

Community Intervention

Creating Opportunities and Support for Cancer Control Behaviors

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Much of the potential for reducing cancer mortality is dependent on the adoption of new behavioral patterns. Such changes demand application of the behavioral-social sciences. A shift from univariate reductionist models of causation toward multivariate systems models is needed. Decisions (and behavior) are the focus of much of the behavioral-social sciences. Determinants of decisions are delimited by controlling systems. Health care is only one of many possible influences on controlling systems, and its influence is only marginal for the behavior of the general public. Thus, community interventions that address multiple determinants within controlling systems are needed to influence most behaviors. Belief saliency hierarchies appear to psychologically mediate controlling systems. Changes in these saliency hierarchies lead to changes in behaviors. Person-valued beliefs, social-valued beliefs, and feasibility beliefs serve as the informational basis for the hierarchies. Needs activation is a primary means by which hierarchies shift. Changing environmental cues and signals also impart such shifts. Experience, persuasive communication, and value extracted from the environment also change hierarchies. Needs activation, community presence, persuasive communication, facilitation, inhibition, and experience-based interventions are discussed for tobacco use control, dietary change, and breast and cervical cancer screening behavior. Emphasis is given to how the health care system can become a part of the controlling system that influences community behavior. Issues concerning successful implementation of community education programs are raised. *Cancer* 1993; 72:1125-31.

Key words: chaos, systems, decision-making, cancer prevention, cancer control, community intervention.

In the document *Cancer Control Objectives for the Nation*,¹ the Nation Cancer Institute puts forth a plan for the prevention and control of cancer. This set of measurable objectives and detailed actions suggests that a 50% reduction in the annual cancer mortality in the United States is achievable if the plan is fully implemented. In addition, such results are based only on the application of existing cancer prevention and control knowledge and the widespread availability of advanced cancer treatments. Cessation of tobacco use, dietary change to low-fat high-fiber foods, increases in breast and cervical cancer screening, and the adoption of state-of-the-art cancer treatment for most patients with cancer are the specific goals.

At the core of each of these is the issue of change in behavior. None are based on a furtherance of our understanding of the etiology and disease mechanisms of cancer. Instead, they are based on evolving patterns of behavior. The challenge is not one for the biomedical sciences. It is a challenge set forth to the behavioral-social sciences.

Achieving these goals and such unprecedented reductions in cancer mortality will be directly related to the successful application of the behavioral-social sciences to bring about change in behavior. A lack of resources and concomitant recruitment of behavioral social scientists into the field of cancer prevention and control has been a noticeable impediment. Perhaps there was not widespread justification. However, a shift seems to be under way. It is hoped that a critical mass can be achieved sufficient to address the issues at hand.

Certain other obstacles must be overcome along the way. A major barrier is the insistence of some that the behavioral-social sciences adhere to the reductionist scientific models that have advanced the biomedical

Presented at The American Cancer Society National Conference on Cancer Prevention and Early Detection, Chicago, Illinois, September 10, 1992.

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Accepted for publication March 26, 1993.

sciences. Unfortunately, or fortunately, the behavioral-social sciences deal with events and relationships that occur in the community. Successful application depends on generalizability to at-large situations. Isolation of variables and their univariate relationships have little importance compared with the interactive and synergistic impact of multiple variables acting as determinants of behavior. "Wishy-washy," "mushy," and "soft" are adjectives often used to describe the work of the behavioral-social scientist. True, the behavioral-social scientist often must answer queries with the phrase, "it depends." But this is in deference to the nature of the phenomena with which he or she works; one must understand the situation before one can predict or advise. The variability is high, and the certainty is low, but careful and well founded observations yield cause-and-effect relationships, relationships that exist as patterns, probabilities, and principles.

Epidemiology, another scientific discipline using probabilistic methodologies, has made important contributions to the biomedical sciences and has been well embraced. However, it is based primarily on principles of variable isolation and experimental control. The behavioral-social sciences have long used these techniques, but with regard to behavioral intervention, they seek to be more comprehensive, to be inclusive, rather than exclusive. Behavior must be explained in ecological terms.² Methods must be used that capture and describe the richness of the community setting, not ones that strip it bare.

One paradigm that approaches the world in this manner is systems theory.³ Systems theory is a set of related definitions, assumptions, and propositions that deals with reality as an integrated hierarchy of organizations existing in space and time and made of matter and energy organized by information.⁴ A useful adaptation to health is proposed by Brody and Sobel,⁵ who offer a framework that can coordinate the roles of various health practitioners, the information about health and disease generated by the biologic, behavioral, and social sciences, and many aspects of health planning and public policy. A shift from the linear mechanistic models to such synergistic systems models seems essential to the successful involvement of the behavioral-social sciences in cancer prevention and control.

In operationally defining behavior, behavioral-social scientists usually have used decision making as a framework. The innovation-decision process^{6,7} examines stages in decision making through which individuals and organizations pass as they take action. These include knowledge, persuasion, decision, and confirmation stages.⁶ Important attributes of innovations also are delineated, such as relative advantage, complexity, trialability and compatibility, which affect the rates at

which new behaviors are adopted.⁶ Additional descriptions include the characteristics of organizations as they affect the innovation-adoption process (such as complexity, formalization, centralization, interpersonal relations, and the handling of conflict).⁷

The Health Belief Model⁸ is a decision model applied specifically to understanding changes in health behavior. It identifies serious consequences, a high probability of occurrence, and a clear course of action for reducing health threats as key motivational determinants. In another psychologic model of decision-making based on conflict resolution, Janis and Mann⁹ extend the paradigm by describing processes for assessing and choosing from among possible alternatives for action.

Expectancy-value theories^{10,11} based on the expectations that consequences will follow actions and the value placed on these possible consequences probably have been the most useful in predicating behavior.^{12,13} The theory of reasoned action¹² and the social learning theory¹³ probably are the best known of these theories in the health field. The assumptions for these theories is that individuals seek to extract value from their environment. Information about what is of value and how to gain it is learned from experience, observation, and communication. This information is stored as beliefs about cause-and-effect relationships between behavior and its consequences. As one interacts with one's environment, one observes the nature of the environment and reacts based on the processing of relevant beliefs. Thus, behavior is focused and guided toward valued outcomes.

One final reference to decision models is made: it is the precede/proceed health promotion planning framework.¹⁴ It offers guidance in the selection and targeting of key health behaviors and their predisposing, enabling, and reinforcing determinants as a focus of health promotion intervention. This model underscores the logic of concerning oneself with the precursors that control decisions as a means to create change.

Work with chaos suggests that events are discrete.¹⁶ From chaos emerges fractal patterns as control is established by strange attractors. Chaos exists in the areas between the boundaries of the strange attractors, but order appears as influence is gained. Sometimes, events controlled by one strange attractor are rapidly shifted to the control of another strange attractor. Something causes the first attractor system to weaken or disintegrate, or the second system to strengthen, allowing the second attractor system to dominate the first. The result is a jerky, dichotomous pattern of events. Many health behaviors exhibit this catastrophic pattern. Persons will demonstrate one pattern of eating as they gain body mass, but at some point, a different system of determi-

nants takes control, and drastic and pervasive changes in eating behavior occur (e.g., liquid diets, fasting, carrot-and-celery diets). Then, after some time, control may switch to the previous system of determinants, and predatory practices return. A pattern of often-drastic changes between somewhat stable sets of behavior is apparent.

Another example of this pattern comes from smoking cessation efforts. The use of a nicotine transdermal patch releases control from physiologic determinants (i.e., nicotine addiction) to other controlling determinants (e.g., social and civil).¹⁷ If these other determinants tend toward nonsmoking behavior, cessation occurs.¹⁸ However, with the removal of the nicotine patch, one may see a rapid return to smoking patterns as the physiologic determinants re-establish dominance.¹⁸

Patterns of smoking cessation without the use of the nicotine patch also often follow this catastrophic pattern, fluctuating between smoking and nonsmoking three or four times before consistent control is established by a nonsmoking set of determinants.¹⁹ However, the dominant controlling determinants are not as obvious as those seen in use of the nicotine patch. Psychological determinants, social determinants, economic determinants, civil determinants, and supply system determinants have demonstrated control over smoking behavior. In addition, they vary depending on the stage of the change process.²⁰

Many other such patterns are evident with health behavior. Adherence to exercise regimens during cardiac rehabilitation falls into these catastrophic patterns.²¹ It seems likely that seat belt use, alcohol and drug consumption, and many other health behaviors also show catastrophic patterns in their occurrence.

This chaos and control perspective of behavior raises a number of important issues. If shifts in motivational systems explain these shifting behavioral patterns, what do the controlling attractor systems look like? Is there a common attractor system for health behavior? What might its components be? How often and when would such a system be in control? What are the other controlling systems from which health behaviors shift, and how often are they in control of health behavior? What are the triggers or points at which shifts occur? How does one influence which system is in control and what the endpoints of control are?

From the systems perspective, let us examine health care in its attempts to influence health behavior. One sees shifts to a controlling position by the health care system when people adopt sick-role behaviors.²² A health threat often changes controlling systems and a new "set" of role behaviors and interactions with the environment appear. Sick people are compliant. They

are dependent. They are passive. In addition, a similar "set" of behaviors often is seen in patients although they may not be "sick."²³

Such control by the health care system suggests that need²⁴ and social influence²⁵ are at work as determinants. Most people will consider themselves sick (as measured by help-seeking behaviors) when they can not function as they expect.²¹ They seek aid to help restore function. Thus, a need arises. When the loss of function is large enough, the need for restoration becomes dominant and sick-role behavior replaces other routine behavior. Needs are a component of the health care attractor system.

Another factor that is operable is that the sick patient seeks aid from the health care system. This implies that the health care system is viewed as a likely source for the valued restoration outcome. It may be that several possible sources of valued outcome are perceived to exist. In such cases, a weighing of alternatives may take place⁹ in which the likelihood that restoration will be successful is considered, along with the response costs of the help-seeking alternatives (e.g., financial costs, time costs, assistance needs, and lost opportunities) and the feasibility of the alternative (e.g., can one get there, does one have time). The likelihood that action will lead to the valued outcome, the costs of choosing that action, and the feasibility of taking the action are likely components of the health care attractor system.

Controlling determinants for the patient who adopts sick-role behaviors although he or she is not sick are likely more complex. Certainly, such patients are seeking value to fulfill a need; otherwise, they would not be seeking care. This manifests itself as help from the health care provider. A power relationship exists²³ in that the health care provider has the power to give the patient the valued outcome. People develop expectations of how to act around people who have the power to give out value. Behaviors motivated by such power relationships are termed "compliance behaviors."²⁶ Power to give out valued outcomes and the compliance relationships this establishes are part of the health care attractor system.

Another possible social influence determinant for the behavior of the patient who is not sick has to do with social approval or disapproval.²⁵ Much evidence suggests that people seek to do what they think other people think they should do.¹² One cannot respond to all people, but there is a group of other people who may significantly influence our behavior. Many factors may determine who is a "significant other," but because the patient thought enough of the health care provider to seek aid from him or her, the provider likely may be one of these significant others. If so, the patient likely would value the approval or disapproval of the provider. Per-

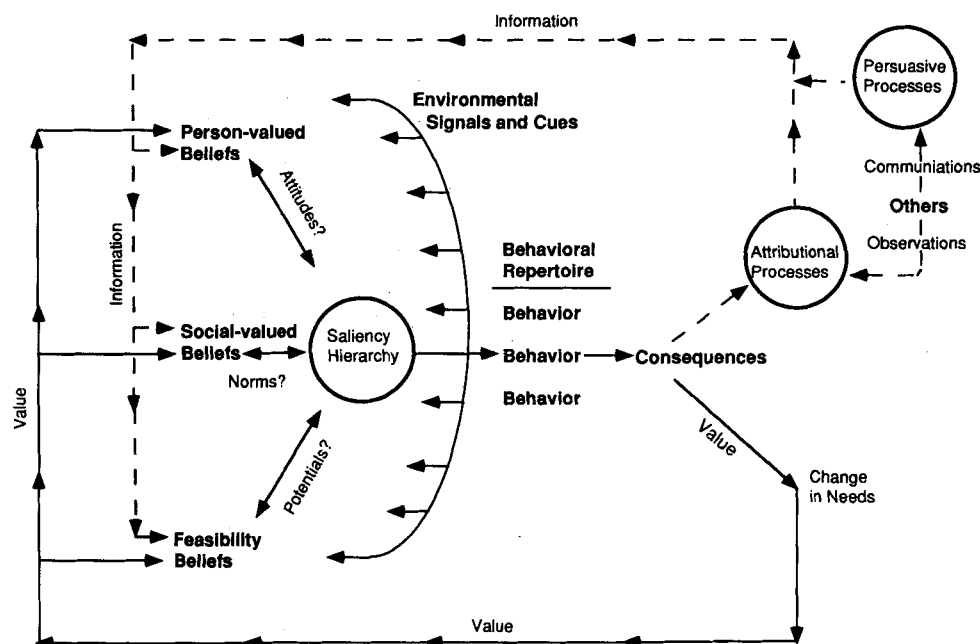


Figure 1. Strange attractor system for behavior.

ceived social approval probably is a component of the health care attractor system.

Social influence that may or may not be in effect in this situation has to do with the needs for belonging and self-esteem.²⁷ People tend to select social referents or referent groups and identify with them.^{25,26,28} They shape their behavior, image, and thinking to that of this referent group. In choosing referents, value often is sought to meet belonging and self-esteem needs. Referents of higher social and economic status may be emulated.²⁵ Patients who are not sick may seek care because they perceive it as expected of their referent group, and feeling (through performing identity behaviors) a part of the referent group has value. This also is true when people choose referent groups based on functional considerations. Role behavior results and consists of sets of expected behavior consistent with the role.²⁸ Gender roles and division of labor roles are common examples.

The term "system" is used to describe health care as a strange attractor because experience suggests that multiple components make up the attractor, and they are synergistic.^{15,24} A model of an attractor system for behavior includes person-valued beliefs, social-valued beliefs, and feasibility beliefs, which lead to behavior (see Fig. 1). Person-valued beliefs concern the perceived likelihood that a specific action will lead to an outcome of utilitarian or hedonistic value.^{10,11,12} Social-valued beliefs address perceptions of value derived from social acceptance by significant others, identity behaviors with referent groups,^{25,26,28} and compliance with those who have power.^{25,26} Feasibility beliefs include perceptions of having control over performance

of the behavior,²⁹ self-efficacy beliefs,¹³ and expectations of costs and accessibility.^{14,15}

How these components combine to direct performance is a matter of speculation. However, the model used by Fishbein and Ajzen in the theory of reasoned action suggests possibilities.¹² Their observation is that based on attention span, apprehension, and information processing research; individuals are capable of attending to or processing only five to nine items of information at a time.¹² From this, they construct the concept of a saliency hierarchy comprised of expectations of the most likely and the most valued outcomes.¹² Make this hierarchy more general to include the person-valued beliefs, social-valued beliefs, and feasibility beliefs, and a generalized strange attractor system for behavior is described. Five to nine beliefs from the three categories would comprise the saliency hierarchy. This hierarchy assumes an associate function⁴ that enables control shifts between attractor systems.

The saliency hierarchy might include a combination of person-valued beliefs, social-valued beliefs, and feasibility beliefs, or it might be dominated by beliefs from one or two of the types of beliefs. Probably, either person-valued or social-valued beliefs would always be included in the hierarchy, because such beliefs direct behaviors toward value, but the mountain climber who climbed the mountain because it was there might suggest that feasibility alone is sufficient to motivate behavior.

Another possibility for the formation of the saliency hierarchy is that person-valued, social-valued, and feasibility beliefs are grouped, and summary per-

son-valued, social-valued, and feasibility judgments are processed to determine action. The concepts of attitude, norms, and behavioral potential suggest this might be true.¹² Such preprocessing of cognition would permit more information to be used in a shorter period of time in the making of decisions. Evidence exists that in crisis situations, rapid decisions are made that short-circuit the decision process.⁹ Similarly, given incentive and time, many more than five to nine factors may be considered in making a decision.¹²

However the saliency hierarchy is formed, an important aspect of the process is that beliefs are subject to the environment.³⁰ Person-valued, social-valued, and feasibility beliefs are influenced by environmental situations. People learn to read the signals and cues from the environment, which informs them about the likelihood that value can be gained.

People are continuously reading and processing information from their environment. Much of this information is processed unconsciously, but when a signal or cue catches one's attention, processing becomes conscious and focused. When this happens, that information and associated beliefs become, at least momentarily, a part of the saliency hierarchy. Depending on the information learned from the environment and how such beliefs change as a result of this new input, newly introduced beliefs may remain salient and may direct behavior. As a result, behavioral alternatives that were not salient may be considered and become salient. Whether they are more feasible to achieve or because attention was not being drawn to their importance although they are indeed important, they become salient. This type of needs activation allows for needs to be met that might be of marginal importance or value but are worthy of seeking under the right environmental conditions. However, if action does not occur quickly, the hierarchy may shift again, directing behavior to other areas.

Finally, in any model of behavior one must recognize that the consequences of behavior change the beliefs and saliency hierarchy. They do this in two ways. First, when value is achieved, there is a change in what is perceived to be of future value. Second, causal information is gained that changes perceptions of the likelihood that value will follow from specific actions taken under certain environmental conditions. In this way, future behavior is shaped by current behavior.

Recognizing the role that environmental stimuli and reinforcement play in this control system underscores that motivation is a dynamic process. A stable structure does not imply that the underlying content is stable.

If this is a workable model of the attractor system for purposeful behavior, the question becomes how

does one have input into it so that the output is the attraction of appropriate health behavior? Also, because most behavior is likely to be controlled by systems other than a health attractor systems, what are the other nonhealth attractor systems that also give rise to health behavior? Much work has been done to answer the first question, but little has been done to answer the second question. To answer it, many more ethnographic descriptions of health behavior and its context are needed. Unfortunately, case studies of this type are not often funded in the health field.

Some assumptions follow on determinants of health care that might be part of an attractor system. Health care is most likely to be a controlling determinant; when health needs are high, care is perceived as likely to lead to value, and health behavior is feasible. This often is referred to as a "high-involvement" situation. However, this suggests that cancer prevention and control behavior are not normally salient considerations. Tobacco control, dietary change, and breast and cervical cancer screening are not behaviors linked closely to a high health threat. In addition, with the exception of screening and possibly the use of a nicotine transdermal patch for tobacco control, health care probably does not offer much instrumentality for cancer prevention and control behavior. Regarding feasibility, with few exceptions the barriers to accessing health care in this country create a mountain that few are willing to regularly climb.

However, choosing to stop smoking, change to a lower-fat higher-fiber diet, be screened for breast and cervical cancer, and perhaps not to initiate tobacco use are decisions that often are influenced by health threats or concerns. Somehow a health need is activated for these behaviors. Because for most people the actions implied by these decisions are perceived as low in feasibility, other controlling determinants for the behaviors must align favorably and significantly support cancer prevention and control behaviors for them to occur. What are these other determinants? That will depend on the behavior, individual, and environment. How are they aligned? That is the nature of community intervention.

The controlling system that has been presented suggests three categories of beliefs, environmental signals and cues, and the reinforcement process as influences that can and should be addressed in community intervention. At any time in the control process, any of the determinants may have dominating control. However, it is more likely that several determinants acting as a saliency hierarchy will interactively exert control.

Person-valued beliefs that are likely to be controlling for cancer prevention and control decisions are the perceived susceptibility to cancer, the perceived

seriousness of cancer, and the perceived efficacy of cancer prevention and control behaviors at preventing death and disability caused by cancer. Persuasive communication is needed to activate needs by building susceptibility and efficacy beliefs, with the seriousness of cancer being well recognized. Because cancer is rather rare compared with the other more immediate events in our daily lives, environmental signals and cues must be present in the community to keep the issue of cancer prevention and control salient.

Radio, television, billboards, posters, and newspapers are typical channels for providing such messages and cues. Unfortunately, these avenues also are filled with many other messages, some of which compete or conflict with cancer control messages. Cancer control messages must be positioned or distinguished in ways that draw people's attention. Diminishing the community presence of messages and signals and cues promoting cancer-causing behaviors also is an appropriate cancer prevention and control strategy.

Reinforcement of cancer prevention and control behaviors is important. When appropriate cancer control behavior is recognized by health care providers, approval and support should be offered. Verbal communication probably is the best way to offer approval, but other indirect means should be used (posters, pamphlets, lapel pins and buttons, pictures). Health care providers should make sure that they do not communicate the wrong messages (e.g., permitting smoking in a clinic or having magazines in the office that display advertising of harmful products). Artificial rewards also could be given to patients who make positive cancer prevention and control behavior changes (e.g., offering free or reduced rate services).

Experience is subject to interpretation by individuals. Attributional theories describe the nature of this personal process to establish causation.^{31,32} Evidence exists suggesting that this interpretation process can be influenced, resulting in differing impacts on beliefs and subsequent behavior (unpublished data; Rainey J). Publicizing the anxiety-reducing benefits of periodic breast and cervical cancer screening could make this a recognized outcome for some women who experience it but are not aware of it. This also is true of weight loss resulting from low-fat high-fiber diets. Making known the possible positive benefits can increase the rewards that other people who try these behaviors may find.

Enhancing the perceptions of individuals that significant others think that cancer prevention and control behaviors are appropriate can increase the value people place on these behaviors. Community educational strategies that enable these types of interpersonal communications to occur are important cancer prevention and control methods. Public rallies, bumper stickers, net-

working, tee-shirt graphics, signs, business cards, ink stamps, and lapel buttons are examples of methods that can be used to facilitate such communications.

Civil systems can greatly affect cancer prevention and control behaviors. Regulation of health behavior has been effective as a controlling determinant.³³ Clean indoor air policies and local tobacco regulations have increased greatly.³⁴ Recognizing that such laws have been justified when the hazards to be regulated are high, caution is urged in using regulation to control self-harming behavior. Side effects accrue for behavioral interventions the same as for all other interventions, and coercive approaches to behavior change have a high potential for negative side effects.

Civil systems also may include much of what forms the basis of feasibility beliefs. The availability of convenient cost-acceptable services will do a lot to build perceptions that cancer prevention and control behaviors are feasible. Publicizing that transportation, parking, appointment hours, child care, and clinic waiting times are not problems (if indeed they are not) will enhance feasibility beliefs. Modeling the skills needed to make and keep appointments also will increase perceptions of feasibility. Costs can be made to seem reasonable by comparing them to other ways people might spend this money, although such comparisons will create close scrutiny of the value of cancer prevention and control. So, make it cost-acceptable, make it easy to perform, and then make people aware and demonstrate how to participate.

One of the most important civil systems for building feasibility beliefs (and person-valued and social-valued beliefs) is through comprehensive school health education. Comprehensive school health education, if implemented as suggested in Healthy People 2000,³⁵ would develop much of the belief base to support cancer prevention and control behavior. However, its implementation will not be easy. The determinants that control its adoption are many, and some will not be easily changed. It is a community decision, and attractor systems controlling community behavior take much effort to influence.

Finally, many community health education interventions are likely to fail for three reasons. First, they are not based on sound educational diagnosis. The actual behavioral determinants for the population that is to change are not addressed by the educational activities that comprise the intervention program. This usually is the result of a faulty planning process, including a lack of application of behavioral-social science principles, and a lack of time and resources.

A second reason is that the selected educational activities do not include the appropriate methods and strategies for the population that is to change. Specific

competencies for adapting appropriate learning and education methods and strategies usually were not brought to bear during planning and implementation.

Third, community interventions fail because of the lack of delivery and institutionalization. The programs do not reach the populations targeted for change, or if they do, they are not sufficiently potent (addressing only single determinants) or they are too short in duration. Such failure also may be attributable to faulty planning, but usually results from a lack of resources.¹⁴ The amount of money spent on cancer prevention and control is small compared with what is spent on cancer treatment.

More behavioral-science personnel and more resources are needed if cancer prevention and control objectives are to be achieved. In addition, systems thinking must be used to identify and strengthen the competencies in the community that support and create opportunities for cancer prevention and control.

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