

Applying Health Behavior Theory to Hearing-Conservation Interventions

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ABSTRACT

The knowledge and experience gained by effective health behavior research programs can be applied to adolescent hearing-loss prevention programs to address the public lack of awareness and concern about the risks of hearing loss. Informative conceptual theories can be found in the health behavior literature. These theoretical models have been tested in a variety of settings over many decades. Continuing health communication interventions that examine changes in awareness levels, attitudes, and risky behaviors have supported the key constructs described in these behavior theories. Intrapersonal-level theories predict how knowledge, attitudes, beliefs, and other traits within the individual will affect health behaviors. Interpersonal-level theories predict how our relationships with significant others affect our social identity and normative expectations and how these in turn will affect our health behaviors. The Transtheoretical Model (also called Stages of Change) focuses on an individual's readiness to make a change in behavior. The underlying principle of this model is that behavior change is achieved through various stages. Research driven by the Theory of Reasoned Action and the Theory of Planned Behavior demonstrates that there is substantial evidence that behavioral intentions are highly predictive of future behavior. These theories explain the importance of subjective norms and perceived behavioral control. The Health Belief Model identifies five important factors that may influence an individual's decision to practice a health behavior, including perceptions of susceptibility and severity, perceived benefits and barriers to making a change, and environmental cues to action. Finally, the Social Cognitive Theory attempts to predict behavior by understanding the interactions that take place within an individual's social environment. In addition, new models of behavior change have been introduced that are dynamic and far-reaching. It is time for hearing-conservation interventions to reap the benefits of research driven by behavioral theory.

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Learning Outcomes: As a result of this activity, the participant will be able to (1) identify the benefits of applying behavioral theory to hearing conservation, and (2) list barriers to the acceptance of the hearing-conservation message.

Despite many efforts to educate people about the risks of hearing loss from exposure to damaging levels of sound, the U.S. public remains largely unresponsive to the danger. The 1997 World Health Organization report¹ concluded, "Because there is widespread ignorance of the hazard, awareness must be increased about the harmful effects of noise and about the prevention and control of noise induced hearing loss." The problem of damaging noise exposure in the general population is already large, widespread, and continually increasing. There is also a growing body of research showing that even mild forms of hearing loss can significantly degrade learning and overall school performance in children.^{2,3}

Several efforts have been made in the United States to develop educational programs aimed at teaching children how to protect themselves from damaging levels of noise (for a recent survey, see Folmer et al⁴). The existing programs are varied and innovative and have made valuable contributions to our knowledge of how to address the need for hearing-conservation programs geared to young people. However, as with many other public health problems, there are substantial barriers to acceptance of the hearing-conservation message. Thus, there is a continuing need to find better and more effective methods for prevention of noise-induced hearing loss (NIHL) among U.S. children and adolescents.

The knowledge and experience gained by effective health communication interventions can be applied to adolescent hearing-loss prevention programs to address the public lack of awareness and concern about the risks of hearing loss. Informative conceptual models can be found in the health behavior literature. These models have been tested in a variety of settings over many decades. Continuing health inter-

ventions that examine changes in awareness levels, attitudes, and risky behaviors have supported their key constructs.

The purpose of this article is to summarize what has been learned from rigorous health intervention research and to identify constructs that can be put to work in the context of hearing conservation. The theoretical models below have been applied to many disparate behaviors affecting our health, and they have been tested on diverse populations. Interventions attempting to prevent smoking, drug abuse, pregnancy, skin cancer, HIV/AIDS, violence, as well as other risky behaviors are replete in the health behavior literature. While individual health behaviors can be substantively different from one another (e.g., using sunscreen to protect the skin as opposed to reducing dietary fat to lower cholesterol), the information gleaned from relevant risk-reduction research can provide a guide for hearing-loss interventions in the future.

The interventions referenced in this article are all communication-based. They incorporate disseminated, sometimes-mediated, messages targeted at a specific segment of a school, community, or other organized group. This research assesses the effects of health communications on health knowledge, attitudes, and behaviors. The theories that drive this research are discussed next.

THEORY APPLICATIONS

The National Cancer Institute report "Theory at a Glance"⁵ classifies theories by whether they apply to the individual, the relationships between individuals, or the interrelationships between people and structures in their community. Intrapersonal-level theories predict how knowledge, attitudes, beliefs, and other traits

within the individual will affect health behaviors. Interpersonal-level theories predict how our relationships with significant others affect our social identity and normative expectations and how these in turn will affect our health behaviors. And finally, community-level theories predict how regulations and policies can affect health behaviors. For the purposes of this article, our main focus will be on intrapersonal and interpersonal levels of theories that have particular relevance to hearing-conservation programs. Four theories are featured in the following section (Table 1).

Intrapersonal Theories

THE TRANSTHEORETICAL MODEL

The Transtheoretical Model (also called Stages of Change), advanced by Prochaska and colleagues,^{6,7} focuses on an individual's readiness to make a change in behavior. The underlying principle of this model is that behavior change is achieved through various stages. The first stage, precontemplation, is a stage in which individuals are content with "unhealthy" behaviors and are not thinking about making any changes. At the next stage, contemplation, individuals are aware that behaviors they engage in are risky and are planning on taking action fairly soon, such as within the next 6 months. The third or preparation stage involves preparatory actions for making the behavior change, such as acquiring an exercise machine or signing up for a weight-loss program. Next comes the action stage, when the behavior changes are actually initiated. After that, during the maintenance stage, individuals strive to maintain the new behavior. Finally, at the termination phase, the new behavior is now performed consistently and without apparent tendencies to revert to the prior, unhealthy behavior.

In Prochaska's presentation of this model, it was explicitly recognized that individuals do not all go through the various stages at the same pace, and the different stages are not necessarily reached in sequential order. Messages will vary according to the apparent stage of change through which individuals or groups are moving. Specific transtheoretical model constructs include self-efficacy, or confidence

in the individual's ability to perform the task; self-awareness for reevaluation of attitudes; and the ability to weigh the pros and cons of the behavior.

The Stages of Change model has been applied to several health behavior studies, some of which have been reviewed by Prochaska et al.⁷ One successful application was a smoking-cessation program, where it was found that adapting the program to a given smoker's current phase made the program more effective. The model also has been applied in attempts to promote healthy behaviors associated with HIV prevention, alcohol abuse, diet and weight control, and sun exposure.⁶

Recent research continues to demonstrate the usefulness of this model. A study by Hacker and colleagues⁸ found that the Transtheoretical Model was a useful tool for promoting pregnancy prevention and disease prevention in teens. Hollis et al⁹ tailored tobacco-reduction messages for teens based on their smoking status and stage of change, with significant results. Aveyard et al¹⁰ used the model to measure the effects among teens who dropped out of a smoking-cessation program. Krisjanson et al¹¹ found that the model was most effective for moving students from precontemplation to contemplation with regard to sunbathing avoidance. Finally, a school-based injury-prevention program found this model particularly effective for increasing safety behavior changes in students.¹²

With respect to hearing protection and noise-induced hearing loss (NIHL), the majority of the U.S. public might be characterized as being in the precontemplation stage, with many people still not aware of the dangers of exposure to damaging levels of noise. Tailored messages can increase awareness of the prevalence and seriousness of the problem. Some people are probably aware of the risk of exposure to loud sounds but unaware of what they can do to reduce this risk. Such individuals can benefit from education designed to develop their skills in preventive behaviors. And even though a small number of young people may have reached the action stage, they will continue to need encouragement and support to help them maintain both their skills and motivation to protect their hearing.

Table 1 Constructs of Four Health Behavior Theories

Theory	Constructs	Change Strategies
Intrapersonal-Level Theories		
Transtheoretical Model (Stages of Change)	Self-efficacy: confidence in ability to perform task Self-awareness: self-reevaluation and self-liberation are needed to move from stage to stage Decisional balance: weigh pros and cons of changing behavior	Match strategy to individual's stage of change
Theory of Planned Behavior and Theory of Reasoned Action	Attitude: personal evaluation of the behavior Intention: likelihood of performing the behavior Subjective norm: whether significant others believe the behavior is important Perceived behavioral control: whether people believe they can control the behavior	Social pressure, public contract-making, influencing social norms; modeling of behavior by significant others
The Health Belief Model	Susceptibility: perceived susceptibility to health threat Severity: perceived severity of health threat Perceived benefits: benefit of acting to avoid threat Perceived barriers: costs of taking action Self-efficacy: confidence in ability to perform task	Provide concrete "how to" information; promote awareness; use reminder systems
Interpersonal-Level Theories		
Social Cognitive Theory	Reciprocal determinism: mutual influence of person's behavior on environment and environment on person Behavioral capacity: skill at performing a behavior Expectations: anticipated outcome of behavior Self-efficacy: confidence in ability to perform task Observational learning: learning via modeling behavior of others' behavior Reinforcements: responses to behavior that influence the likelihood of reoccurrence	Peer modeling, role play, mentoring programs

THE THEORY OF REASONED ACTION AND THE THEORY OF PLANNED BEHAVIOR

There is substantial evidence that behavioral intentions are highly predictive of future behavior, and therefore it is important to determine what factors influence behavioral intentions. According to the Theory of Reasoned Action advanced by Fishbein and Ajzen,¹³ there are three constructs that are fundamental to planned changes to risky behavior (intentions to change): these are (1) the individual's attitude about the behavior (for instance, how much hazard is it perceived to entail), (2) the individual's perceived control over the behavior in question (how easy or difficult will it be to change the undesirable behavior),¹⁴ and (3) subjective norms, representing the individual's perception of how others (peers) view the behavior.

This theory suggests that social norms often determine individual attitudes, and strategies for behavioral change must consider the range of relevant social influences. A typical example involves research in which elementary school children were instructed in a sun-safety program.¹⁵ The investigators found that children were opposed to wearing long-sleeved shirts in the sun if they believed that their peers would tease them for that behavior. Other research has confirmed the dramatic effects of peer attitudes on the use of hearing protection and on avoidance of noise exposure.¹⁶ Fishbein and Ajzen¹³ also identified the importance of adult attitudes and behaviors in shaping young peoples' actions with respect to risk avoidance. In the context of hearing conservation, their findings suggest that students receiving training in prevention of hearing loss will be more likely to accept such programs if they believe that their parents, teachers, and/or other important adults identify hearing health as a significant issue.

The Theory of Planned Behavior is an extension of the Theory of Reasoned Action. Here the construct of perceived behavioral control is added.⁵ Bandura^{17,18} emphasized the importance of beliefs in one's own ability to perform (self-efficacy) and control (perceived behavioral control) desired behaviors. Bandura¹⁹ stated, "People tend to avoid tasks and situations they believe exceed their capabilities, but they

undertake and perform assuredly activities they judge themselves capable of."

Recent studies have demonstrated the usefulness of these theories in reducing verbal and physical aggression in teens,²⁰ increasing healthy eating among high school students,^{21,22} and increasing consumption of fruits and vegetables in seventh graders.²³ In addition, Baranowski and colleagues²⁴ reviewed seven different models in an effort to identify the best fit to understand the nature of obesity and identified a modified Theory of Planned Behavior as most explanatory.

Research suggests that students who know how to determine when a particular risk-avoidance behavior is appropriate, and who believe they have command of the relevant behavioral skills, are more likely to engage in these behaviors.¹⁸ As an example of this type of approach, a program to increase hearing-protective behavior in rural high school students included substantial practice in correct methods for inserting earplugs.²⁵ In addition to a formal instructional program about hearing, the students also were trained in the use of sound-level meters and encouraged to use them to measure sound levels of noisy equipment on their own farms.

An important adjunct in strengthening young peoples' feelings of self-efficacy involves their communication skills, particularly where interaction with their peers is concerned. Such interactions can be important for establishing links between social norms and desirable risk-avoidance behaviors. Learning how to explain to one's peers the reasons for avoiding risk and for practicing risk-avoidance behaviors can be very important because these behaviors have been found to increase the likelihood that an individual will actually engage in the avoidance behavior. Furthermore, if the individual succeeds in convincing one or more peers about the importance and feasibility of risk avoidance, these communication skills also increase the likelihood that the social norm will be altered. There are various skills needed for effective communication with peers, including behavior modeling and role playing, developing refusal skills and techniques for resisting social pressures, public contract-making, and assertiveness training.²⁶⁻²⁹

THE HEALTH BELIEF MODEL

Young people are known to harbor a wide variety of beliefs concerning risks to health, and these beliefs may influence their reactions to programs such as hearing conservation. In the Health Belief Model, Janz and Becker³⁰ identified five important factors that may influence an individual's decision to practice a health behavior. First, there are perceived "roadblocks" or barriers to performing the recommended behavior (whether these barriers are physical, mental, or social). Second, there is the individual's perception of potential benefits to be gained from practicing the recommended behavior. Third is the extent to which the individual perceives his or her susceptibility to the risk; and fourth, the extent of potential damage or harm to be incurred if the risk is not avoided. In addition, self-efficacy, or the ability to perform the task involved in the behavior, is critical. Finally, individuals will experience a variety of cues to action (such as media messages or school-based health interventions), which can potentially shape their beliefs regarding the need for a behavior change. A review of 46 different health-behavior studies incorporating the Health Belief Model summarized the results in the light of the five factors listed above and concluded that there is substantial empirical support for the model.³⁰

The Health Belief Model underscores several significant challenges that exist for hearing-conservation programs. Experience has shown that concern about their own susceptibility to hearing damage appears to be low in many young people. Equally pervasive are misperceptions about the potential damage to our hearing caused by loud sounds. Further, potential benefit to be gained from the use of hearing-protective devices, or from avoidance of overly loud music or damaging recreational noise, are evident only in the long-term and not immediately. There are also extensive barriers in the form of social pressures to accept dangerously loud recreational noise such as motorcycles, "boom" cars, or amplified music. These factors make it difficult to convince young people that hearing protection is important for their long-term health. In the face of these discouraging observations, the Health

Belief Model provides useful guidance by emphasizing those topics that should receive special emphasis in hearing-conservation programs aimed at youth. The model supports the specific value of cues to action such as well-crafted media messages alerting adolescents and children to risks of loud sound exposure and to the long-term benefits to be gained from adopting preventive strategies.

The Health Belief Model is rarely studied as an entire model. More often individual constructs are examined separately, such as barriers to change and cues to action.³¹ Perhaps most important for hearing-conservation programs is the notion that perceived susceptibility is critical for behavior change to occur.³² Unlike smoking-related diseases, most young people do not perceive themselves as susceptible to NIHL. For this reason, the Health Belief Model may be applicable to examining hearing-protection behavior.

Interpersonal Theories

THE SOCIAL COGNITIVE THEORY

Bandura¹⁹ and the Social Cognitive Theory made one of the most influential contributions to the study of health behavior. This theory attempts to predict behavior by measuring the interactions that take place within an individual's social environment. Bandura argued that behaviors are learned and adapted through social interactions with others and the environment in a reciprocal model in which individuals can understand and anticipate the outcomes of a prescribed behavior. According to this theory, individuals learn by observing, anticipating behavioral outcomes, and practicing skills and developing confidence in them. Experiences with behaviors, whether they are positive or negative, will predict whether a behavior will be reinforced or not. In the case of hearing-protective behaviors, Social Cognitive Theory emphasizes the need to identify and deal effectively with existing social pressures that contradict the importance of hearing or denigrate efforts to avoid potentially damaging situations.

The immediate physiologic rewards associated with tanning or use of alcohol or other

drugs of abuse is clear, but in addition, there are potent social rewards for young people engaging in behaviors that make them appear "cool" or more adult or more in command of their own choices. As hearing professionals know, wearing hearing-protective devices such as earplugs or earmuffs is seldom viewed as "cool"—except, perhaps, in the context of space exploration or other high-technology activities. However, behavior that is modeled by desirable role models (such as by adolescents who are perceived as leaders) can lead to imitative efforts by those who are somewhat younger or in positions of lower social influence. That fact has led to the use of "peer presenters" to educate school children about various health behavior issues. For example, Black et al³³ reviewed more than 100 drug-prevention programs designed for middle school children. They found that children were more receptive to sessions led by peer "facilitators" because of the following factors: peer presenters were seen as having more realistic understanding of situations in which drugs might be used; children were more receptive to communications from peer presenters than from teachers or other adults; and peer-led educational interactions were in general more comfortable and also more fun for the subjects involved. Similarly, peer facilitators were found to be effective presenters in a program to teach third graders about the dangers of sun exposure and how to achieve skin cancer prevention.³⁴

Recent studies have found success using the Social Cognitive Theory. Health behavior interventions driven by this theory have focused on increasing physical activity in adolescent girls³⁵⁻³⁹ and adolescents in general.⁴⁰ Dietary issues, including those involved with diabetic adolescents, also have used the social cognitive theory to develop interventions,^{41,42} identify perceptions,⁴³ and increase self-efficacy.⁴⁴ The usefulness of the Social Cognitive Theory for teaching hearing conservation to adolescents is clear. Using peers or older-age peers to change attitudes and behavior is well documented. This "role model" strategy has the potential to reduce risk taking in both the target audience and those chosen to be older peer leaders.

CONCLUSION

Many other models of behavior change have been described and examined in the literature. These new additions build on the constructs identified in the theories noted above. Noted examples include (1) the Health Promotion Model,⁴⁵ which identifies constructs that describe the benefits and barriers to behavior change called behavior-specific cognitions and affect; (2) social ecology models that incorporate constructs accounting for social and environmental factors in the change setting⁴⁶; and (3) other models like the Precede-Proceed Model⁴⁷ and RE-AIM,⁴⁸ which serve important functions for structured planning and evaluation.

New additions to the theoretical landscape are illustrative. They demonstrate that theory building continues to be dynamic and far-reaching. This is in no small measure because the challenge of reducing risks by changing behaviors is vital. This is particularly true in adolescent hearing protection. Earplugs are not cool (at least not yet), and most adolescents do not perceive hearing loss as important. To overcome these obstacles, it is incumbent upon hearing-conservation programmers to incorporate the knowledge gleaned over many decades by health behavior research.

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