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The Behavioral Aspects of Peak Oil: Basic Contingencies

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*This is a guest post by Lyle Grant, a Professor at Athabasca University's Centre for Psychology and co-author of **Principles of Behavior Analysis**. Since discovering the issue of peak oil his work has largely concerned the psychology of sustainable living.*

In behavioral terms, peak oil is an aversive consequence. The Hirsch report's crash program is an avoidance response that will prevent the worst of the aversive consequence from occurring. Meeting the challenge of peak oil is therefore a problem of engaging in successful avoidance responding.

Peak oil is an especially difficult problem due to (a) the nonrecurring nature of peak oil, (b) the delay of the aversive consequence, (c) the variability in the predicted date of peak oil, (d) the predicted aversiveness of peak oil, and (e) the nature of avoidance responding.

Peak Oil as a Nonrecurring Consequence

The once-in-history aspect of worldwide peak oil makes it necessary to discriminate the avoidance contingency in advance of the aversive consequence's occurrence and to do so without any previous learning trials. Addressing peak oil successfully prior to the peak itself can therefore be considered as an instance of one-trial discriminated avoidance responding. In one trial, it is necessary to discriminate (a) that peak oil will occur, (b) a plausible time frame in which peak oil will occur, (c) that peaking will be a serious problem, (d) that a crash program is capable of avoiding or lessening the problem, and (e) the time interval required for the crash program to have a mitigating effect before peaking occurs. This is a difficult assignment because each of the five elements of the discrimination is contested in contemporary discussions in varying degrees, and because the program itself is a major effort that appears to require both cultural reinvention and substantial spending.

A major behavioral problem with peak oil is simply that nobody has had any practice in coping with such a unique event. One of the major contributions of successful applications of behavior analysis is to structure learning experiences so people are given lots of practice and feedback in acquiring and maintaining skills (e.g., Grant & Evans, 1994; Martin & Pear, 2003). With a once-in-history event like peak oil, no one has had prior opportunities to learn to behave successfully toward such an event.

The Delay Parameter

Peak oil is also a problem of delayed aversive consequences: The fact that delayed consequences

are less effective than immediate ones is a generic problem in efforts to improve the future (Skinner, 1973). The effects of programs to mitigate peak oil will be realized only after a delay required to implement the programs. Delayed events, even very harmful ones, lack concreteness and currency that compels people to pay attention to them, making it difficult even to bring them into the public arena for discussion. Both those who predict peak oil and advocates of a crash program to avoid a harmful peak-oil future will therefore always tend to be judged as incorrect because the aversive future events they predict are nowhere to be seen. Kunstler (2006, ¶ 1) referred to a form of this problem when he indicated his critics have taken him to task because "I have so far failed to correctly predict the end of the world".

The Variability-of-the-Delay Parameter

As discussed earlier, the length of the delay before the peak is reached is poorly predicted. While some experts specify we are already past the peak point of production, others maintain the peak will not occur for many decades. This lack of consensus also lessens the degree to which information about peak oil functions as an effective motivating operation to induce behavior, like a crash program, that avoids a peak-oil crisis.

The Aversiveness-Intensity Parameter

The events that will occur in a post-oil future are to some degree ambiguous, even though there is a broad consensus that peak oil is a harmful event. Some predict anarchy and a breakdown of rule of law (Kunstler, 2005), whereas others entertain notions of a future in which people drive their cars using solar energy, ethanol or hydrogen (e.g., Rifkin, 2002). This lack of consensus concerning the severity of the effects of peak oil lessens the extent to which information about peak oil functions as a conditioned motivating operation (Michael, 2004).

The Nature of Avoidance Contingencies

As discussed earlier, the crash program called for in the Hirsch report is a type of discriminated avoidance response that prevents or postpones an aversive consequence. Avoidance responses do nothing more than maintain the status quo, whereas the failure to emit the avoidance responses enables the aversive consequence. If the crash program were successful, there would be no disastrous consequences. In contrast, failure to make the avoidance response, to carry out the crash program, enables the disaster. Even with practice, avoidance responding is difficult to acquire, partly because nothing immediately happens after the response (Catania, 1998).

Many avoidance responses are initially acquired as escape responses (Grant & Evans, 1994; Martin & Pear, 2003). For example, Geller (1992) pointed out that water conservation is often acquired as behavior that escapes the problems of a shortage, whereas recycling is acquired as a response that escapes excess solid waste. In escape responding, the learner receives practice in removing the aversive stimulus, which appears to facilitate learning how to prevent it as well. However, the nonrecurring nature of peak oil means there is no opportunity to learn to use a crash program to escape the effects of peak oil as a training method to teach subsequent peak-oil avoidance.

Additional Challenges in Addressing Peak Oil

In addition to these basic contingency-related issues in solving the peak-oil crisis are the following challenges: (a) the resistance to change of established patterns of energy use, (b) the history of false signals of oil depletion, (c) the history of technological advancement, and (d) the aversiveness of delivering peak-oil messages.

Resistance to Change

The use of highly concentrated energy sources such as oil and natural gas has made daily life more reinforcing in many respects and has established routine and stereotypic behaviors that are highly resistant to change (Nevin, 2005). This resistance to change regarding motor vehicle use, for example, occurs even despite lethal and other harmful consequences (Alvord, 2000; Kay, 1997). One quantitative measure of resistance to change is seen in empirical studies of the relative inelasticity of demand for gasoline: Price increases have relatively little impact on short-term gasoline demand (Dahl & Sterner, 1991; Espey, 1998) and there is some evidence demand inelasticity has increased over the past several decades (Hughes, Knittel, & Sperling, 2006).

The resistance to change of fossil-fuel use poses a problem for the transition to a peak-oil future because it rigidly frames discussions of what alternatives are acceptable. Existing energy-use practices are accepted as a constant, with everything else subject to change. Proposals like gasoline taxes are seen as politically impossible even among those sympathetic to the problem of energy overconsumption (Quinn, 2006).

Prior False Signals of Oil Depletion

Yergin (2005) points out the current apprehension that oil supplies will begin to decline has been preceded by five previous periods of similar concern, all of which turned out to be misplaced.

Those individuals who have previously raised concerns about oil depletion were essentially providing false, or at least premature, signals for oil depletion. Those who doubt the imminence of peak oil use this history of false signals as a reason for suggesting that the current indications of peak oil are equally false. From a behavioral perspective, a key effect of presenting a false discriminative stimulus signaling the lack or scarcity of a reinforcer would be to strip the signal of any discriminative control, through extinction, over whatever responding (e.g., conservation, planning for scarcity) would be otherwise occasioned by the discriminative stimulus and any future similar signals.

The effects of the history of false signals of future disasters should also be understood in a wider context of inaccurate, or at least premature, predictions of other types of doom. For example, Thomas Malthus (1798/1985) incorrectly predicted the human population would grow too large to feed itself by the mid-19th century. Ehrlich's (1968) more recent predictions of a disaster due to overpopulation have also not been realized. As a result of incorrect predictions of this sort (or correct predictions that have yet to be realized) predictions in general have lost their discriminative and motivational properties. This poses a special difficulty for a problem like peak oil, which the Hirsch report indicates will *necessarily* occur.

Aversive Features of Peak-Oil Messages: Bearers of Bad News

A problem in spreading information about peak oil is the reluctance of political leaders to bring the problem of peak oil to public attention.

Raising the prospect of a less affluent future due to the lack of energy supplies is difficult for

politicians and other opinion leaders. Analyses of campaign rhetoric indicate that candidates who deliver upbeat messages promising a bright future are generally more successful than those who raise concerns about the challenges of a difficult future (Zullow, Oettingen, Peterson, & Seligman, 1988). Politicians who deliver information about aversive events in the future run the risk of establishing themselves as conditioned aversive stimuli by means of classical conditioning, whereas those who deliver promises of a bountiful future establish themselves as conditioned stimuli for positive emotional responses. Conditioning processes that occur in political contexts may work in a manner similar to classical conditioning in advertising (e.g., Shimp, Stuart, & Engle, 1991; Stuart, Shimp, & Engle, 1987).

History of Technological Advancement

Another impediment to motivating people to conserve energy and engage in other activities to prepare for a peak-oil crisis is the advancement in technology throughout human history, especially during the industrial age. Yergin (2005), for example, maintains there is a general historical tendency in history to underestimate the role of technology in oil discoveries. A specific difficulty however is that oil discoveries have been declining since the mid-1960's, despite striking improvements in oil discovery technologies.

The problem is people have come to expect technology to provide them with relatively inexpensive energy sources (Cavallo, 2004). These expectations are due to a long history of reinforcement in the form of advances in energy and other technologies. With respect to energy-conservation behaviors, technological advances that have provided inexpensive oil supplies have functioned like a source of (practically) response-independent reinforcement (i.e., getting something for doing little or nothing), weakening incentives to conserve.

Risk Management Contingencies

Hirsch et al. (2005) recognized the lack of a clearly predictable fixed date for peak oil and therefore characterized the problem as one of risk management. A risk management approach acknowledges that either the proponents of an early peak (e.g., within 0-20 years) or those of a late peak (e.g., more than 20 years) may be correct and offers a course of action that produces an optimal combination of the least aversive and the most reinforcing consequences.

Hirsch et al. asked two questions:
1. What are the risks of initiating the crash program prematurely in advance of the peak?
2. What are the risks of initiating the crash program too late in advance of (or after) the peak?

Hirsch and his colleagues maintained the two risks are asymmetric, that with a premature crash program “there might be an unproductive use of resources” (p. 88) whereas a late crash program would result in “a decade or more of devastating economic impacts” (p. 88). Many energy conservation programs would not carry much risk in the case of a late peak and would have important benefits. The Hirsch report identified improvements in vehicle fuel economy as a part of the mitigation program. However, if such improvements were required by the government even 30 to 50 years or longer before peaking, these improvements would likely not be a severe drain on resources and would have direct benefits on reducing CO_2 emissions, global warming and various forms of environmental pollution (Union of Concerned Scientists, 2005). Simmons (2006) has advocated increased use of telecommuting, a transition from long-distance trucking to rail and barge transport, and eating locally-grown food, each of which would also have desirable environmental benefits even if they were timed too early in advance of peak oil.

Unfortunately, at this time the problem of peak oil is not conceptualized in terms of risk management. Instead, discussions of the issue are typically framed in terms of who is "right" and "wrong" regarding the imminence of peak oil. This mode of conceptualizing the issue, along with the problem of resistance to change, has led to placing an implicit high-stakes bet on the behavioral alternative that carries the maximum risk, which is our current course of inaction on peak oil.

Note: This piece is a summary of a longer article available here (opens pdf file).

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