A.2) reflects an implicit (and justifiable) assumption that the current allocation of resources among members of society is not fair. To rectify this problem, society must: (a) determine the appropriate allocation of resources (e.g. equal distribution or allocations according to monetary resources); and (b) design mechanisms to ensure the achievement of these allocations.[3]

The third issue of identifying resources used in the production of goods and services may seem relatively more straightforward given sufficient at-

[1] Consider, for example, opera singing as a good. People might be seen to be 'overconsuming' opera singing by attending numerous operas in the search for self-fulfillment. Although this situation might be considered an 'overconsumption problem' in that people are seeking external services as a means of obtaining happiness when such services may fail to do so, the services would not significantly reduce natural resources. This example illustrates the difference between high and low resource intensive goods and services.

[2] Some environmentalists argue that the world's ecosystems are so interlinked that all current ecosystems must be maintained. Others, however, argue that some resources are not valued by a significant proportion of society and are not key to a valued ecosystem. Such discrepancies in opinions regarding which resources must be preserved for sustainability are likely to require resolutions in the absence of definitive evidence for or against either position.

[3] The importance of current income distribution patterns from an environmental (as opposed to ethical) standpoint rests with the implications on resource use and sustainability rather than on discrepancies in income per se.

tention from experts. Problems arise, however, in developing ways to enable individuals to determine how his or her use of goods and services impacts on resource depletion. Although some economists argue that prices can control consumption effectively so that individuals need not know such details in order to make purchasing decisions, prices often do not reflect the true resource costs because of the public good aspect of many resources and the failure to take into account the presence of external costs such as pollution.[4]

One way to view overconsumption, then, is as a large, unique form of common pool resource dilemma in which: (a) the size of the pool of resources is unknown; (b) people differ in their access to resources and their preferences for resources; and (c) people must make their decisions about the use of goods and services without a clear understanding of the types and quantities of the resources used their production. Developing acceptable methods for resource allocation will require extensive work by environmental scientists, economists, and other social scientists. Although it is likely such methods will be developed, they may not be available for many years. Until then, society needs to develop consumption strategies that are likely to promote environmental sustainability in the absence of definitive solutions to these problems. Strategies such as adopting simplified lifestyles that involve general reductions in resource use may prove to be the most viable and effective strategies for the near future.

[4] Of course, some economists argue that there may not be an overconsumption problem at all. In a market economy with properly defined property rights, prices will reflect the proper resource usage and income levels will determine each person's allocation of resources. However, the presence of public goods, externalities, and the lack of an existent theorem ensuring that a competitive market will allocated resources in a sustainable manner either within or across generations (Pearce and Turner, 1991) raises the specter that overconsumption is indeed a problem in many parts of the world.

3. Strategies for reducing overconsumption of common pool resources

Characterizing the problem of overconsumption as an overutilization by society members of a shared basket of resources leads us to consider the fundamental dilemma associated with the use of common pool resources: If individuals follow self-interested motives and consume more than their 'fair shares' of resources, then the total stock will be reduced, future consumption will be undermined, and resources are very likely to be depleted. Resolving common pool resource dilemmas thus requires individuals to curb their self-interested motives and limit their consumption in the current time so as to maintain the integrity of the pool.

Researchers from a number of fields have identified a variety of potential approaches to resolving common pool resource dilemmas. One category of approaches aims to preserve resources by restricting access to them. The establishment of property rights, for example, entails assigning ownership to allotments of the resources so that each consumer uses only his or her assigned share. Unfortunately, the difficulties in establishing property rights for a number of resources (e.g. air) means that other tactics for restricting access must be used, including the use of sanctions and penalties for consuming resources beyond specified standards. Considerable evidence suggests that the use of regulations and penalties, when perfectly enforced (i.e. all violations are detected and violators fined), will increase the price of goods and consumers will lower their consumption levels (Plott, 1983; Harrison et al., 1987). Problems arise, however, when enforcement is costly (see Batabyal, 1995). Moreover, experimental studies reveal that although compliance rates improve as the probability of an inspection and penalty levels increase, significant non-compliance is likely to remain even with high penalties (Alm et al., 1991, 1992; Brown et al., 1999).

A second method for reducing consumption is through increases in the costs of resources through taxes or other corrective measures. Attempts at establishing environmentally-based taxation schemes are an example of this type of

approach. Although these price-correcting strategies generally are successful in controlling consumption levels, the difficulties experienced in getting legislation passed and in generating compliance with taxation highlight a basic problem with these attempts to resolve the social dilemma: There must be an intrinsic willingness among societal members to support the goals of the regulation.[5] In effect, public support is required to exact the necessary legislation.[6] Thus, while taxes are likely to be effective, the history regarding the passage of such legislation highlights the difficulties in using corrective taxation.

A third tactic for reducing consumption levels is to persuade individuals to voluntarily limit their use of resources. To date, there is little evidence that such persuasion efforts have effectively reduced consumption levels. For example, efforts to reduce energy consumption through advertisements or mass appeals have met with little success (Syme et al., 1987; Aronson, 1990). Similarly, the success of voluntary compliance programs for firms appears to hinge upon the perceived positive publicity that would accompany such actions (Arora and Cason, 1995), suggesting that their success may rely on their public relations value.

A fourth tactic for reducing resource consumption involves initiatives generated by consumers rather than by regulatory agencies or companies. Consumers can attempt to reduce excessive resource use by staging public boycotts of goods whose production creates overuse of scarce resources. Successful boycotts that have induced landmark reductions in overconsumption or harmful damage to resources include the boycott of tuna manufactured by companies whose fishing practices depleted dolphin populations, the boycott of ivory in order to halt the over-hunting of elephants, and the threatened boycott of McDonald's restaurants over its use of polystyrene food containers. Consumer boycotts, while effective, require considerable efforts to organize and disseminate information to synchronize activities, and even then the success of a boycott relies fundamentally on the willingness and cooperation of consumers.

A final tactic to reduce overconsumption of common pool resources is to enhance communication about resource use strategies among consumers. Empirical research using common pool resource simulations suggests that encouraging communication among consumers about resource use strategies can enhance the likelihood that the common pool resource will be managed successfully (Dawes et al., 1977). Communication may promote successful management of common pool resources by enhancing reciprocity motives, in which individuals who express cooperative sentiments and behaviors are likely to motivate others to reciprocate these responses. Communication can also serve the important function of assuring group members that others are willing to cooperate, as individuals who want to cooperate often fail to do so because they fear others will act self-interestedly and take advantage of them (Brown et al., 1999).

It is important to note that for each of these tactics, success depends upon the consumers valuing the resource conservation goals and being willing to curb their consumption levels for the greater good of the community and the environment. Efforts to reduce consumption levels through penalties and taxation policies have met with limited success because of the lack of public support and significant rates of noncompliance (Sagoff, 1988). Efforts to encourage voluntary conservation of resources, boycotts, or the communication of cooperation in sharing resources have met with limited success because of predominant individual motivations to consume resources in ways that maximize one's own welfare. In effect, in order to be successful all of these tactics require a fundamental shift in cultural value orientation away from self-interested, consumer-oriented motives and toward a prosocial, pro-environmental value orientation that motivates limits on resource consumption. It is for this

[5] This adversarial relationship is evident in theoretical works in which compliance is viewed as a game between regulators and the generators of pollution. See Russell et al. (1985) for a review.

[6] This is especially true when the tax (e.g. a consumption tax) imposes a disproportionate hardship on poor members of society and thus comes into conflict with society's goals for an equitable tax system.

reason that we argue that solutions to the problem of reducing overconsumption will require strategies for changing consumeristic value orientations.

4. Overconsumption and value orientations

Attributing blame for resource overconsumption to a consumeristic value orientation is not new; indeed, environmental leaders have argued vociferously that a fundamental barrier to controlling consumption is a predominant cultural orientation to seek consumer goods as a means of achieving personal satisfaction and happiness (Elkins, 1991; Durning, 1992). The prevalence of this value orientation in the US is underscored by observations that the post World War II economy is structured in such a way that its success is contingent upon the continued consumption of nonessential goods and experiences (Cushman, 1990).

It is at this point, however, that researchers and environmental experts tend to reach an impasse. Difficult questions arise: How do we empirically test the hypothesis that consumeristic value orientations promote resource overconsumption? How exactly do value orientations determine consumption choices? How do we identify potential ways to create shifts in cultural value orientations? Progress in addressing these issues in empirical research requires a theoretical model of the role of value orientations in determining consumption behavior.

Paul Stern and his associates (Stern et al., 1995) have proposed a model delineating the role of social values in guiding general belief systems, attitudes, intentions, and behavior. This model provides a useful theoretical and empirical foundation with which to organize and systematically evaluate economic, social, and psychological factors determining consumption behavior in general, and the role of social value orientations in particular.

Fig. 1 depicts a modified version of their model. As indicated, social institutions (including national laws, market and incentive structures, educational systems, community structures, and social networks) foster the development of specific social values. Examples of social values include values of cooperation, individualism or egoism, altruism, competitiveness, consumerism, and biospheric integrity. These generic values guide the construction of general belief systems or worldviews regarding specific life domains, such as political belief systems or views about the environment. The belief system or worldview provides a picture of 'reality' (Milbrath, 1995) that serves as a filter for new information, thereby channeling and constraining the development of attitudes and beliefs about specific issues (e.g. attitudes about specific political candidates, environmental policies, or products). These specific attitudes determine intentions and decisions to engage in relevant behaviors. Behavioral commitments and intentions also are determined by prevailing social norms (perceptions that family members, friends, respected members of the society, and members of reference groups endorse

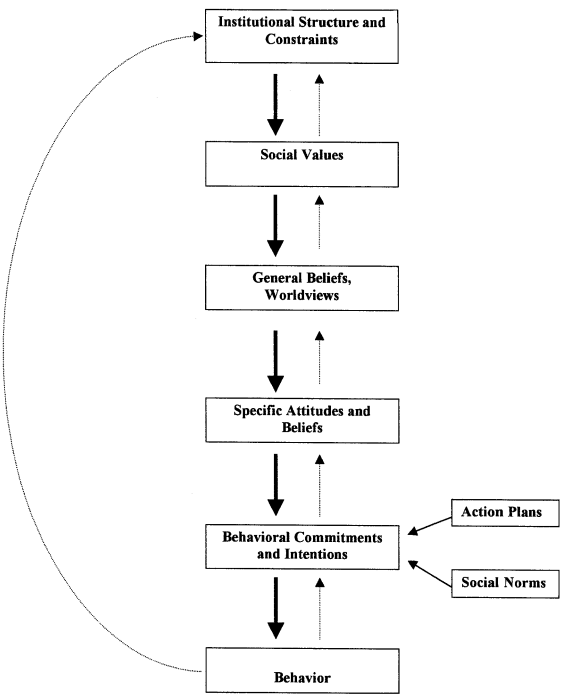

Fig. 1. The roles of institutional structure, social values, worldviews, attitudes, and intentions in determining consumption behavior. Adapted from Stern et al. (1995).

such behaviors; (Ajzen and Fishbein, 1980)) and by the development of specific plans or strategies for engaging in behavior (Leventhal and Cameron, 1994). Behaviors (e.g. voting for tax policies, signing petitions, or boycotting businesses that waste scarce resources) often can significantly alter the structure of social institutions, and these effects then filter on through the system.

According to this model, higher-level structures are more stable, less susceptible to transient influences, and more resistant to change relative to lower-level structures. For example, worldviews are more stable over time and less susceptible to effects as a result of moods, propaganda messages, or social influences relative to specific attitudes. Moreover, higher-level structures have a greater influence on lower-level structures than lower-level structures have on them (this predominant, downward flow of causal influence is illustrated in Fig. 1 by the differences in the boldness of the arrows between levels). For example, a shift in a worldview (e.g. towards a pro-environmental worldview) will have a greater impact on specific attitudes (e.g. positive attitudes toward paper made out of recycled material) than an attitude shift will have on worldviews.[7]

Within this framework, the consumeristic values are seen as molded by the structure and constraints of the prevailing socio-economic system, including the incentive structure reflected by the market and promotional messages. This consumeristic value orientation serves as the organizing principle for a general worldview or system of beliefs regarding ecology and the environment. Milbrath (1995) argues that this worldview is structured according to principles emphasizing economic growth, social power, and control over the social and physical environment. This worldview organizes and guides the development of attitudes and beliefs about environmental issues and consumer goods that favor relatively unrestrained consumption of resources, and these attitudes and beliefs motivate behavioral intentions and actions that promote resource consumption.

4.1. Value orientations and willingness to support consumption reduction efforts

By considering the prevalent consumeristic orientation within the context of this behavioral model, it becomes apparent why individuals often do not support consumption reduction policies. It also helps to clarify why environmental programs promoting voluntary reductions in resource usage generally have met with limited success. These programs generally attempt to motivate consumers to engage in efforts to reduce consumption by changing specific attitudes about issues, such as by advertising the environmental benefits of conserving resources (e.g. the benefits of reducing consumption of fossil fuels and water) or by choosing products made from recycled materials. Although consumers recognize and understand the information about the environmental benefits, these perceptions generally have only a small impact on decisions. Instead, their environmental decisions appear to be determined primarily by perceptions of personal and monetary costs (DeYoung, 1989; Cameron et al., 1998), a pattern that is consistent with a consumeristic value orientation. As Stern et al. (1995) note, these programs will have little long-term impact because they focus on changing specific attitudes and beliefs about individual issues while ignoring the general worldviews, values, and institutional structures that provide the context for these attitudes. Attempts to induce change at either the level of specific attitudes and beliefs or the level of commitments and intentions will fail if such changes are not consistent with the superordinate and more stable world views and general cultural values.

The limited potential of efforts to reduce consumption levels by changing specific attitudes about particular goods or environmental issues is

[7] There also may be important relationships across the levels, and these influences may vary across settings and subject domains. Note, for example, that behaviors can alter attitudes and beliefs under certain conditions (Cooper and Scher, 1994) and that social institutions may constrain behavioral intentions and actions such that individuals may be forced (e.g. by laws or institutional barriers) to act against their values and attitudes (Stern et al., 1995). For the sake of exposition, these and other possible relationships have been omitted from the model and only the most predominant relationships are presented.

also suggested by evidence that there is little coherence in the environmental attitudes and behaviors held by individuals. Studies consistently find that there is little correspondence in the sets of predictors across environmental behaviors; instead, any given environmental behavior is predicted by a unique constellation of specific attitudes and beliefs (cf. Oskamp et al., 1991; McKenzie-Mohr et al., 1995). Similarly, surveys assessing environmental behaviors generally find little correlation among behaviors, such that engaging in one behavior (e.g. reducing vehicular transportation to reduce the use of fossil fuels) is not necessarily associated with other environmental behaviors (e.g. conserving water or contributing to efforts to preserve rainforests), although recent surveys of young adults indicate higher consistency in environmental behaviors (e.g. Cameron et al., 1998). The lack of coherence in predictors of behaviors and among environmental behaviors suggests that many individuals do not possess ecological belief systems that systematically promote environmentally responsible behaviors.

Taken together, this theoretical model and empirical research suggests that interventions aimed at reducing consumption will be most effective if they can bring about higher-level changes in the socio-economic-cognitive system — i.e. by changing cultural values and worldviews. Efforts to reduce consumption need to address ways to promote the adoption of an alternative set of social values and a belief system that incorporates and promotes behaviors that will lead to ecological sustainability and environmental preservation.

5. Changing consumeristic value orientations

In considering ways to promote an alternative value orientation, the obvious question that arises is whether or not these global values can be changed. To date, there have been few, if any, empirical attempts to alter social values as a result of potential ethical dilemmas (e.g. attempting to alter the broad sociopolitical orientations of participants in laboratory studies) as well as to general beliefs that such values might be relatively unmalleable. Clearly empirical explorations of this issue are needed to determine the viability of promoting alternative social values. Nevertheless, it is possible to posit the necessary conditions for changing social values.

5.1. Condition 1: challenging the consumeristic value orientation

One critical requirement for changing the predominant consumeristic value orientation is to challenge and discredit the underlying assumption that utility increases with the number of goods consumed. Although there is a long history of questioning this basic association (see Smith, 1980), breaking the link between consumption and happiness would appear to be a formidable task. Survey research exploring the association between happiness and income (which generally is equated with consumption, although the two constructs are not synonymous) indicates that individuals associate increased income with increased happiness. In fact, when asked how much money (for purchasing goods and services) they would need to be happy, individuals generally report needing an average of twice their current income (Diener, 1984).

Yet the association between income and happiness may be only a perception. Although there is a weak but positive correlation between income and happiness ratings within a country, between-country comparisons typically find no association (Easterlin, 1974). Furthermore, comparisons of happiness ratings across time find that individuals report being no more satisfied now than respondents were 40 years ago even though real incomes have more than quadrupled (Argyle, 1987). This evidence has led numerous researchers to suggest that happiness depends not on absolute income but on relative income: how much one makes relative to their perceived social or reference groups (see Campbell, 1981; Wachtel, 1983; Trainer, 1985). These relative comparisons of income can lead to a 'rat race' mentality in which all community members strive to do better than each other and yet end up working harder with only modest (if any) gains in happiness.

The prevalent perception that income fosters happiness may arise because individuals miscalculate their present marginal disutility of earning income (labor) and the utility they actually receive from the consumer items. Specifically, individuals may not directly compare the relative utility of each state or else there may be negative externalities associated with the consumer items (such as maintenance costs or time expenditures) that are not included in the internal calculation.[8] In either case, the assumption can be challenged by revealing that individuals are actually better off if they lead a simplified lifestyle by working less (i.e. earning less income) and consuming fewer resources.

An alternative tactic to challenging the assumed association between resource consumption and happiness is to argue that investments in nonmaterial consumer activities may lead to greater happiness than would purchases involving extensive use of resources. It is interesting to note, for example, that the correlation that does exist between income levels and happiness appears to arise because income is perceived as increasing access to health care, job security, and financial stability, all of which are associated with greater happiness (Campbell, 1981). These three goals do not necessarily involve resource intensive consumption. Other valued activities afforded by income (such as travel, education, and attendance of artistic and cultural events) often can be undertaken using relatively low levels of scarce resources. Taken together, these arguments challenge the key assumptions underlying a consumeristic value orientation. Whether or not individuals can be convinced by these arguments and how to most effectively structure these arguments in order to maximize their persuasiveness are important empirical issues.

[8] This is the implicit argument made by many advocates of 'voluntary simplicity' (e.g. Dominguez and Robin, 1996) in which it is argued that reducing consumption increases happiness. At present, however, there is little evidence either for or against this claim.

5.2. Condition 2: promoting an alternative value orientation

A second criterion for altering social values is the ability to provide a viable, alternate value orientation that promotes a pro-environmental belief system and, in turn, a willingness to support and adopt both voluntary and legislative efforts to reduce consumption levels. Extensive research on social values and cultural ethics (e.g. Inglehart, 1990; Schwartz, 1992; Stern et al., 1995) reveals that a consumeristic value orientation is not the only ethic held by members of Western societies. In fact, studies indicate a growing trend toward 'post-materialist', altruistic, and ecological values in Western countries that may reflect an alternative value system that promotes simplified lifestyles and lower consumption levels. Although researchers propose somewhat different patterns of values, each research team has delineated two distinctive classes of values among members of Western societies. The first class, called 'materialist' (Inglehart, 1990), 'self-enhancement' (Schwartz, 1992), or 'egocentric' (Stern et al., 1995) values, involve values of wealth, social power, authority, and control and, as such, closely correspond with the general consumeristic value orientation. A second class of values, labeled as 'post-materialist' (Inglehart, 1990), 'self-transcendence' (Schwartz, 1992), 'social-altruistic', or 'biospheric' (Stern et al., 1995) values, include values of nonmaterial goals such as social justice, preservation of the environment, a world of beauty, self-esteem, cooperation, and altruism. This cultural orientation clearly incorporates values for ecological sustainability and preserving the environment, as well as co-operative and altruistic orientations to resolving social and environmental issues. Within this cultural orientation, well-being and happiness would be defined by the quality of environmental surroundings, community and global well-being, social relations, meaningful work, and leisure time rather than in terms of material goods.

Surveys suggest that 24% or more of the US population endorse a cultural ethic that includes the principles identified by this second, prosocial/pro-environmental value orientation (Dunlap and

Van Liere, 1978; Ray, 1996). As noted by Gardner and Stern (1996), this value orientation appears to represent the values underlying the world views (e.g. deep ecology, Devall and Sessions, 1985; ecofeminism, Shiva, 1989; ecotheology, Gelderloos, 1992) being adopted by many in the environmental movement, and it has been found to be significantly associated with pro-environmental beliefs and willingness to engage in proenvironmental behaviors (Stern et al., 1995).

These values also have been identified and found to be associated with behavior in simulated and actual common pool resource dilemmas. For example, research on social values and behavior in social dilemmas has revealed that individuals vary significantly in their social value orientations. Although approximately half of the populations exhibit individualistic and competitive orientations to act primarily in one's self-interest, between 40 and 45% tend to exhibit cooperative and altruistic orientations to act in the interest of the social good (Kramer et al., 1986; Van Vugt et al., 1995). Relative to those with proself value orientations, participants with prosocial values are significantly more likely to act in the interest of the common group in the resource dilemmas (Kramer et al., 1986; McClintock and Liebrand, 1988) and to engage in environmentally responsible behaviors (Van Vugt et al., 1995; Cameron et al., 1998).

6. Implications for reducing resource consumption

The model of consumption behavior and the preceding discussion suggest several key implications for research and interventions aimed at reducing resource overconsumption. These implications point to specific issues requiring empirical attention in order to advance our understanding and development of solutions to the problem of reducing consumption of natural resources.

Fostering prosocial-proenvironmental value orientations may be the most successful means of promoting enduring reductions in resource consumption. Although changing behavior requires that individuals adopt a proenvironmental worldview incorporating beliefs about the utility of resource conservation, we can expect that it will be very difficult to dramatically shift environmentally-related worldviews to this position unless individuals possess the sort of social-altruistic or biospheric value orientation described by Stern et al. (1995). As noted previously, there is little empirical evidence regarding how to change value orientations and so there is a need to develop and assess strategies for doing so.

It is also essential to foster appropriate worldviews about environmental conservation. To do so, it is important to disseminate information regarding environmental principles and values in schools, the media, popular books, and the community at large. As argued by Milbrath (1995), students from elementary grades through the college level lack sufficient education in the basic principles of environmental science, including the need for sustainability and the impact of human consumption on resources and ecosystems. These principles, and the principles of a pro-environmental value orientation, can be further disseminated through popular books, press, and television. These dissemination efforts appear to be gaining momentum, as exemplified by the increasing number of popular books about environmental science (e.g. Wilson, 1992) and environmental ethics (e.g. Durning, 1992). We may expect to observe the following patterns in response to these efforts:

1. People with prosocial and biospheric value orientations will adopt proenvironmental worldviews more readily than will people with consumeristic value orientations. Such a hypothesis may induce a sense of pessimism because efforts to promote proenvironmental worldviews may not instill significant changes in all individuals. However, if recent estimates that 30% of individuals harbor a prosocial-biospheric value orientation are valid then we can expect that a sizeable group of individuals are likely to adopt these worldviews.
2. These worldviews may reinforce and strengthen prosocial and biospheric value orientations (as suggested by the causal arrow from worldviews to value orientations depicted in Fig. 1). As such, interventions aimed at promoting prosocial-biospheric value orienta-

tions may find that these new orientations may be strengthened by the added provision of environmental worldview information.

3. Instilling these worldviews should automatically predispose individuals to adopt favorable attitudes about specific measures and behaviors aimed at reducing resource consumption.
4. Promoting these pro-environmental worldviews should have the added effect of increasing the 'basket of resources' identified by individuals as needing to be sustained. As noted in Section 2, there are considerable differences of opinion regarding which resources need to be sustained and which resources are unimportant and should be allowed to disappear. To the extent that a pro-environmental worldview instills beliefs that the ecosystem involves a complex web of flora and fauna, and that biodiversity is essential for sustainability, then individuals should show an increase in the range of resources that are believed to be important to sustain.

Individuals need specific plans and strategies for reducing resource consumption. As research in other social domains reveals, simple dissemination of information may be sufficient to change attitudes, but it is not sufficient to induce behavioral change (Hines et al., 1987; Leventhal and Cameron, 1994). Individuals also need specific guides and strategies for reducing consumption of resources and for attaining a lifestyle of 'voluntary simplicity.' Ideally, these guides will not only provide realistic and specific suggestions, but they will also use role models to provide salient demonstrations that these techniques are effective and that this alternative lifestyle is, in fact, a satisfying and rewarding one. A recent best-selling book, 'Your Money or Your Life' by Dominguez and Robin (1996), exemplifies this tactic of providing concrete, specific strategies for attaining a simplified lifestyle based on significantly lowering consumption. The authors present the benefits of reducing consumption, including increased leisure time, simplified lifestyle, and opportunities to focus on meaningful activities brought about by the reduction in work time resulting from decreased costs of living, and then outline in great detail a 9-step process for reducing consumption.

Social norms may play a critical role in motivating consumption reduction behaviors. Efforts to persuade individuals to reduce their consumption levels may have the greatest success if they foster effective social norms; that is, if they provide communications that family members, friends, respected members of the society, and members of social reference groups endorse the promoted behaviors. Social psychological research indicates that, across a wide variety of domains ranging from health behaviors to consumer choices, social norms strongly influence intentions and behavior (Ajzen and Fishbein, 1980; Ajzen, 1988). References to social norms, role models, and case anecdotes within the education and guidance materials may significantly promote their efficacy.

Changes in the social structure will have the greatest, long-lasting impact on reducing overconsumption if they clearly influence and promote prosocial-biospheric value orientations. Although there are many potential regulation and taxation policies that can curtail resource overconsumption, those policies that emphasize the goals of resource conservation and the prosocial-biospheric nature of the aims will have a better potential for influencing pro-environmental value orientations. For example, the use of the label 'green taxes' can clearly identify for consumers the purpose of the tax and additional publicity can underscore the social-altruistic and biospheric ethic. An alternative strategy would be to adopt strategies that lessen the promotion of a consumeristic value orientation. For example, sociopolitical efforts to restrict advertisements of consumer goods may effectively curtail the important social influences motivating a consumeristic value orientation (Durning, 1992). The primary goal of advertising is to create and enhance desires for material goods, and advertisements clearly are very successful in doing so. Developing and promoting legislative efforts to restrict advertising in the media and in public domains may help to reduce the relentless barrage of media images reinforcing consumeristic values and beliefs. Such efforts may also reduce consumption motivations because they are reducing exposure to important normative influences in society. By re-

quiring restrictions or modifications in advertising practices, social norms advocating the acquisition of material goods are weakened. These types of pro-environmental changes in institutional and incentive structures can directly influence social values, although the magnitude, timeline, and variations in their effects remain to be determined.

7. Issues for future research and the roles for economists

We have discussed how the proposed model of resource consumption behavior provides a useful framework for integrating social, economic, and psychological determinants of consumption and how the model identifies numerous hypotheses and implications for interventions that warrant empirical assessment. This discussion leads to a consideration of several critical issues facing researchers and a number of important roles for ecologists and economists in empirical and applied efforts to promote sustainable consumption behavior.

Perhaps the most fundamental problem is that of determining sustainable consumption patterns and, in turn, overconsumption behavior. As discussed in Section 2, this determination will require the completion of two important tasks. First, we must resolve the technical questions associated with defining sustainable consumption and identifying mechanisms that will allow individuals to consume goods and services in ways that do not exceed their share of natural resources. To this end, it is important that economists and ecologists continue their research efforts aimed at identifying the inter-linkages within and between ecosystems, the value of ecosystems, and appropriate taxation and pricing mechanisms. Included in these efforts would be the task of identifying the implications of changing consumption patterns on economic growth.

The second task is to resolve debates about which resources should be preserved and what are the appropriate trade-offs between current consumption patterns and those of future generations. Economists and other social scientists can continue to promote these resolutions through research that identifies the different opinions and beliefs held by various social groups and through efforts to delineate positions that are likely to receive public support.

In our discussions of the overconsumption problem, we have emphasized the critical role of social values in determining consumption behavior and the need to change predominant social value orientations. Clearly psychologists and other social scientists should provide guidance into how best to enact these shifts in social values. A critical issue facing these efforts, however, is the problem of determining which specific set of social values should be targeted for change. As noted, writers have identified the need for individuals to adopt non-consumeristic orientations (Elkins 1991; Durning 1992), biosphericaltruistic values (Stern et al., 1995), prosocial value orientations (McClintock and Liebrand, 1988) or postmaterialist values (Inglehart, 1990) in order to promote environmental conservation. Although the definitions of these value orientations overlap considerably, there are important conceptual distinctions that may correspond with significant differences in tendencies to value sustainability and willingness to reduce consumption. For example, the nonconsumerist position endorsed by many social scientists (Goodwin et al., 1997) as well as by Dominguez and Robin (1996) may not sufficiently promote conservation of natural resources because individuals may reduce their overall consumption levels but still consume high levels of particularly scarce resources or goods that cause high levels of environmental damage to produce. In contrast, biospheric-altruistic values are likely to motivate both overall reductions in consumer goods and preferences for the types of goods that cause the least environmental damage. Moreover, there is an important conceptual distinction between prosocial values and proenvironmental values: Individuals may be prosocial (altruistic and cooperative) but not proenvironmental (value sustainability of environmental resources). It is possible, however, that a well-developed pro-environmental position must include prosocial values involving: (1) altruistic motivations to sacrifice personal gain by limiting

resource consumption in order to promote environmental integrity; and (2) cooperative orientations to use only one's fair share of resources and to act in ways to ensure that others are allowed their fair share. In effect, prosocial values may be necessary, but not sufficient for guaranteeing proenvironmental values.

These conceptual distinctions may have important implications for empirical research and efforts to promote pro-environmental values. Research is needed to determine: (1) are individuals truly distinctive in their levels of non-consumeristic values, pro-environmental values and prosocial values, or do these values tend to form a natural cluster or 'package' as a belief system?; (2) if these value orientations are distinctive, then which orientations are the most susceptible to change?; and (3) if these orientations are distinctive and all are changeable, then which ones have the greatest impact on consumption levels?

What role can economists play in promoting proenvironmental value orientations? Economists typically take values or preferences as given when designing incentive mechanisms and structures that promote the societal good.[9] Changing or altering social values may seem to be beyond the scope of economics. Yet economists can make significant contributions to the task of changing social values. The behavioral framework described above highlights the important influence of institutional structures on social values. Economists can play an important role in collaborating with other social scientists in efforts to identify which institutional structures are most likely to create shifts toward proenvironmental values and how to present and publicize policies so that they effectively reinforce proenvironmental values. Campaigns designed to promote a proenvironmental value structure must also consider how the tax and regulatory system either promotes or works against its efforts, and economists can play a central role in identifying these influences.

Another role for economists is to develop valid and reliable methods for assessing individual consumption for use in empirical research on efforts to understand and reduce resource consumption. Given the limitations of relying solely on monetary expenditures as an indicator of resource consumption levels, substantial effort is needed to develop sustainability indices that provide a more accurate assessment of individual consumption of natural resources. For example, these measures must delineate goods that have considerable environmental impact (such as meat products, automobiles, and packaged goods; see Durning, 1991) and those that do not (e.g. food staples purchased in bulk amounts; building insulation, and goods made out of recycled materials).

Finally, economists can collaborate with other social scientists in current efforts to promote and evaluate sustainable living within small communities. Small community interventions (such as a program that increases the cost of trash removal or a campaign against purchases of luxury items) have the potential to capitalize on the dynamics within cohesive social networks that foster attitude and behavior change, such as the establishment of salient social norms and the rapid diffusion of information through the social network (Darley and Beninger, 1981). Economists also can collaborate in research exploring the consumption patterns of communities that already practice or encourage simplified living. Although there are religious and communal groups that strive to practice environmentally responsible lifestyles, their efforts rarely make their way into economic discussions of resource consumption. Studies of such groups would provide important insights into their economic behaviors, social dynamics and quality of life and how they differ from those of a traditional consumer society. As such, these studies may lead to insights regarding potential institutional mechanisms for promoting resource sustainability. Research demonstrating the importance of group identity and dynamics in resolving common pool resource dilemmas suggests that these community efforts merit close attention.

These are but a few of the research issues associated with the problem of defining and reducing overconsumption. Economists today are faced with a choice as to how best to contribute

[9] See Spash and Hanley (1995) for a discussion of related issues.

to research and intervention efforts aimed at promoting sustainable use of natural resources. Clearly there is a need to continue the development of national and international policies that will promote sustainable living. Environmentally-based taxation and pricing strategies, stringent environmental regulations, and international sanctions are examples of institutional changes that undoubtedly will have the most significant impact on promoting sustainable consumption in the long run. However, given that the successful implementation of these broad institutional changes requires a critical shift in social value orientations and resolutions of the difficult problems associated with defining overconsumption, these institutional changes may be a long way off. Using a framework of individual consumption behavior, this paper has outlined several ways that economists in the short run can work to promote sustainable living. Such efforts clearly require collaboration with ecologists, psychologists, and other behavioral scientists in order to most effectively develop solutions to the problem of resource overconsumption.

Acknowledgements

The authors wish to thank Alice Trost, David Terkla, Arthur McEwan and Ruth Becker for sharing their knowledge. Each author contributed equally to the article. Support was provided by a research grant from the US Environmental Protection Agency

References

Ajzen, I., 1988. Attitudes, Personality, and Behavior. Dorsey Press, Chicago.

Ajzen, I., Fishbein, M., 1980. Understanding Attitudes and Predicting Social Behavior. Prentice-Hall, Englewood Cliffs, NJ.

Alm, J., Jackson, B., McKee, M., 1991. Estimating the determinants or taxpayer compliance with experimental data. Natl. Tax J. 65, 107–114.

Alm, J., McClelland, G., Schulze, W., 1992. Why do people pay taxes? J. Public Econom. 48, 21–38.

Aronson, E., 1990. Applying social psychology to desegregation and energy conservation. Personal. Soc. Psychol. Bull. 16, 118–132.

Arora, S., Cason, T., 1995. An experiment in voluntary environmental regulation: participation in EPA's 33/50 program. J. Environ. Econom. Manag. 28, 271–286.

Argyle, M., 1987. The Psychology of Happiness. Muthuen Press, New York.

Batabyal, A.A., 1995. Leading issues in domestic environmental regulation: a review essay. Ecol. Econom. 12, 23–39.

Brown, P.M., Cameron, L.D., Chapman, J.G., 1999. Understanding compliance with an environmental regulation. Unpublished manuscript.

Campbell, A., 1981. The Sense of Well-being in America: Recent Patterns and Trends. McGraw Hill, New York.

Cameron, L.D., Brown, P.M., Chapman, J.G., 1998. Social value orientations and decisions to take pro-environmental action. J. Appl. Soc. Psychol. 28, 675–697.

Commoner, B., 1990. Making Peace with the Planet. Pantheon, New York.

Cooper, J., Scher, S.J., 1994. When do our actions affect our attitudes? In: Shavitt, S., Brock, T.C. (Eds.), Persuasion: Psychological Insights and Perspectives. Allyn and Bacon, Boston.

Costanza, R., Daly, H.E., Bartholomew, J.A., 1991. Goals, agenda, and policy recommendations for ecological economics. In: Costanza, R. (Ed.), Ecological Economics: The Science and Management of Sustainability. Columbia University, New York.

Cushman, P., 1990. Why the self is empty. Am. Psychol. 45, 599–611.

Darley, J., Beninger, J., 1981. Diffusion of energy-conserving innovations. J. Soc. Issues 37 (2), 150–171.

Dawes, R., McTavish, J., Shaklee, H., 1977. Behavior, communication and assumptions of other people's behavior in a common dilemma situation. J. Personal. Soc. Psychol. 35 (1), 1–11.

Devall, B., Sessions, G., 1985. Deep Ecology: Living as if Nature Mattered. Peregrine Smith, Salt Lake City.

DeYoung, R., 1989. Changing behavior and making it stick. Environ. Behav. 25, 485–505.

Diener, E., 1984. Subjective well-being. Psychol. Bull. 95, 542–575.

Dominguez, J., Robin, V., 1996. Your money or your life. Penguin Books, USA.

Dunlap, R., Van Liere, K., 1978. The 'new environmental paradigm': a proposed measuring instrument and preliminary results. J. Environ. Educ. 9 (4), 10–19.

Durning, A., 1991. Limiting Consumption: Toward a sustainable culture. in The Futurist, July–August, 11–15.

Durning, A., 1992. How Much is Enough? W.W. Norton and Co, New York.

Easterlin, R., 1974. Does economic growth improve the human lot: Some empirical evidence. In: David, P.A., Reder, M.W. (Eds.), Nations and Households in Economic Growth: Essays in Honor of Moses Abromowitz. Academic Press, New York.

Elkins, P., 1991. The sustainable consumer society: A contradiction in terms? International Environmental Affairs, Fall.

Gardner, G.T., Stern, P.C., 1996. Environmental Problems and Human Behavior. Allyn and Bacon, Boston.

Gelderloos, O., 1992. Eco-theology: The Judeo-Christian Tradition and the Politics of Ecological Decision Making. Wild Goose Publications, Glasgow.

Goodwin, N.R., Ackerman, F., Kiron, D., 1997. The Consumer Society. Island Press, Washington, DC.

Harrison, G., Hoffman, E., Rutstrom, E., Spitzer, M., 1987. Coasian solutions to the externality problem in experimental markets. Econom. J. 97, 388–402.

Hines, J.M., Hungerford, H.R., Tomers, A.N., 1987. Analysis and synthesis of research on responsible environmental behavior: a meta-analysis. J. Environ. Educ. 18, 1–8.

Inglehart, R., 1990. Culture Shift in Advanced Industrial Society. Princeton University Press, Princeton, NJ.

Kramer, R.M., McClintock, C.G., Messick, D.M., 1986. Social values and co-operative responses to a simulated resource conservation crisis. J. Personal. 54, 576–592.

Leventhal, H., Cameron, L.D., 1994. Persuasion and health attitudes. In: Shavitt, S., Brock, T.C. (Eds.), Persuasion: Psychological Insights and Perspectives. Allyn and Bacon, Boston.

McClintock, C.G., Liebrand, W.B.G., 1988. Role of interdependence structure, individual value orientation and another's strategy in social decision making: a transformational analysis. J. Personal. Soc. Psychol. 55, 396–409.

McKenzie-Mohr, D., Nemiroff, L.S., Beers, L., Desmarals, S., 1995. Determinants of responsible environmental behavior. J. Soc. Iss. 51, 139–156.

Milbrath, L.W., 1995. Psychological, cultural, and informational barriers to sustainability. J. Soc. Issues 51, 101–120.

Montivalli, J., 1996. Enough, E-Magazine, March/April, 28–35.

Oskamp, S., Harrington, M.J., Edwards, T.C., Sherwood, D.L., Okundo, S.M., Swanson, D.C., 1991. Factors influencing household recycling behavior. Environ. Behav. 23, 494–519.

Pearce, D.W., Turner, R.K., 1991. Economics of Natural Resources and the Environment. John Hopkins University Press, Baltimore.

Plott, C., 1983. Externalities and corrective policies in experimental markets. Econom. J. 93, 106–127.

Ray, P.H., 1996. The rise of integral culture. Noetic Sci. Rev. 5, 15.

Russell, C., Harrington, W., Vaughan, W., 1985. Enforcing Pollution Control Laws. Resources for the Future, Washington, D.C.

Sagoff, M., 1988. The Economy of the Earth. Cambridge University Press, Cambridge.

Schmookler, A., 1991. The insatiable society. In The Futurist. July/August, 16–19.

Schwartz, S.H., 1992. Universals in the content and structure of values: theoretical advances and empirical tests in 20 countries. Adv. Exp. Soc. Psychol. 25, 1–65.

Shiva, V., 1989. Staying Alive: Women, Ecology, and Development. Zed Books, London.

Smith, G.A., 1980. The Teleogical view of wealth: a historical perspective. In: Daly, H. (Ed.), Economics, Ecology, Ethics: Essays Toward a Steady-State Economy. W.H. Freeman and Company, New York and San Francisco, pp. 214–237.

Spash, C.L., Hanley, N.D., 1995. Preferences, information, and biodiversity preservation. Ecol. Econom. 12, 191–208.

Stern, P.C., Dietz, T., Guagnano, G.A., 1995. The new ecological paradigm in socialpsychological context. Environ. Behav. 27, 723–743.

Syme, G.L., Seligman, C.S., Kantola, S.J., MacPherson, D.K., 1987. Evaluating a television campaign to promote petrol conservation. Environ. Behav. 11, 441–461.

Trainer, F.E., 1985. Abandon Affluence. Zed Books, Atlantic Highlands, NJ.

Vadnjal, D., O'Connor, M.P., 1994. What is the value of Rangitoto Island? Environ. Values 3, 125–143.

Van Vugt, M., Meertens, R.M., Van Lange, P.A.M., 1995. Car versus public transportation? the role of social values in a real-life social dilemma. J. Appl. Soc. Psychol. 25, 258–278.

Wachtel, P., 1983. The Poverty of Affluence. Free Press, London.

Wilson, E.O., 1992. The Diversity of Life. Harvard University Press, Cambridge, MA.

World Bank, 1992. World Development Report 1992. Oxford University Press, New York.