

Behavior Modification in Primary Care: The Pressure System Model

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The leading causes of death in the United States are predominantly attributable to modifiable behaviors. Patients with behavioral risk factors for premature death and disability, including dietary practices; sexual practices; level of physical activity; motor vehicle use patterns; and tobacco, alcohol, and illicit substance use, are seen far more consistently by primary care providers than by mental health specialists. Yet models of behavior modification are reported, debated, and revised almost exclusively in the psychology literature. While the Stages of Change Model, or Transtheoretical Model, has won application in a broadening array of clinical settings, its application in the primary care setting is apparently quite limited despite evidence of its utility [Prochaska J, Velicer W. *Am J Health Promot* 1997;12:38–48]. The lack of a rigorous behavioral model developed for application in the primary care setting is an impediment to the accomplishment of public health goals specified in the *Healthy People* objectives and in the reports of the U.S. Preventive Services Task Force. The *Pressure System Model* reported here synthesizes elements of established behavior modification theories for specific application under the constraints of the primary care setting. Use of the model in both clinical and research settings, with outcome evaluation, is encouraged as part of an effort to advance public health.

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INTRODUCTION

Individual and group behavioral patterns amenable to modification represent the leading causes of morbidity and premature mortality in the United States [2]. Many of the *Healthy People* objectives can only be achieved through modification of behavior [3]. There is evidence that individualized counseling for behavior change may be effective when the simple dissemination of public health messages fails [4–6]. Thus, future successes in modifying behavioral risk factors will derive

at least partly from the efficacy of individualized counseling.

Impediments to changing individual or group behavior are the basis for psychological models intended to characterize, and optimally, modify behavior. Such models as the *Stages of Change* or *Transtheoretical Model* [7], *Social Learning Theory/Social Cognitive Theory* [8,9], the *Theory of Reasoned Action* [10,11], and the *Health Beliefs Model* have been developed to characterize the difficulties encountered by patients and counselors in efforts to modify established behaviors [12]. There is evidence that the application of behavioral modification paradigms to public health and clinical goals can be effective [13,14]. The transtheoretical model, which developed from smoking cessation programs, has been applied to such programs with some success [15]. Recently, the model has been applied to diet where it shows similar promise [16].

However, the prevailing behavior change models are fundamentally the products of the behavioral sciences, especially psychology, rather than primary care [17]. The models, of demonstrated utility when skillfully applied, generally fail to address important limiting realities of the primary care setting and often use jargon and assume prior expertise more germane to clinical psychologists than to primary care practitioners [18,19]. Yet the vast majority of patients with behavioral risk factors are seen by one or more primary care providers at various times and, appropriately for the most part, never present to a mental health specialist [20,21]. For individualized behavior modification counseling to make a difference at the population level, it cannot be the exclusive purview of mental health specialists.

The primary care setting imposes unique constraints on the delivery of effective counseling [22,23]. Visits are generally brief, often limited to 15 min. In contrast, mental health interviews are often 45 min to an hour long and generally less structured. In the limited time available, the primary care provider must address all



of the pertinent health problems and concerns of the patient, or at least distinguish the more pressing from the more reasonably deferred. Consequently, modification of behavior, if it is to be promoted in the primary care setting, requires an efficient model of delivery with explicit guidance to practitioners in identifying how to change behavior in the context of readily distinguishable clinical circumstances.

Primary care practice is the purview of a diverse group of practitioners, encompassing, minimally, internists, pediatricians, family practitioners, gynecologists, naturopaths, nurse practitioners, and physician assistants. Training in behavioral psychology varies in both depth and breadth across these disciplines and in no instance is as comprehensive as that provided by psychologists and psychiatrists. There is meaningful evidence that physicians' advice regarding behavior change can be influential [4,24]. Missed opportunities in dietary counseling have prompted a specific recommendation for the development of more comprehensive and practicable models of behavior modification [25]. The large potential contribution of effective behavior modification counseling in primary care justifies the development and application of a behavior change model specific to that setting. The *Pressure System Model* described in this report is proposed for that purpose. The model synthesizes elements from established models of behavior change with novel elements and explicitly identifies applications to typical clinical presentations.

PRESENTATION OF MODEL

Description of Antecedent Models upon Which the PSM Is Based

In addition to the transtheoretical model, prevailing behavior modification models include Social Cognitive and Social Learning Theory, the Theory of Reasoned Action, and the Health Beliefs Model [12,25,26]. Social Cognitive Theory [8,9] stipulates that behavior results from an interaction of environment, emotional response, and cognitive response. An important concept related to this model is self-efficacy, the belief an individual has that he/she can accomplish a specified task. Self-efficacy is therefore task specific. Studies indicate that self-efficacy reliably predicts changes in health-related behaviors [25].

Social learning theory contends that behavior is a product of expectations that the behavior in question will influence outcomes of interest to the individual. The principal factor influencing behavioral responses in this construct is the locus of control [27]. Locus of control is internal when one believes that behavior will influence outcome and external when one believes that good or bad outcomes are uninfluenced by behavior and are, instead, determined by external forces. External

forces may be random (i.e., fate) or ordered (i.e., individuals deemed to be powerful, such as family members or health care providers). Locus of control is less task-specific than self-efficacy, but need not be entirely generalizable. An individual may believe that his/her behavior will influence outcomes in certain ways (e.g., injury prevention), but not others (e.g., cancer prevention) [25].

The theory of reasoned action [10,11] asserts that interest in particular behavior (and therefore intention) is primarily related to expectation of outcomes, while the actual behavior is a product of intention, perceptions of causality, and the perceived benefits and detriments of various behavioral options [18]. Implicit is a suggestion that intention and behavior may diverge due to difficulty in executing change. The Health Belief Model theorizes that behavior change occurs when the individual perceives him/herself to be susceptible, perceives the consequences of the current behavior to be serious, and perceives the benefits of the behavior change to be important.

The most widely cited and applied behavior change model, the Stages of Change Model, or Transtheoretical Model, established by Prochaska and Di Clemente [28], was derived by observing the behavior of individuals attempting to quit smoking. This model stipulates that behavior change progresses predictably through the stages of precontemplation, contemplation, preparation, action, maintenance, and, if ultimately successful, termination [29].

The models interrelate both implicitly and explicitly. The Stages of Change Model relies on self-efficacy as the basis for progression from one stage to the next [18]. Health beliefs influence the desire for behavior change, but conversion of that desire into action depends in turn on the stage of preparedness for change, on self-efficacy, and on the locus of control. Implicit, if not explicit, in the health beliefs model is the stipulation that the behavior change in question must be perceived as feasible. Feasibility in turn depends on accessibility, availability, cost, convenience, safety, familiarity, and understanding, as well as the influence these factors have on self-efficacy.

Locus of control and self-efficacy may be associated, as well. In behavioral domains where the locus of control is external, self-efficacy is apt to be low, while the converse may or may not be true. Recurrent failure in efforts to achieve the demands of authority, conscience, or perceived norms erodes self-esteem. The tendency to engage in behavior one knows or believes to be wrong cultivates feelings of guilt, self-doubt, and, ultimately, apathy and relative helplessness [30]. Thus, self-esteem and self-efficacy interrelate.

This overview of antecedent models is derived from a vast literature and is willfully brief and selective rather than comprehensive. The intent here is to provide a

context and rationale for the *Pressure System Model*, rather than to review systematically the behavior change models on which it is based.

Elaboration of the Pressure System Model

Effective application of behavioral theory in primary care requires that the model be not only valid but also simple, expedient, and explicit with regard to not only the state of the patient but also the response and responsibility of the provider [31]. None of the existing models meets these criteria.

The multiple components of behavior change theory can be synthesized into two opposing forces: the desire to change, or *motivation*, and the impediments to change, or *resistance*. Believing in the importance of the condition to be avoided, in personal risk, and in the efficacy of the change are all components of motivation. A change believed to modify meaningfully a substantial, personal risk is desirable. Such a change, however, will only occur if the resultant motivation exceeds resistance. In this regard, the other models are informative. To effect a change, one must be capable of change. Individuals with an external locus of control cannot change their behavior until or unless they learn that they have the capacity to do so [27].

The Pressure System Model (PSM) derives its name from meteorology, where differences in barometric pressure determine the direction in which the wind blows. Air is pushed from a high-pressure system toward a low-pressure system; changes in relative pressure can reverse or stifle the movement of air. In the PSM, the same is true of behavior change.

The initial contribution of the PSM is its capacity to separate two fundamental goals of behavioral counseling, raising motivation and overcoming resistance. Either effort may serve to produce the desired behavior change: movement will proceed from high to low, however the difference in relative "pressure" is achieved. This concept is displayed schematically in Fig. 1.

The conventional approach to behavioral counseling in primary care is to raise motivation [19,32]. Patients are appraised of the health risks associated with the maintenance of smoking, alcohol consumption, illicit drug use, or a sedentary lifestyle and of the benefits of changing such behaviors [31]. As shown in Fig. 1, when motivation can be raised above resistance, behavior change will occur.

Generally unaddressed in counseling efforts, however, are the fixed impediments to behavior change. A schedule that does not readily accommodate exercise may overcome motivation for physical activity. A fellow household member's smoking may overcome an individual's motivation to quit. The convenience and familiarity of fast food, and uncertainty about how to change patterns of shopping and cooking, may overcome an

individual's desire to improve their diet [33]. As shown in Fig. 1, even if motivation is fairly high, change cannot occur if resistance to change is higher still. While counseling may serve to raise motivation, the level may fail to exceed resistance.

The insidious danger in this traditional approach to counseling is the tendency to actually or at least apparently "blame the victim" of behavioral risk factors [34–38]. While an unmotivated patient may be encouraged by a clinician's efforts to motivate, an already motivated patient is apt to experience frustration when change does not occur. That frustration is generally shared by the practitioner, adversely affecting the relationship [39]. The PSM serves as a reminder that motivation is not infinitely malleable and that when resistance is great enough motivation alone cannot produce behavior change. This encourages both patient and provider to engage in the productive process of identifying impediments to change that may be surmountable, instead of the unproductive process of self-recrimination.

The second contribution of the PSM is its capacity to define the appropriate focus of counseling efforts based on discrete and easily recognized clinical scenarios. The model allows for the classification of patients into one of five categories. In each of the categories, the theoretical aspects of behavior change are translated for the primary care practitioner into a clearly defined goal for counseling, namely, to cultivate motivation or attempt to overcome obstacles and resistance to change (or, occasionally, both). Ultimately, the model functions almost algorithmically, with the patient's responses to a brief interview identifying their PSM category and the category in the PSM model identifying in turn the nature of the counseling required to promote/facilitate the desired change.

The Stages of Change Model may be viewed as sequential assessments of the balance between resistance and motivation. When difficulty is perceived to exceed the rewards of change, one is unwilling to change; when alternative behaviors are unfamiliar, one is unaware of the possibility of change. Either scenario results in a precontemplative state. With new information or experience, motivation for change may rise as the perceived resistance remains constant. As the gap between the two narrows, one perceives the potential for change and becomes first contemplative, then preparative. Change is attempted whenever motivation, at least temporarily, exceeds perceived resistance. The behavior change is maintained until or unless resistance overtakes motivation, at which time relapse occurs. More realistic, or at least more practiced, assessments of both resistance and motivation result from unsuccessful attempts at change. These attempts either serve as the necessary preparation for sustainable change or lead to frustration. Termination, a stage in which there is

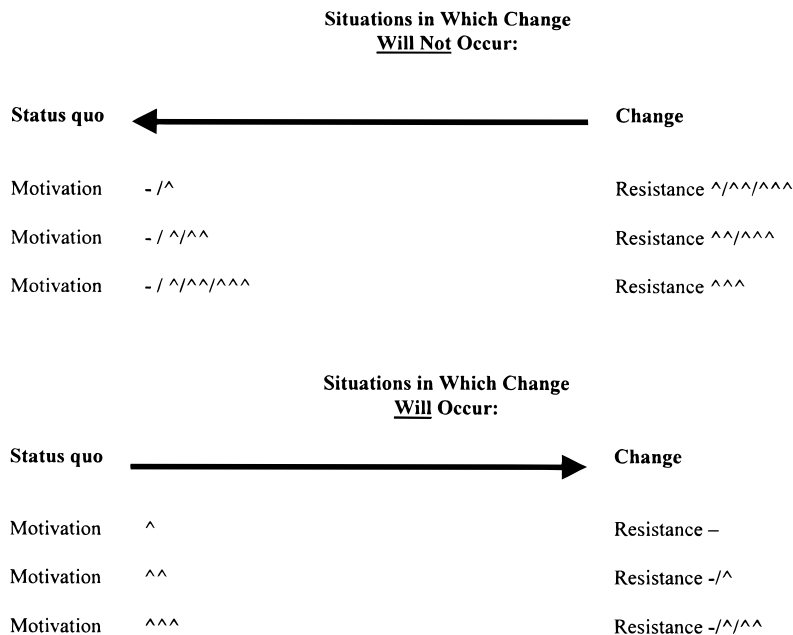


FIG. 1. Schematic representation of the Pressure System Model. The relative force of motivation and resistance, as represented by arrowheads, determines whether desired behavior change occurs or whether the status quo is maintained. A horizontal line represents neutrality, and increasing numbers of upward arrowheads represent increasing force or “pressure.”

no temptation to return to the modified behavior, represents success. Recurrent “failure” to achieve lasting change, however, may lead to regression to earlier stages.

Virtually all clinical encounters in which behavioral counseling is pertinent may be placed in one of five categories, based on the stages of change and consideration of both resistance to change and motivation for change. A patient’s category may be determined by eliciting the answer to two questions: (a) Are you currently involved in any effort to modify (the behavior in question), or, if not, are you considering such an effort? (b) Have you made prior attempts to modify the behavior, and, if so, how did they end? Each scenario indicates the approach to counseling most likely to be of value. In the stage of true termination, behavioral counseling is not required, as the patient has completely overcome the risk behavior.

(a) *The patient is precontemplative, with no prior attempts to change the behavior in question.* Counseling should be directed at raising motivation. The clinician should attempt to encourage contemplation and preparation for action. Difficulties in achieving and sustaining behavior change should be discussed in anticipation. The focus of counseling is on *what* the change should be and *why* it should occur.

(b) *The patient is contemplative, or preparative, with no prior attempts to modify the behavior in question.* Generally, in contemplative and preparative stages,

motivation and perceived resistance are, or nearly are, balanced. The balance can be tipped by raising motivation slightly or by addressing any perceived impediments to change and devising strategies to reduce the difficulties involved. The focus of counseling is on both *why* change should occur and *how* change can be achieved.

(c) *The patient is actively modifying behavior or the patient is maintaining behavior change.* With sustained effort, motivation tends to wane. Difficulty often rises early, as unanticipated impediments are encountered, and slowly declines, as the new behavioral pattern becomes increasingly familiar. The patient must be encouraged to sustain motivation, and newly encountered difficulties should be discussed to develop tailored strategies. Counseling must be focused on *how* to maintain changes, in addition to *why*. As the patient acclimates to the new behavioral pattern, further improvements become possible. More detailed discussion of *what* additional changes should occur may be indicated.

(d) *The patient reports a lapse to the prior behavioral pattern.* Lapses occur in any situation where the difficulty involved in sustaining change exceeds motivation. Lapses tend to produce feelings of remorse and to affect self-esteem adversely. Counseling must serve to alleviate remorse, reestablish motivation, and assure the maintenance of an internal locus of control. Discuss reasons for (re)lapse in the context of the apparent impediments to the particular behavior change. Discuss

specific circumstances that lead to (re)lapse, and devise strategies for dealing with such circumstances in the future.

(e) *The patient is precontemplative, or contemplative, with prior attempts to modify the behavior in question.* Prior, unsuccessful efforts at behavior modification, or relapses following transiently successful efforts, tend to damage self-esteem. Low self-esteem and lack of perceived self-efficacy are likely to have externalized the patient's locus of control. Patients in this group may benefit from counseling directed at raising motivation, but are more in need of counseling directed at raising self-esteem, relieving feelings of failure, and internalizing the locus of control. This can be achieved by explaining the involuntary elements (e.g., environment) influencing behavior and by refuting the concept of personal fault. Patients in this group will be particularly wary of the difficulties involved in changing behavior; counseling efforts should focus on tailored strategies for overcoming specific obstacles. This stage is probably the most commonly encountered in primary care and why conventional approaches to counseling in primary care are so ineffective. A preferential focus on motivation in this group is likely to be harmful, exacerbating the patient's perceptions of failure and further eroding self-esteem and self-efficacy.

DISCUSSION

To achieve explicit national public health goals, and ameliorate the leading causes of death and disability in the United States, effective approaches to behavior modification are essential. The application of such models to primary care is equally essential, if population-wide benefit is to result [21]. Current practice patterns in primary care largely fail to exploit the physician's potential to influence behavior [40]. The development and application of behavior modification models tailored to primary care are required by the limited application, and resultant ineffectiveness, of existing models in such a setting. [25].

The PSM is tailored to primary care practice. Brief interviewing allows the clinician to ascribe to the patient, and the desired behavior change, one of five scenarios incorporating the stage of change, as well as elements from Social Cognitive Theory and Social Learning Theory. The PSM foregoes use of psychological jargon, however, and specifies for each such scenario whether the patient is more likely to need motivational counseling or assistance in identifying and overcoming resistance to achieving or maintaining change. While the delivery of detailed advice for overcoming barriers to change may require more time, and perhaps more expertise, than are generally available in the primary care setting, the model facilitates rapid identification of the need for such counseling. By so doing, it helps

direct the practitioner away from exclusive consideration of motivation under circumstances where that is of potential harm. Correctly identifying the needs of a patient should assist the primary care provider in efforts to meet/address those needs, if not directly then by appropriate referral. The need for such an approach is particularly acute given that efforts to raise motivation, improperly applied, may serve instead to damage self-esteem, further reducing the probability of behavior modification.

That being said, the PSM should not be considered an argument against well-applied efforts to raise motivation for change. In the early stages of change, the PSM specifically indicates a need to address patient motivation. As noted by Botelho and Skinner, "advice giving," a relatively ineffective means of raising motivation, has tended to predominate in clinical practice [19]. Specific methods of motivational interviewing have been developed and published [32,41-43]. While detailed discussion of such methods is beyond the scope and intent of this paper, behavior modification efforts in the primary care setting would doubtless be more successful were these techniques to be more widely applied. Nonetheless, when motivation is already high, the incremental yield of efforts to raise motivation further, even by effective and skillful means, is questionable, and in certain patients such an effort may be harmful as noted above.

The PSM, like the Transtheoretical Model upon which it is partly based, is, at its introduction, a product of clinical empiricism and observation rather than outcomes research [44]. As has been the case with antecedent behavioral models [45], the PSM can be applied in a variety of clinical settings; unlike prior models, the PSM is specifically developed to facilitate such an effort. The achievement of clinical goals, or explicit research outcomes, in varied efforts at behavior change will validate the particular methods and, indirectly, the model upon which the methods are based. As the PSM is fundamentally a vehicle for the delivery of established behavior change theory to the primary care setting, rather than novel theory per se, its appeal to primary care practitioners and its application in primary care are the principal means of proving its utility.

The PSM draws heavily on existing, accepted, and to varying degrees validated models, synthesizing established concepts into a construct with explicit implications and guidance for the delivery of counseling in primary care. The value of applying the transtheoretical model is increasingly clear in the research setting, where it serves both to characterize subjects and guide the tailoring of interventions [46]. The PSM is intended to facilitate wider application of such effective strategies in primary care by virtue of efficient packaging and explicit links to easily identified clinical scenarios.

An important limitation of the PSM is its inability to

impart to the clinician explicit guidance for overcoming impediments to behavior change encountered through use of the model. In some areas of behavior change, literature is available both to identify common impediments and to offer guidance for overcoming them. Smoking cessation is a good example, with the literature slowly evolving a tailored approach involving behavioral and pharmacologic interventions [47]. Similar insights are emerging for promoting physical activity [48], and dietary change [49]. An extensive discussion of impediments to dietary change, and of strategies to overcome them, is included in a textbook soon to be published [50]. Even in situations, however, where strategies for overcoming resistance to change are uncertain, the PSM will at least guide the clinician away from potentially harmful efforts to compensate by ill-advised efforts to emphasize patient motivation.

In all but the most problem-focused encounters, primary care providers should address preventive health issues, including diet, physical activity, and smoking [51]. By applying the PSM, providers can quickly ascertain what the counseling needs of a patient are likely to be. Motivational counseling can be provided when appropriate and avoided when more likely to be harmful than helpful. The model can indicate when the limited time available for such counseling should be spent attempting to identify impediments to behavior change, in order to work with patients to devise compensatory strategies. The model is amenable to more robust applications as well. The value of tailored messaging in promoting behavior change has been described [52,53]. An intuitively simple algorithm is the ideal way of determining how best to tailor messages to the needs of individual patients. The development of software to exploit the PSM algorithm as the basis for generating messages tailored to the behavior, the need for motivation or overcoming resistance, and, in the latter instance, the specific impediments to change has the potential to make tailoring more accessible to primary care providers. Coupled to such software, the PSM would facilitate highly efficient counseling: brief questioning to establish patient stage and information needs, followed by the use of a simple computer algorithm to generate the needed information.

The PSM is uniquely designed to facilitate the application of behavior change theory in the primary care setting and is an appropriate response to the widely acknowledged need for enhanced health promotion/disease prevention efforts in primary care. The model should help prevent counseling damaging to patient's self-esteem and has the potential to facilitate behavior modification conducive to the achievement of important clinical and public health goals. Refinements of the model, such as its linkage to computer software, warrant consideration. As the model is above all a means of conveying established behavior change practices to

primary care, the true test of its utility would be its acceptance and application by primary care practitioners and evaluation in that setting of its contributions to behavioral outcomes.

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