

The Personal Life of the Behavior Analyst

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The human species faces crises of critical proportions. Excessive population, global warming, and the anticipated descent from peak fossil-fuel extraction promise to change our future in far-reaching ways. Operant conditioning prepares the individual for a world similar to the selecting past, but our world is changing more rapidly than our adaptation. As individuals, we cannot make substantial changes in the world at large because we do not control enough reinforcers, but we can turn to the sources of our personal behavior and manipulate them. We will need help. Better organized social networks and the self-management techniques they support can promote immediate changes in consumption at home, work, and moving about in our personal worlds. Surprisingly, consuming less can lead to more satisfying and happier lives, but a better understanding of reinforcement contingencies is necessary. We can recover the strengthening effects of personal daily accomplishments that are eroded when conditioned generalized reinforcers intervene. When we get our own personal lives in order we can reduce our carbon footprints, restore the connections between our behavior and its strengthening effects, and become models worthy of imitation.

Key words: energy descent, global warming, climate change, personal behavior, stimulus control, self-management, behavior analysis

In the recent special issue of *The Behavior Analyst* dedicated to the human response to climate change, L. G. Thompson (2010) described a serious developing problem. He concluded that warming cannot be attributed to typical cycles, as critics disclaiming human causes assert. Carbon dioxide is now present in the atmosphere at a level not seen in 800,000 years, and the change in level appears to be accelerating, with the possibility of abrupt massive climate changes. Thompson concluded that prevention of climate change is no longer possible, as the change has already begun.

The remaining contributions to the special issue described and recommended solutions coming from behavior analysis (Heward & Chance, 2010; Keller, 1991/2010; Layng, 2010; Malott, 2010; Neuringer & Oleson, 2010; Nevin, 2010; Pritchard, 2010; Twyman, 2010). Chance and Heward (2010) summarized the contributions

of the special issue with further suggestions, while noting that earlier contributors cited by Tuso and Geller (1976) were active in previous years. An implication of the papers that focused on global warming is that the human species must cut back on fossil fuel consumption, not simply because consumption results in global warming and weather disruption, but because we are running out of fossil fuels, which is an issue that deserves further emphasis.

CHANGING ENERGY SOURCES

Many authors during the past decade have described aspects of the two looming global problems of climate change and the progressive decline in available fossil fuels (e.g., Heinberg 2003, 2004, 2007, 2009, 2011; Heinberg & Lerch, 2010; Homer-Dixon & Garrison, 2009; Hopkins, 2008; Kunstler, 2005; Leeb, 2006; Rubin, 2009; Stein, 2008). These authors extensively reference scientific geological sources of data that support their summaries and suggestions for action. The series of papers contained in the recently published *The Post Carbon Reader*

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(Heinberg & Lerch, 2010) broadly and comprehensively summarizes our situation, as does the recent book *The End of Growth* (Heinberg, 2011). In addition, Grant (2007, 2010) has contributed a penetrating behavioral analysis of what he calls our pending “cultural crisis.”

It is widely believed that technology will solve predicted energy problems, a belief that is nurtured by our media as well as governmental leaders. Prominent among the proposed alternative energy solutions are solar, wind, tidal, hydroelectric, geothermal, and even atomic fusion. But there are problems with nearly all alternative energy sources (Fridley, 2010). They still account for a small portion of overall world energy consumption. Many are not yet well developed, and all require the infusion (embodiment) of energy in the technologies themselves. It takes energy to develop technology and convert to new energy sources. The capacity of alternatives to fossil fuel for supporting our current consuming lifestyles is questionable at best, partly because the embodied energy required in the development and production of new technologies will come out of dwindling fossil fuel sources, a consideration not adequately addressed in most optimistic predictions of alternative energy sources. But technological improvements must occur quickly, and the world must vigorously reduce its energy consumption *now* if we are to avoid widespread painful economic and social consequences in the future.

THE CONSUMPTION TRAP

Our personal lives are not necessarily happier because we consume more. Many people were productive and happy before industrialization and the rapid exploitation of fossil fuels. When one found rewarding work, access to healthy food, a modicum of financial security, and

time for relaxation, personal happiness was achieved without excessive consumption of nonrenewable natural resources. The emotional by-products called “happiness” and “satisfaction” arise from accomplishment, not necessarily acquisition (Skinner, 1987b). Specialization of labor and its efficiency led to wealth, leisure, and further technological development. However, these so-called advances came with a corresponding deterioration in the quality of life. Pursuit of the respondent by-products called “pleasurable feelings” increasingly replaced the by-products of operant strengthening (sometimes called “satisfaction”).¹ In this process, daily personal accomplishment of even the most routine and trivial tasks was increasingly replaced by technology. Energetic behavior was accomplished by mechanical devices, and large-muscle work declined to the point that we now contrive exercise at the gym. Specialization of labor led to efficiencies, but at a cost of boring repetition (i.e., long response ratios). As a result, pleasing consequences eclipsed strengthening ones.

People progressively moved from physically energetic behavior with great daily variety (e.g., the manual activities such as cleaning, maintaining the household, raising one’s own children, preparing food from unprocessed ingredients, walking to locations) to the 40-hr plus workweek doing largely the same kind of things. Machines took over the physical labors of daily life to the extent that people simply pushed buttons. But in exerting less physical effort, they lost the satisfaction that comes with

¹ We cannot trust feelings themselves as a guide to those contingencies that have desirable strengthening of behavior because the referents for feelings are not yet subject to an objective scientific analysis. In the present discussion, *pleasing* versus *strengthening* is a rough vernacular distinction between the by-products of reinforcement contingencies. The former term emphasizes respondent by-products; the latter emphasizes the future utility of operant behavior.

producing immediate and tangible accomplishments at nearly every turn of the day (i.e., short response ratios). As a result they have become increasingly bored with the repetition in their work, spending what leisure time they have left passively observing the serious lives of others in drama, competitive struggles, comedy, gambling, or using drugs. Very little of what many people now do in their leisure time makes any significant contribution to the strength of the culture, and many of these activities consume large amounts of fossil energy.

Why people are not happy in the Western world cannot be completely summarized as a problem of short and long ratio requirements, or the presence of aversive control (Sidman, 1989). Contingencies are complicated. A great deal of the problem comes from the destruction of the direct and natural relations between what people do in their daily lives and the important consequences of their behavior. They now work for the generalized conditioned reinforcers of praise (prestige) and money, neither of which is always clearly nor necessarily related to other important consequences, especially remote consequences for our species. As noted, affluence with its specialization has weakened the satisfaction that comes from producing simple and immediate physical changes in one's environment.

Energy consumption accompanies affluence, but affluence for the majority of people in the world may now be on the decline. The end of worldwide economic growth, possibly precipitated in advance by the derivatives debacle, is now being predicted (Heinberg, 2011) and tied to the declining availability of fossil fuels. But, surprisingly, it is quite possible that a reduction in affluence and energy consumption may foster a return to happier, more productive, lives. We may return to simpler patterns of living with greater daily

variety of shorter (and, yes, manual) ratios. These small immediately contingent consequences may replace the search for happiness through activities that are simply pleasing. A simplified life may prove to be a far happier life than the one experienced in the consumption trap, as Thoreau argued.

RETURN TO A MORE SATISFYING LIFE

Consuming less can become healthier, personally satisfying, and interesting, but the transition to it will take preparation. Here, I suggest specific actions. To consume less we need to deliberately reorganize our current daily living patterns, possibly even changing the work we do and moving to a different location. We can expand our ability to participate in the production and processing of what we eat, for example. We can redesign the places in which we live and work, walking or cycling when possible. We can expand our ability to produce art, music, and literature, as well as consume it. We can explore our world with science for pragmatic and personal reasons rather than salary increases. Making these improvements can significantly reduce energy consumption, but the process will require design. Such improvements are accomplished in successive approximations; fortunately, behavior analysts are especially prepared for the task. We can do this collectively and individually.

New group living arrangements with lower consuming cooperative and experimental lifestyles such as those envisioned by Skinner in *Walden Two* (1948), Kinkade (1973), and Comunidad Los Horcones (Los Horcones, 1989, 1991) offer the promise of the reduction of significant fossil energy consumption, but to date successes in planned communities have been modest and have not been widely duplicated. Promoting the movement to a sustainable lifestyle

(Grant, 2010) (i.e., one that can be supported with renewable energy while maintaining a livable steady-state environment for those in the future) will need to be accomplished in stages. Nevin (2005) has pointed to coordinated group action. Local groups can team up to get their communities to invest in windmills, for example. A number of studies have reported success in the formation of advocacy groups and community action (e.g., Altus, Welsh, & Miller, 1991; Altus, Welsh, Miller, & Merrill, 1993; Briscoe, Hoffman, & Bailey, 1975; Fawcett, 1991; Fawcett, Miller, & Braukmann, 1977; Welsh, Miller, & Altus, 1994). Some have focused on the crucial importance of the maintenance of contingencies after they have first been implemented.

A major difficulty is that all group efforts run into the problem of complex and conflicting established reinforcers for their members, an issue examined by Glenn (1991, 2004). Efforts to reform are confronted with strong tendencies to behave in established ways. Nevin (1995, 1996, 2005), Nevin and Grace (2000), and Nevin, Mandell, and Atak (1983) have examined the processes metaphorically termed *behavioral momentum*, which refers to the persistence of behavior and its relation to the rate of reinforcement in the context. What is termed *temporal* (or *delayed*) *discounting* (Critchfield & Kollins, 2001) is also relevant. People tend to behave in ways that produce immediate but small consequences rather than ways that produce large but delayed consequences. They watch television rather than read, go to a restaurant rather than prepare the meal at home, and take drugs (including alcohol) rather than enjoy the by-products of artistic production (e.g., playing and composing music, or doing craft work). In summary, our cultural contingencies now favor behaviors that produce immediate small consequences

at the expense of alternative behaviors that produce delayed but larger consequences (Grant, 2007). Our financial system makes it easy for corporations to profit from the consumption trap. Further, the advanced state of the physical sciences supports the development of products that make life easier in small but immediate ways. Unfortunately, the relatively less advanced state of the behavioral sciences provides little support for the development of interventions that help make life more rewarding in large but delayed ways. Why consuming behavior persists even when individuals are presented with opposing facts and alternative options is a complex issue, and future research will, no doubt, isolate controlling variables. Unfortunately, as L. G. Thompson (2010) and Heinberg (2011) have noted, time is not on our side.

The thrust of the present paper is that effective steps toward a lifestyle of reduced consumption can be taken without wrestling with politics, struggling to change behavior of others that is supported by contingencies out of reach, and enduring the dilution of personal effect that results from the participation in social movements. Instead, a great deal can be done at the level of the individual in his or her personal life and, as we shall see, can be begun immediately. If the problem is the absence of knowing what to do, we can target that personal energy-conscious behavior, prompt it, sharpen the contingencies that support it, and monitor its progress through time. This can be accomplished by the behavior analyst (or anyone else) at home when contingency-management skills are applied to one's own behavior in a manner similar to controlling the behavior of another person. All of this can occur without substantial group coordination, but only if the probability of doing it is already high enough, prompting is skillfully employed, and changes in

targeted performance are magnified with methods of monitoring progress. Suggestions for such personal self-management are to follow; however, the presence of supporting social contingencies that instruct, prompt, and maintain behavior are often necessary. I shall suggest that, when necessary, such additional contingencies can be brought to bear by incorporating the local community, increasingly through the use of the Internet. We may do this in small measures, by easy initial steps as Nevin (2005) and Mace et al. (1988) have suggested, or perhaps by totally changing the physical environment in which we live. Lehman and Geller (2004) summarized variously effective ways to initiate community action, and what is to follow will turn to the actions of individuals in their personal lives drawing from these techniques.

IMMEDIATE ACTION: THE DAILY STARTING POINT

Most of us have a regular time and place devoted to reading. We can raise the probability of responding to rising energy costs by surrounding our reading area with sources of scientifically derived data about worldwide trends. S. C. Thompson and Stoutmeyer (1991) found that many home residents conserved if they received instruction about long-term consequences and personal efficacy education. Arranging magazines, books, and so on in a sequence keeps prompts in sight. *Science News*, for example, comes in a printed version and is available on the Web. Web feeds can also place articles regularly on one's reading docket. Winett, Leckliter, Chinn, and Stahl (1984) reported that video presentation of conservation behaviors significantly decreased residential energy use, for example. Keeping prompts in front of us is critical. Out of sight, out of behavior.

The effectiveness of prompting is well documented in behavior-analytic literature (e.g., Jacobs, Bailey, & Crews, 1984; Newkirk, Feldman, Bickett, Gipson, & Lutzker, 1976; Tusso & Geller, 1976; Winett & Neale, 1981). Many successful strategies can be readily applied to self-management.² Transporting notes from the reading area to other points in our path raises the probability of action at those points when one has done so successfully in the past. Such notes are especially helpful when we are preoccupied with other matters, as is often the case in professional lives; however, their use requires the recognition of the external environment as a controlling source. It is important to begin further action as soon after writing a note as possible to capture the strength of the current probability. Where do we place notes or relevant objects? Knowing oneself is important. To have an effect, discriminative stimuli ought to appear at critical physical or temporal points in our future path. Such points may be the bathroom mirror, the vehicle dash, doors, and yes, even certain places on the floor. They should appear at just the point in time and place that they capture the highest current probability of the behavior and combine with other variables. A watch with a repeating timer can prompt behavior at just the right time. Geller, Winett, and Everett (1982) identified several conditions under which prompting strategies are most effective. They noted that prompts work best when the target behavior is relatively easy to perform and clearly defined, and when the message is displayed in close proximity to the place where the target behavior can be performed.

²The "self" in so-called self-control can be described as interlocking connections between a controlling repertoire and a repertoire to be controlled. As such, the "self" in self-control is not an originating agent. It has social origins and requires supplementation from the social environment.

Winett (1978) also found that simple prompting strategies are effective at increasing energy-conserving behaviors.³

If you do not measure behavior, you are less likely to change it. Monitoring, feedback, and incentives have been shown to support changes in energy use in a wide variety of settings (e.g., Abrahamse, Steg, Vlek, & Rothengatter, 2005; Bekker et al., 2010; Boyce & Geller, 2001; Kohlenberg, Phillips, & Proctor, 1976; Luyben, 1980; McMakin, Malone, & Lundgren, 2002; Palmer, Lloyd, & Lloyd, 1977; Seaver & Patterson, 1976; Slavin, Wodarski, & Blackburn, 1981; Winett et al., 1982). Graphs are common in behavior analysis because conversion of measured behavior to graphic form amplifies changes and, in our case, can make even the sight of small improvements in energy consumption reinforcing. It is not widely understood that many electrical devices consume power even when turned off. A DVR, television, and audio system are good examples. (All devices that employ a transformer at the point at which they are plugged in are suspect.) A meter that indicates electricity consumption is especially helpful for identifying sources. Electronic devices are now available to do both the measurement and cumulative usage display automatically at a

central location. Action can be taken by using a power strip devoted to these energy users that gangs them together. One must, of course, remember to turn the power strip off and on if it is not clock-operated (another reason for notes and daily checklists placed at critical points in one's path). Graphs of daily, weekly, or monthly electricity consumption kept on the refrigerator door encourage social contingencies that arise from onlookers such as family members, companions, and visitors. A clearly visible, up-to-date graph invites conversation about electricity use and comparison with what other households may be accomplishing. Changes in the direction of data invite commentary from others about novel conservation efforts and possibly even some friendly competition.

Unfortunately, advances in technology have now become conditioned reinforcers without regard to their outcomes. We love gadgets. But we are paying a high energy price for these small gains. Are power windows really necessary? Does the air-conditioning flow need to adjust automatically when a person sits in a given area of the vehicle? Does the seat really need to be heated? Is it a significant safety advantage when headlights move in concert with the steering wheel? Do we need text messages and a television in the car?

Heating water consumes significant electricity, and small changes in consumption can make big differences. Reminding ourselves with cues to take low-flow and more efficient showers rather than baths saves both energy and water. It is unfortunate that washing dishes by hand has come to be "old fashioned." The automatic dishwasher does not do the entire kitchen cleanup, and emptying it is a larger ratio of behavior compared to putting dishes away as they are cleaned. Furthermore, one person washing while another dries is a social situation facilitating one-on-one discussion (possibly with one's

³ *Self-management* tends to be weak behavior because the consequences of emitting it are often delayed or uncertain, and stimulus control of self-instruction rapidly loses strength (e.g., we fail to respond to our notes). In addition, the effort of emitting responses in the controlling repertoire competes with other behaviors that produce more immediate or certain consequences (i.e., writing notes or generating cues diverts effort from immediately reinforcing activity). Adding a contrived consequence (a "reason") for the controlling behavior must lead to reinforcement strong enough to maintain the self-management contingency. I am assuming that readers of this paper have substantial controlling repertoires and that these repertoires are more likely to be evoked by my analysis than readers not exposed to a science of behavior.

child). A little social engineering can reduce or eliminate the use of an automatic dishwasher and even a clothes dryer.

FOOD ENERGY

Casual observation suggests that many grocery store shoppers visit the delicatessen section for major food purchases. This may be an indication of hurried lifestyles, poor understanding of nutrition, or simply the lack of cooking skill. We do not like to do things we have not learned to do well. As a result, the typical supermarket basket contains many prepared foods that raise both nutritional and energy consumption issues (Bomford, 2010). Preprocessing requires more energy. Most supermarket items have traveled a long distance (Pimentel & Pimentel, 2008). In contrast, buying locally produced foods reduces transportation costs. Cooking from basic ingredients can avoid consumption of excessive salt, fats, sugar, preservation additives, and possibly genetically engineered plants. When we buy basic staple ingredients such as flour, rice, beans, potatoes, and so on, we can buy in bulk without the excessive packaging now so much a part of processed foods (inspect the contents of your kitchen wastebasket). Reusable containers and bags require thinking ahead (e.g., notes in the right places), but their use quickly becomes routine. Eating lower in the food chain saves a great deal of energy, because mass production of animal products consumes prodigious amounts of energy and water as well as destroying local environments and raising personal health concerns. A shopping list with a bold heading on it saying “purchase locally grown foods and eat lower on the food chain” can be a well-placed discriminated stimulus. Many years ago, behavior analysts applied their research skills to what people purchase at the store and what they select at cafeterias. For example,

Dubbert, Johnson, Schlundt, and Montague (1984) found that labeling increased the probability of certain food selections, and Winett, Kramer, Walker, Malone, and Lane (1988) found that modeling-feedback and participant-modeling procedures were most effective in reducing fat consumption and expenditures. It is unfortunate that researchers have not continued to vigorously develop methods of altering what we eat. The field is ripe for inventive behavior-analytic research, research that comes with the tighter scrutiny of direct observation of targeted behavior rather than questionnaires.

GROWING MORE OF WHAT ONE EATS

Urbanization has led to specialization in food production. Cheap energy enabled transportation of food over long distances. Efficiencies of production equipment size, cheap fuel, and petroleum-based fertilizer made raising food at home uneconomical. Home gardening became obsolete. But with rising food costs, we are beginning to see its revival. Unfortunately, many people no longer have the skills of vegetable gardening and instead mow lawns that could be gardens. Maintaining a garden, possibly sown with heirloom seeds (those that promote expanded gene pools), moves in the direction of sustainability, resiliency, and reduction in the consumption of petroleum-based energy. A small carefully managed garden (perhaps containing a greenhouse) can produce a continuing array of vegetables. One’s salad can come from 50 steps away rather than thousands of miles. The food tastes better because most supermarket vegetables called “fresh” have been picked many days earlier and have been grown in soil that contains petroleum-based fertilizers and pesticides and that is slowly depleting each year because it is not being enriched organically.

It is unfortunate that basic food preparation has gone out of style in many homes. Cooking ceases to be a chore when it becomes an art, as the followers of Julia Child know. Food preparation does not need to be elaborate, but knowledge is required. When skillfully done, cooking directly reinforces the cook's behavior. So powerful are these reinforcers that the cook may arrive at the table having sampled many "appetizers" while in the kitchen. Home-cooked food better conforms to personal tastes. Recipes of greater variety are possible. Such homely efforts as canning and freezing enable the preservation of locally grown food when it is in season. These efforts are time consuming, and one must have the equipment, but a return to this type of food preservation yields better knowledge of the content of what one is eating.⁴ Because there are direct relations between each link in the behavioral chains involved in cooking and the reinforcing products, a source of daily satisfaction of tangible accomplishment automatically happens. One looks forward to preparing a dish. At the same time, fossil energy consumption is reduced. Simply consuming locally raised food that is in season is a step in the direction of conservation and supports local agriculture. If we cannot prepare local foods from scratch, we can reinforce the activity of others who can when we purchase theirs. We can ask restaurants to note the locally grown foods on their menus.

⁴ At the moment, many people lack both the components of these chains of behavior and the linkage between elements that arises from experience. The solution, of course, is to seek advice via media and to imitate the successful behavior of those who have fully developed repertoires. Seeking such advice and instruction may be more likely when one understands that the source of the problem is not personal failing but the absence of a necessary history (Skinner, 1971).

REPAIRING THINGS

Labor has become so expensive that repairing things or replacing parts may not currently make economic sense. But repairing does make ecological sense, and it will make greater economic sense as energy becomes more precious. We now discard defective things rather than fix them (e.g., clothing). We put off tasks like replacing a high water consumption toilet or showerhead, partly because we are busy with other matters, but often because we do not know how to do the tasks ourselves. Repairing a dripping faucet, soldering a failing copper pipe, or even correcting a leaking roof may not be difficult. One simply has to know what to do and have the appropriate implements at hand.

Years ago, the public school curriculum contained manual arts, such as home economics, wood, metal, and general shop classes. The college preparatory curriculum replaced these "blue collar" classes with courses that establish verbal behavior that is often distantly related to practical matters. The disappearance of instruction about mechanical processes has left many people without even an elementary understanding about how many things work. Now, it is probably the case that the average house, condominium, or apartment contains precious little in the form of tools, such as an array of wrenches, screwdrivers, clamps, chisels, drills, bits, saws, a tool bench, a vice, a soldering iron, and drawers containing various sizes of nails and screws. It is likely that most homes no longer have a sewing machine or a meter for testing electrical current. Some may lack a powerful electric food mixer or processor with useful attachments. The result is the necessity of buying manufactured, prepared, and replacement items as well as the dependence on service people. A deep and abiding satisfaction can come from repairing something oneself.

We can supply additional reinforcement for fixing things ourselves by quantifying and even graphing what is going into our trash (possibly using a bathroom scale while holding a trash can or bag). Recycling plastics, glass, and metal is effortful, but most materials need not go into the landfill. Table scraps and some kinds of paper can be shredded and buried in the garden or composted in an easily constructed bin. In this way, organic fertilizer and soil amendments can be produced on the home premises, avoiding the necessity of purchasing them. We can buy appliances with an eye to their repairability and simplicity of function, while avoiding unnecessary gadgets. When anything fails in our home we then have a better chance of making routine repairs (possibly with the help of tutorials now readily available on the Internet). A copy of *When Technology Fails* (Stein, 2008) is a particularly valuable household resource. Energy use declines as our trash containers become lighter.

GETTING OFF THE ROAD

We can each drive our personal vehicles less, and walk and bicycle more. We can calculate the miles we travel to typical locations, convert the calculations into costs per mile to each location, and then place a note with the cost of each trip on our dashboard (perhaps above where we insert the ignition key). Graphs of weekly accumulated travel miles can be posted on the refrigerator or the bathroom mirror. Obtaining a behavioral commitment has been a component of many successful behavior-based interventions (e.g., Bachman & Katzev, 1982; Burn & Oskamp, 1986; Geller & Lehman, 1991). Pardini and Katzev (1983–1984) found that groups asked to make verbal or written commitments showed significantly higher rates of newspaper recycling than controls did. DeLeon and Fuqua (1995) dem-

onstrated that combining a public commitment to recycle paper (participants' names were published in a local newspaper) with feedback resulted in a 40% increase in the weight of recycled paper for residents of an apartment complex. Werner et al. (1995) found that a written commitment to participate in a curbside recycling program resulted in greater rates of participation than informational brochures or face-to-face contact without written commitment. We can individually do this on the Internet, as Malott (2010) has suggested. Such public posting invites scrutiny and brings reinforcing social contingencies to bear. The field is wide open for enterprising Web developers and researchers with skills in behavior analysis.

Most of us resist public transportation even when it is available, because it is often inconvenient and we ride in the company of strangers. But we can get over this.⁵ Simply walking for errands or leisure activities brings one back into contact with the world of natural things and reduces the necessity of contrived physical effort on an exercise machine. The important thing is to exert effort, to enjoy oneself in the process, and to raise one's heart rate for sustained periods of time frequently and regularly each week. This happens automatically when we walk rather than ride.

COMMUNITY RELATIONSHIPS

We need not do all our efforts alone, nor can we. Energy conservation can be supplemented with net-

⁵ Many people travel long distances for both business and pleasure. They travel each year to far away conventions and meetings. Airline travel has nearly the highest consumption of petroleum per passenger mile of any form and it disperses pollutants directly into the upper atmosphere. Travel to conventions consumes prodigious amounts of fuel. It is ironic that conference participants travel long distances by jet to deliver or listen to presentations about "sustainability."

working and social interdependency. Strengthening face-to-face relationships with those in our neighborhood fosters resiliency when troublesome things like power outages, breakdowns, or shortages occur. Networking with neighbors sets the stage for trading items and services. Energy conservation can be contagious, and networking with neighbors can supply needed reinforcers. Through closer associations, we become especially sensitive to the progress our neighbors are making and we can profit from it.

Participation in art, literature, music, and exploration of our world can be more reinforcing when done with others. We can deliberately associate with people who play musical instruments or sing. We can join a local musical group that simply gets together to “jam.” The social consequences themselves can be worth the effort, and energy consumption may be trivial when little travel is required. Artistic and nature-loving cultures are particularly supportive of newcomers. Participatory sports contribute to our health when they are not overly competitive and are age appropriate.

BIGGER STEPS

Since 1950, the average size of new single-family houses in the United States has more than doubled, even as the average family size has steadily shrunk (Wilson & Boehland, 2005). Do we really need rooms that we rarely use, large walk-in closets filled with clothing we rarely wear, and large bathrooms with energy-consuming spas? Existing housing essentially ignores the costs of heating and air conditioning because they have been so low. A big step is to design and move into a smaller energy-efficient home. The truly “solar” home depends on the prevailing climate in its area. Minimizing effects of the sun’s heating energy in the summer and maximizing it in the winter requires careful design, but it

can make dramatic changes in energy consumption. A solar home’s shape and positioning may be unconventional, but the energy savings can be remarkable. Personally accomplishing much of its construction and finish work can be a particularly satisfying experience, because one then enjoys the consequences every day. Locating one’s home close to current or future mass transit sites is important.

ONE’S PROFESSION

Changes in the world energy picture warrant a reanalysis of our vocations. The ethics of behavior analysis extend to the long-range cultural consequences of what we do in our occupations. However, our commitment to what we do at work has everything to do with past contingencies. We remain prisoners of our past and present contingencies without help. We are committed to where the money has been and still is (for the moment). We are likely to have climbed professional ladders, live in homes, and work in locations without consideration of the now predicted changes in available resources (Heinberg, 2011). In many cases, we find ourselves denying that trouble is ahead by insisting that technology will bail us out. But the daily news brings nagging questions. Will the purchasing power of our salaries decline? Will the distance we travel to work increasingly squeeze our personal budgets? Will the strength of institutions that support us decline when the world culture is forced to consume less energy? Can we depend on the promises of private institutions and the government for our retirement income? How much can we count on current medical care benefits? All of these issues suggest that denial may not be productive and that, instead, careful planning and engaging in occupations that increase in value as energy costs rise are appropriate behaviors.

The future is likely to favor occupations that increase human performance efficiency, encourage natural resource conservation, promote local food production, and teach renewable agricultural practices on smaller scales. Occupations that develop habitat renovation, teach personal handicrafts, and teach how to analyze energy efficiency will support the shift to lower consumption. Those occupations that teach personal artistic performance will make life more satisfying in a world that consumes less energy. Community social engineers will increasingly be in demand because the predicted cultural crisis will involve changes in personal contingencies that will be disruptive. Because it is likely that government grants as well as social programs such as Medicare and Medicaid will be curtailed, local communities and family members will need to develop support networks that replace declining governmental support. Education and care for the elderly and other individuals with special needs will require changes in local social contingencies. The common thread in all of this is the need for effective behavior management and instruction. Fortunately for us, this has always been a focus of behavior analysis. But, as has been pointed out, many of us have become so specialized in what we do that we lack practical skills in many areas. This has reduced our resiliency, that is, the rapidity with which we can adapt to the changing energy picture. It is the time for each of us to develop a broader repertoire of vocations in which we apply our behavior-analytic technical skills.

RECOVERING THE BEAUTIFUL AND ABUNDANT LIFE

What I have said here will be unsettling to many because it challenges our accustomed reinforcers. A change to different patterns of behavior will be difficult and disruptive.

As we have seen, it is unlikely that we can depend on the cornucopia of technological advances to save us from the beginning decline in fossil fuels. As energy supplies become more expensive and unavailable, we will unavoidably return to lifestyles that were more common in the early and middle 20th century. But I am not suggesting that we are going backward, because I believe we have not always advanced. The conveniences of technology have come at a cost in energy and the satisfaction of accomplishment, in other words, alienation from ultimate consequences. In addition, our standard of consumption (not "standard of living") requires longer hours of working at our primary occupations. We find ourselves prisoners of contingencies that have evolved in our lives. Changing our behavior will require approximations toward goals. Sometimes the steps will be small but they can be progressive, and we do not need to wait for others to begin taking these steps.

Many of us now live overcommitted and excessively busy lives. We are sometimes stressed and exhausted when we arrive at home after a day of work that does not prepare us to make the changes in our personal lives that I have suggested. But this is part of the problem to be solved. I believe behavior analysts are better prepared to make systematic and progressive changes. We understand that we do not do this by an act of will. We accomplish it by creating a personal daily environment that provides prompts for behavior that must be embedded within contingencies with relatively immediate, powerful reinforcers.

To change our behavior, we change the contingencies, but the "we" who are to do the changing are not originating agents (Baum, 1995; Skinner, 1971). We do not lift ourselves by our bootstraps. We all have standing probabilities of action, and they are often well managed by

our controlling repertoires. But, in turn, these repertoires are created, maintained, and altered by others in our culture (Skinner, 1953). The individual does not “act on his own” in his personal life for long without supporting contingencies from others. Behavior analysis is an especially promising field because it understands this problem and has a powerful research technology to address it. Actions by the community of others who are under the control of predictions of our energy future can provide the necessary reinforcement for actions of individuals in their personal lives (Glenn, 2004). The task of developing behavioral technologies that reach into the most personal lives of behavior analysts is not an easy one, because scientific rigor requires independent verification of procedures and effects. Reducing the consumption of nonrenewable resources is a fertile field for behavior-analytic research, and there is a growing urgency for action if predictions about peak oil and coal are correct. Our field has evolved at a critical moment in the evolution of cultures, perhaps in the nick of time.

A PERSONAL NOTE

I had my first epiphany while reading *Walden Two* (Skinner, 1948) in the fall of 1966, when it dawned on me that I did not need to wait for a better life to happen; it could be designed using a science of behavior (Skinner, 1987a, 1987c). My professional and personal life became dedicated to that aim. Several years ago, after retiring from university instruction, I had another epiphany. This one was a better understanding of the serious circumstances that now face humanity.

I still believe that we, as behavior analysts, can be the saviors of the world because we are the happy few who understand that behavior does not begin inside us. We also understand that the future predicted by

science can have an effect on us only through the contingencies brought to bear by a culture that affects us (Glenn, 2004; Skinner, 1971, 1987b). As I have noted, such a culture can do this by contriving contingencies, many of them supporting self-management. Many solutions will come from contingencies in our personal environments, which are by their nature less accessible to scientific objective scrutiny and invite behavioral researchers with that special challenge. But we cannot wait for miracles or for leaders to show us the way, because our leaders are themselves followers who cling to a conception of human behavior that appeals to an origin inside people and to the illusion of perpetual economic growth. They appeal to the wrong source for change. It is our personal environment that must be changed.

I am inclined to agree with Frazier in *Walden Two*. Frazier argued that we cannot change the world through world, national, and even state politics. Such “solutions” would likely be the averaging out of the groups seeking power and the human propensity to work for immediate personal welfare. I have, personally, given up trying to change a larger world, one I believe I am essentially powerless to do anything about. But I also believe that we can make a difference when in the presence of others who are in the process of changing and whose standing probabilities of behavior are at the threshold of behaving in more sustainable ways. To do this, we need not wait, nor simply call for others to do something. We can apply our technology to ourselves and model better management of our personal environments. This is where dramatic change is possible because more of the required variables are available.

I am here suggesting that we start at home first. Many of us have powerful controlling repertoires, ones that are integrated with much of our own behavior. Indeed, such reper-

toires have played a significant role in the fact that we are behavior analysts, and that is why I have written this paper. Making notes and other cues for personal action is part of our personal repertoires. These repertoires can be extended more earnestly to changing energy consumption while improving the quality of daily life.

My hope is that these words may tip the balance toward behaviors the reader is already inclined to do, some of them more vigorously enlisting the network of other behavior analysts via the Internet. Advice is often a weak form of behavior management, because its power depends on the history of the listener or reader. Behavior analysts need supporting contingencies, and these necessarily come from contact with others. We cannot change the world much by simply modeling for the relatively few neighbors in our communities. I have proposed that stimulus control will play a key role, but differential reinforcement gives prior stimuli their power. Through control of the setting conditions of our moment-to-moment personal environments and interlocking them with contingencies maintained by a community of supporters, striking changes in our personal rates of consumption can happen. In doing so, we can also live more happily while consuming a great deal less. We can achieve a new order in our own lives rather than being swept up in the current deteriorating situation. We can experience much of “the good life” of *Walden Two* in our own spaces. With local contingencies that support our own direct contact with the world of things, we can better influence the broader culture by setting an example and contributing to this sustaining culture.

The great challenge for behavior analysts is the development of these interlocking local contingencies for personal behavior, contingencies that prepare us for a world that promises

to be greatly different from our selecting past. Operant selection prepares the individual only for a future that resembles the past, and this is also true for the culture of behavior analysis. If it is to survive, our culture will focus on efforts that foster behavior that is better aligned with a world now predicted by science. As I have said, we can begin at home. Our personal behavior can then exploit any tendency of others to imitate. As Gandhi said, “We must be the change we wish to see in the world.”

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