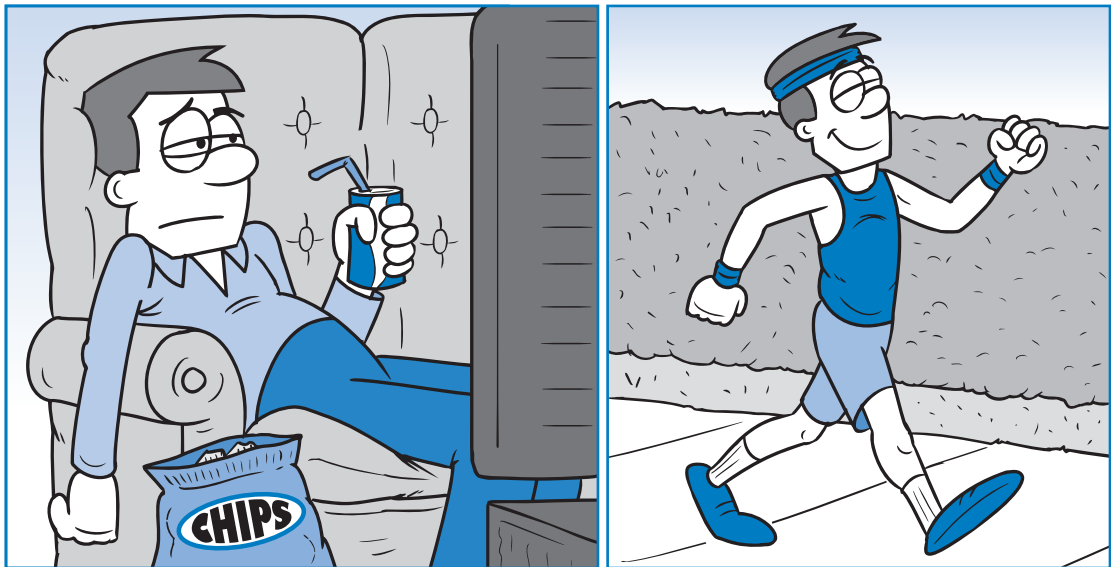


## CHAPTER

# 1

# Why Do People Change Physical Activity Behavior?

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## UNDERSTANDING THE PRINCIPLES OF BEHAVIOR CHANGE

### CONCEPT OVERVIEW

### WHAT IS BEHAVIOR?

Behavior is broadly defined as anything an organism or living being does, which includes actions, words, and manifestations of emotions and thoughts (17). Behavior must be observable, measurable, and operationally defined in order to determine how to modify or change it. Behaviors have important antecedents (cues or triggers that stimulate the behavior), as well as consequences (the positive and/or negative outcomes that follow the behavior). However, behavior is operationally defined differently across contexts. For example, physical activity behavior is often defined as a bodily movement, produced by skeletal muscles, that uses more energy than when a person is at rest (67). Physical activity has also been conceptualized as the “umbrella term” that includes several dimensions such as exercise, sport, leisure activities, dance, etc. (14). However, people generally also view physical activity as a behavior that is more like a habit, particularly when a person is regularly physically active. On the other hand, exercise is often defined as a behavior that is a planned and uses structured movement of the body that is designed with the goal of enhancing physical fitness (6). As a practitioner, you need to define the target behavior first before developing a plan for behavior change. Elements of behavior change are presented in more detail in the next section.

## Behavior Change

Changing behavior is difficult. Why? Because people are creatures of habit and the things they do are the behaviors they really *want* to do. These are the actions that “work best” or “are easy to do.” So to conceptualize behavior change, you need to understand that many behaviors, particularly physical activity and its related health behaviors, fall on a continuum from an undesired or health-risk behavior to a desired or healthy behavior. Changing an undesired or health-risk behavior involves making a conscious decision to repeatedly do something new or different or “not doing” something bad such as smoking or drinking excessive alcohol. Similarly, changing a desired behavior such as being physically active or eating healthy involves the same conscious decisions to repeatedly do the new behavior, until over time it becomes part of your regular routine. So why then is it so difficult to make positive behavior changes? Because it is common nature to actively seek out activities that you enjoy and avoid activities that you dislike. Unfortunately, many positive health behaviors involve doing things you may not “like.” For example, although physical activity has numerous health benefits, it also requires time, effort, and energy; thus, you need to make a conscious decision to incorporate it into everyday life. Understanding the principles of reinforcement will further emphasize this idea.

## Principles of Reinforcement

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*“The way positive reinforcement is carried out is more important than the amount.” (BF Skinner)*

Reinforcement is anything that increases the probability that a behavior will occur again, and the use of rewards and punishments will increase or decrease the likelihood of a similar response happening in the future. Skinner (62) argued that teaching rests entirely on the principles of reinforcement. Today, these principles are among the most widely accepted and practiced in psychology and are the foundation for changing behavior. The most basic assumption of reinforcement is if doing something results in a good consequence (being praised or rewarded), a person will try to repeat the behavior, whereas if doing something results in a bad consequence (being criticized or punished), a person will usually try not to repeat the behavior. For example, if you start jogging and within a few weeks, you see a friend who says “Wow, that jogging is really paying off. You look fantastic!” you will likely try to repeat the behavior in the future to receive more positive praise from friends and family. In contrast, if you receive negative feedback from an important other such as a family member who says “That running is only going to cause you to hurt yourself; I don’t know why you even bother” you may stop jogging altogether in an effort to avoid this type of shame and criticism. However, reinforcement in the “real world” is not always this straightforward. The same reinforcer may affect people differently. For example, some people are motivated when a fitness instructor says “Come on, you need to work harder! You’re just relaxing back there!” But other people may view this as negative feedback and stop the activity altogether. The reinforcer needs to be tailored to the individual for it to be effective, particularly when the behavior is as complex as physical activity. Thus, it is extremely important to understand the individual and the value he or she places on different reinforcers. What works for one person may not work for another!

The general consensus from most behaviorists is that the positive approach to reinforcement is most appropriate because it increases the likelihood that desirable behaviors will be repeated in the future. From a practical perspective, a positive approach to reinforcement also has a greater chance of strengthening important determinants of physical activity such as attitude, motivation, and self-efficacy. While there is not one set of guidelines for using positive reinforcement, researchers in the sport and exercise psychology domain (71) have recommended the following strategies for using positive reinforcement for behavior change:

- **Choose effective rewards:** Rewards should be important and relevant to the person who is doing the behavior. That is, you should like the reward, otherwise it will not be effective! Some of these rewards may be intrinsic, such as you taking pride in your accomplishment or working harder to learn more and perform better. Some of these rewards may be extrinsic, such as social (praise, public acknowledgement, clapping), material (clothing, trophies, certificates of achievement), and/or monetary (cash or gift cards) incentives.
- **Schedule reinforcers effectively:** Researchers (42,58,71) have demonstrated that continuous and immediate reinforcement is desirable when a behavior is new or the person is in the early stages of learning the behavior. Reinforcement should be immediate to maximize the likelihood of making a link or connection between the desired behavior and a positive response. However, once the behavior has become more routine, intermittent (sporadic or not expected) reinforcement is preferred because the reinforcement otherwise becomes monotonous and loses its impact or value.
- **Reward appropriate behaviors:** As with scheduling reinforcers effectively, it is also important to be selective about the behaviors that are rewarded. If you get

rewarded for every behavior you do, the impact of the reward structure is lost. Thus, you should know which are the most important behaviors or outcomes to reward for a target person and when to consider rewarding close approximations to this behavior. This is called *shaping*, which is when behaviors that are close to the desired behavior are rewarded in an effort to gradually change an existing behavior over time (50,62).

- **Reward performance and effort; not just the outcome:** Similar to the goal-setting literature, it is important to reward process or procedural determinants of behavior such as hard work, effort, and dedication in addition to the actual performance or behavior. This will increase the likelihood you are able to repeat the behavior in the face of adversity or barriers because you learn the value of the process and will be less likely to give up when it is challenging to achieve the behavior.
- **Positive motivational climate:** Using positive reinforcers within a positive and supportive environment can maximize the likelihood of behavior change. Feedback on the behavior should be given with instruction and encouragement, patience, and an opportunity for discussion and additional feedback with the target person or group.

However, behavior change is frequently determined by more than the principles of reinforcement. Thus, it is important to consider theories that incorporate a more comprehensive approach to behavior change. The following sections will provide an overview of why using theories and models to guide behavior change is important and will also describe several frequently used behavioral theories to explain and predict physical activity behaviors. Case example illustrations are also included to demonstrate how to apply these theories.

## THEORIES OF BEHAVIOR CHANGE

### The Importance of Theories and Models

*“There is nothing more practical than a good theory.” (Lewin, K. (1952). Field theory in social science: Selected theoretical papers by Kurt Lewin. London: Tavistock.)*

Theories and models of behavior change can at first seem overwhelming to understand. However, once the initial sense of apprehension for using theory passes, a practitioner often quickly sees the underlying value and added benefits of using a theoretical approach. A simple way to view a theory or model is to see it as a structured logical explanation or way of describing a certain phenomenon. A *theory* allows you to understand, explain, and predict behavior. They provide the “how and/or why” a behavior occurs and offer an empirically-based framework or “blueprint” from which to develop interventions to promote healthy behaviors such as physical activity. A *model* provides a visual representation of a phenomenon—or an illustration of how certain parts, known as the components, are related within a structure (10). Many theories have models but not all models are based on a theory. From a practical perspective, a good theory often uses a model to demonstrate how the components of the theory are related and predict behavior. Health promotion experts may choose to use theories and/or models for many different reasons, including to better explain the factors that facilitate or inhibit behavior change at the individual, community, and societal levels and/or to guide the selection and development of appropriate health promotion strategies. It is important to note that theories should never be applied without a good understanding of the “big picture”—that is, without a thorough insight and awareness of

the individuals, groups, organizations, and communities you are working with to promote healthy behavior changes. Remember, a theory isn't the solution, but rather the foundation.

To change or promote physical activity behavior, it is important to recognize the critical elements of the most commonly used, evidence-based theories and models of behavior change. To this end, this section provides an overview of several widely used theories/models applied to physical activity behavior, reviews evidence from the literature with summaries of the research in the physical activity domain, offers a step-by-step description of how to use the theory in practice, and presents example scenarios for illustration.

## SELF-EFFICACY THEORY

### CONCEPT OVERVIEW

#### WHAT IT IS AND WHY IT WORKS

*Self-efficacy* is a person's situation-specific belief in his or her capabilities to perform a behavior (7,8). Whether you realize it or not, self-efficacy influences just about every choice you make—from deciding to drive a car on a freeway to choosing to walk or jog today. Self-efficacy beliefs determine how you think, feel, and behave (7). A belief that you have the capability to successfully carry out any or all of the activities that you have thought about today will influence your decision to do or not do these actions. Also, the amount of effort you invest in these activities will be influenced by the value of the belief. If you have a weak belief in your personal capability to carry out a behavior successfully (*i.e.*, low self-efficacy), you will be uncertain and likely not invest much effort. On the other hand, if you have a strong belief in your ability to do a specific task (*i.e.*, high self-efficacy), you will undertake it with confidence and conviction. A strong sense of efficacy enhances personal well-being and facilitates motivation and effort. Higher assurances in your personal abilities also lead you to approach difficult tasks as challenges to be mastered rather than threats to be avoided (7).

Self-efficacy is an integrated component of Social Cognitive Theory (8) and stems from the assumption of Social Learning Theory (46) that if you are motivated to learn a behavior, the behavior would be learned by observation and reinforced with positive reinforcement. Self-efficacy is thought to be influenced by several main sources (see Figure 1.1). The first and most important source is *mastery (performance) experience*. When you successfully carry out a task, you believe that you have the capabilities necessary to repeat the behavior. Past successes have the most important influence on self-efficacy and confidence in doing a behavior in the future. However, self-efficacy is fragile and therefore, your past failures can also undermine your efficacy beliefs.

Another source of self-efficacy is *vicarious experience* or observational learning. The behaviors of others (both successes and failures) can influence your self-efficacy. That is, observing a friend or family member achieve success on a similar task can increase self-efficacy, whereas watching him/her fail in a similar circumstance can diminish it.

A third but weaker source of self-efficacy is *verbal persuasion*. When you receive verbal praises such as "Great job!" or "Keep going. You can do it!" from important others

*continued*

(friends, family members, coaches/trainers), these praises generally have an immediate increase in efficacy beliefs. In contrast, negative comments can damage or weaken efficacy beliefs—particularly under circumstances when there is already doubt about your abilities. Generally, verbal persuasion has its greatest impact on self-efficacy if you have some reason to believe that you could be successful if you persist.

Your *physiological state* can also impact self-efficacy. Factors such as rapid heart rate, elevated respiratory rate, and increased sweating can provide a signal or cue to you about your current level of self-efficacy. Your appraisal of the situation and these physiological cues is critical. When you are calm and confident, these physiological cues are generally interpreted as being a part of the activity and are usually in control. In contrast, if you interpret these physical signals as evidence of not being prepared, they can serve to undermine efficacy and make you question your abilities.

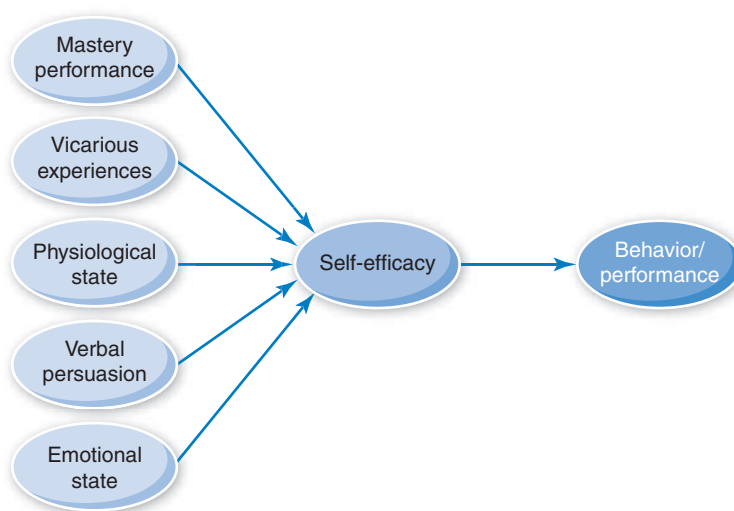
A final source, *emotional (mood) states*, influences self-efficacy because of the association between your past successes and failures and the moods associated with these events. When you are successful, these experiences are stored in memory along with positive feelings (e.g., accomplishment, pride) that are associated with the event. However, failed experiences are also stored in memory and linked with negative feelings (e.g., frustration, shame). Mood states before a future event can trigger events from memory and thus, the presence of a positive mood state prior to an action can prime memories of accomplishment and joy and thereby serve to improve self-efficacy.

Because self-efficacy is a situation-specific construct, different operational definitions have evolved over time. The following concepts are aspects of self-efficacy that have evolved in the research (45) as key factors related to physical activity behaviors:

- **Exercise efficacy:** Beliefs about your ability to successfully engage in incremental bouts of physical activity—varying across mode, intensity, and duration of the activity.
- **Barriers efficacy:** Belief about overcoming obstacles or barriers to physical activity participation. Barriers can be social (lack of spousal support), personal (lack of motivation, feeling lazy), and/or environmental (bad weather, unsafe neighborhood).
- **Scheduling efficacy:** Confidence in your ability to plan physical activity behaviors into a daily or weekly routine.
- **Health-behavior efficacy:** Beliefs about your capability to engage in health-promoting behaviors such as meeting the physical activity guidelines.



As mentioned earlier, the strongest source of self-efficacy is mastery (performance) experiences. It is thus not surprising that the relationship between self-efficacy and physical activity participation is reciprocal. That is, efficacy beliefs are associated with the initiation and maintenance of physical activity and in turn, short- and long-term physical activity participation leads to significant increases in self-efficacy (44). Studies have confirmed the important role of self-efficacy for exercise promotion. For example, a review of 27 self-efficacy and exercise studies revealed a positive relationship between self-efficacy and



**FIGURE 1.1.** The Self-Efficacy Theory. (Adapted with permission from Bandura A. *Social foundations of thought and action*. Englewood Cliffs (NJ): Prentice Hall: 1986.)

exercise participation, and specifically among intervention studies, participation in an exercise program promoted exercise self-efficacy beliefs (35). The positive effects of self-efficacy on exercise participation appear to extend across a variety of populations including cardiac rehabilitation patients (64), people with developmental disabilities (11), adolescents with elevated diabetes and obesity risk factors (22), cancer survivors (47), and new mothers (23). Although there is an abundance of evidence that improving self-efficacy beliefs can promote physical activity behaviors, the important question is “How?” The next section provides a step-by-step description of how to apply self-efficacy theory to promote physical activity behaviors.



### STEP-BY-STEP: HOW TO APPLY SELF-EFFICACY THEORY TO PHYSICAL ACTIVITY BEHAVIORS

Edward McAuley (43), an authority on the correlates of self-efficacy in physical activity, stated: “It is vitally important for practitioners and programs to provide experiences that maximize individuals’ beliefs in their sense of personal capabilities with respect to exercise and physical activity. If practitioners fail to [do so], participants are likely to perceive the activity negatively, become disenchanted and discouraged, and discontinue.” Thus, he proposed a series of strategies within each of the main sources to promote self-efficacy:

#### Step 1: Mastery Experiences

Set up the opportunity for mastery experiences by increasing the frequency of positive physical activity experiences. For example, gradually increase the frequency and intensity of the activity—do not start out with the maximum dosage from the start (*e.g.*, a max fitness test); integrate activities of daily life that provide a sense of accomplishment such as walking to work, taking the stairs instead of the elevator, and parking the car farther from the store; find activities that people enjoy and maximize their chances of engaging in these activities (*e.g.*, joining a community facility, identifying an exercise buddy).

#### Step 2: Vicarious Experiences

Maximize the exposure to positive modeling experiences. For example, showing videotapes of successful models of similar age, gender, physical characteristics, and capabilities; providing



frequent participation in modeling or expert demonstrations to learn the activity form, improve the sense of comfort or ease with the activity, and repeat the actions; and facilitating group activities in a supportive and cooperative environment to increase peer-to-peer modeling.

### Step 3: Verbal Persuasion

Augment opportunities for feedback with positive and encouraging feedback. For example, developing social support networks and “buddy systems” to provide multiple opportunities for encouragement, providing a telephone number for a contact person to provide emotional support and assist with overcoming barriers, tapping into social media (e.g., Facebook, Twitter, online support groups), and using video/audio tape recordings or Internet podcasts of positive feedback received from supportive others (personnel, family, friends).

### Step 4: Physiological States

Facilitate learning experiences to understand and interpret physical symptoms. For example, teach people how to accurately and positively infer symptoms such as heart rate, respiratory rate, perspiration, muscle soreness, weight changes, and general fatigue; explain how these symptoms are also positive cues for effective exercise participation.

### Step 5: Emotional States

Increase opportunities to discuss emotions and maximize opportunities for positive emotional states prior to exercise participation. For example, provide supportive communication about feelings, thoughts, and moods as they relate to physical activity participation; use strategies such as positive imagery and muscle relaxation to promote feelings of calmness, control, and happiness prior to physical activity participation; assist a person with “making the connection” between positive mood states and positive physical activity experiences (*i.e.*, feeling better before exercise leads to feeling better during and after exercise).



## Case Scenario 1.1

Julie is entering her senior year of high school and about to begin preseason for her last year of high school soccer. Julie has been the team's star midfielder leading the team in goals and helping carry the team to the state playoffs. Julie is optimistic about the team this year; however, she is lacking the self-efficacy to perform well due to an anterior cruciate ligament (ACL) tear that occurred during the winter indoor soccer season. She was forced to have surgery to repair the ACL and missed out on the rest of her indoor soccer season and all of the elite spring traveling team that she usually played on due to the rehab therapy she was required to do. She is afraid that if she puts forth all of her efforts as she has done in the past, she might re-tear her ACL since the doctor told her that re-tears are more likely after an initial tear. She is also worried that the knee brace she must wear will inhibit her range of motion and that she won't be able to perform at the level she once did. She has dreams of playing collegiate soccer but fears these things might ruin her goal of playing soccer in college.

In order to help Julie, a practitioner should consider the following strategies:

1. **Past performance accomplishments:** Have Julie make a list of her accomplishments (particularly those she has achieved in the sport of soccer) and also include the barriers and challenges she experienced along the way so she can relate to those times and remember how she handled those challenges and what she did to overcome them.



## Case Scenario 1.1 *continued*

2. **Vicarious experiences:** Show Julie pictures of videos of other elite athletes with a former ACL repair surgery so she can see that it is possible to still perform well after surgery.
3. **Verbal persuasion:** Enlist the help of her family, teammates, and coaches to provide a positive and supportive environment for her so she continues to gain confidence. These individuals should not focus on the fact that she is just recovering from a serious injury (*i.e.*, “Wow, you’re really playing great considering the injury you just had” or her coach going easier on her due to her injury), but rather, they should treat her the same as before so that she doesn’t feel isolated as a result of her injury.
4. **Physiological and affective states:** Julie needs to be taught to learn to listen to her body. She needs to start slowly. If her knee starts to feel sore, she may need to reduce her training or cut back on intensity or duration. The more in tune she is with her body, the less likely she will be to reinjure herself. She also should maximize opportunities for positive mood states prior to her training (*e.g.*, listening to music to get her excited, using imagery to visualize doing the activities correctly as she rehabilitates her knee, etc.).

### TAKE-HOME MESSAGES

Self-efficacy is a powerful belief that you are capable of organizing and executing the behavior that is needed to produce a specific outcome. Self-efficacy is influenced by a variety of factors that include mastery (performance) experiences, vicarious experiences, verbal persuasion, physiological states, and emotional states. Specific to physical activity behaviors, self-efficacy plays an important role. When you are more efficacious, you are more likely to sustain motivation, participation, and adherence, and you are also more likely to report more positive and less negative effects after physical activity participation. As a result, you also enjoy physical activity more! Finally, efficacy beliefs are driven by the individual; therefore, understanding your sources of efficacy is essential for promoting positive efficacy beliefs.

## TRANSTHEORETICAL MODEL

*Note: This theory is presented here for chapter completeness. A more comprehensive approach for using this theory is presented in Chapter 4.*

### CONCEPT OVERVIEW

#### WHAT IT IS AND WHY IT WORKS

For most people, changing unhealthy behaviors (*e.g.*, physically inactive) to healthy behaviors (*e.g.*, physically active) is often challenging. Change usually does not occur all at once; it is a lengthy process that involves progressing through several stages. At each stage, your cognitions and behaviors are different, and so one approach to facilitating behavioral change is not appropriate. The concept of stages—or a “one size does not fit all” philosophy (39)—forms the basis for the Transtheoretical Model (TTM) of behavior change developed by James Prochaska and his colleagues (53).

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This model emerged from a comparative analysis of leading theories of psychotherapy and behavior change (56). The TTM includes the following four constructs:

1. stages of change
2. decisional balance
3. processes of change
4. self-efficacy

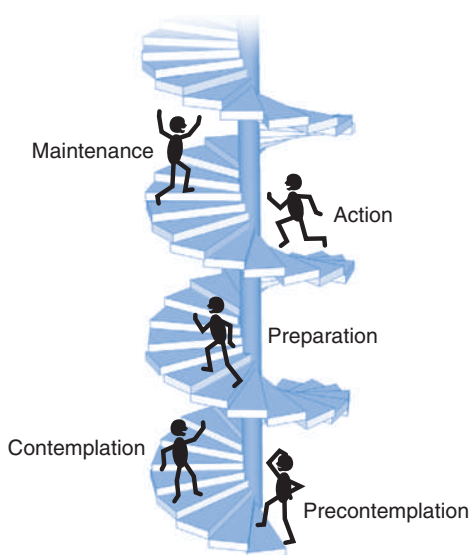
Each of these constructs is described briefly below and in detail in Chapter 4.

## STAGES OF CHANGE

**Stages of Change** recognizes that behavior change unfolds slowly over time through a series of stages. Prochaska and DiClemente (54) hypothesized that as you change from an unhealthy to a healthy behavior—for example, from a sedentary to an active lifestyle—you move through a number of stages at varying rates and in a cyclical fashion with periods of progression and relapse. If you are sedentary, you may begin to think about the benefits (*e.g.*, more energy) and costs (*e.g.*, time away from watching television) of physical activity. Then, a few months later, you may buy a pair of walking shoes. Six months later, you may start walking 3 times a week. After a year of walking, however, you may become overwhelmed with the stress of work and stop it altogether. The cessation of physical activity would represent a regression to an earlier stage (*i.e.*, relapse). In short, as you go through the process of behavioral change, you typically cycle, or progress and relapse, as you recognize the need to change, contemplate making a change, make the change, and finally, sustain the new behavior. There are five main stages through which you pass in attempting any health behavior change: precontemplation, contemplation, preparation, action, and maintenance (57). Figure 1.2 provides a graphic illustration of the stages of change. A brief description of each stage is provided next. For a more comprehensive description, see Chapter 4.

### Precontemplation (“I won’t or I can’t”)

If you are in the precontemplation stage, you are either not considering or do not want to change your behavior. The so-called “couch potato” is an example of someone who would fall into the precontemplation stage for physical activity. As adopting physical activity is concerned, you may be in precontemplation because you do not think it’s valuable, or think



**FIGURE 1.2.** The Stages of Change Model.

it's valuable but may be overwhelmed by barriers such as lack of time. Precontemplators are the most difficult people to stimulate into behavioral change. They often think that change is not even a possibility.

### Contemplation ("I might")

If you are in the contemplation stage, you acknowledge that you have a problem (*e.g.*, "I know I need to be more physically active") and are thinking about changing your behavior sometime within the next 6 months. You see a need for change because you are aware of the costs and benefits of changing your behavior (55).

### Preparation ("I will")

In the preparation stage, you are planning to change your activity level in the near future, usually within the next month. Preparation is an unstable stage because when you are in this stage, you are more likely than precontemplators or contemplators to progress over the next 6 months (55).

### Action ("I am")

When you have recently changed your behavior (*i.e.*, within the last 6 months), you are in the action stage. This is the stage that requires the greatest commitment of time and energy. Because you have just recently established the new habit, attentiveness is necessary to avoid relapse (*i.e.*, reduce or stopping physical activity).

### Maintenance ("I have")

Once you have been regularly active for 6 consecutive months, you are deemed to have made it to the maintenance stage. Although the new behavior has become better established, boredom and a loss of focus can become a danger for inactivity. It is at this time that you work to reinforce the gains made through the various stages of change and strive to prevent a relapse.

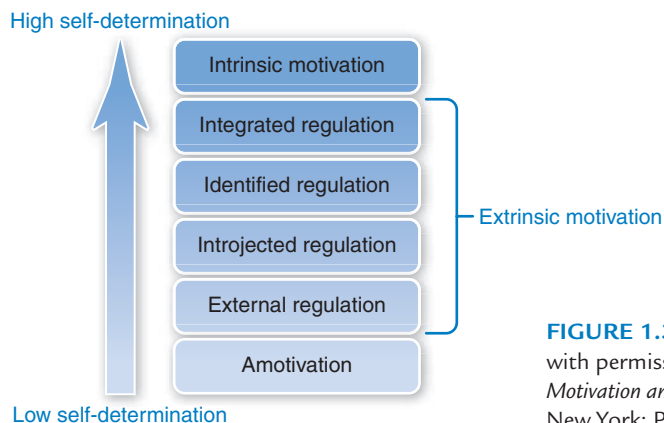
## DECISIONAL BALANCE

**Decisional balance** assesses the importance that you place on the potential advantages or *pros* and disadvantages or *cons* of a behavior (31). The balance between the pros and cons varies depending on which stage of change you are in. When the cons of exercise (*e.g.*, takes time away from other activities) are of greater importance than the pros of exercise (*e.g.*, improves psychological well-being), motivation to change behavior (*i.e.*, move from being sedentary to engaging in physical activity) is low. Thus, for example, in the precontemplation and contemplation stages, the cons are assumed to outweigh the pros. In the preparation stage, the pros and cons are believed to be relatively equal. Finally, in the action and maintenance stages, the pros are thought to outweigh the cons.

## PROCESSES OF CHANGE

**Processes of Change** are the 10 processes of change that represent the behaviors, cognitions, and emotions that people engage in to change a behavior. They are defined in more detail in Chapter 4 and include:

- **Consciousness Raising** (gathering information)
- **Counterconditioning** (making substitutions)
- **Dramatic Relief** (being moved emotionally)
- **Environmental Reevaluation** (being a role model)
- **Helping Relationships** (getting social support)
- **Reinforcement Management** (being rewarded)
- **Self-Liberation** (making a commitment)
- **Self-Reevaluation** (developing a healthy self-image)
- **Social-Liberation** (taking advantage of social mores)
- **Stimulus Control** (using cues)



**FIGURE 1.3.** The Self-Determination Theory. (Adapted with permission from Deci EL, Ryan, RM. *Intrinsic Motivation and Self-Determination in Human Behavior*. New York: Plenum Publishing Co: 1985.)

*Self-efficacy*, as previously mentioned in this chapter, is a judgment regarding your ability to perform a behavior required to achieve a certain outcome. Not surprisingly, it is critical to behavior change (8) and has been incorporated into the TTM. According to the TTM, self-efficacy is proposed to change with each stage, presumably increasing as you gain confidence, through for example, successful attempts to increase physical activity. Conversely, self-efficacy may decrease if you falter and spiral back to an earlier stage. See Figure 1.3 for a graphical display of the TTM constructs.

## EVIDENCE

The TTM was first applied to physical activity in the late 1980s by Sonstroem (63) and since then its popularity has grown dramatically. Marshall and Biddle (41) conducted a meta-analysis of 91 independent samples from 71 published studies that examined at least one of the aforementioned constructs of the TTM applied to physical activity. They found the processes of change, self-efficacy, and decisional balance differed across the stages in the direction predicted by the model. They also noted that stage membership is associated with different levels of physical activity, self-efficacy, pros and cons, and processes of change. More recently, Hutchinson, Breckson, and Johnston (30) reviewed the TTM-based interventions for physical activity behavior change and found that most of the interventions failed to accurately represent all dimensions of the model. They concluded that to examine efficacy of the model, practitioners should develop physical activity interventions that accurately represent all the TTM model constructs (*i.e.*, stages of change, self-efficacy, decisional balance, and processes of change).

## STEP-BY-STEP: HOW TO APPLY THE TRANSTHEORETICAL MODEL TO PHYSICAL ACTIVITY BEHAVIORS

To successfully apply the TTM to physical activity, you must first determine the person's stage of change. See From the Practical Toolbox 1.1 for a stage of change questionnaire that you can use to determine a person's stage of change. Once you know a person's stage of change you can then target the remaining TTM constructs (*i.e.*, the process of change, self-efficacy, and decisional balance; see From the Practical Toolbox 1.2 through 1.4 for questionnaires that assess these TTM constructs) in an attempt to change physical activity intentions and/or behavior, with the ultimate goal of moving a person forward along the stage of change continuum.

For *decisional balance*, you can tell if people are moving forward through the stages by looking for differences in the number of pros versus cons they list for exercise. For example, in the precontemplation stage, the cons of exercising will far outweigh the pros. Carlos DiClemente and his colleagues (25) noted that assessing the pros and cons is relevant for understanding and predicting transitions among the first three stages of change (*i.e.*, precontemplation,

## From the Practical Toolbox 1.1



### EXAMPLE OF A STAGES OF CHANGE QUESTIONNAIRE

#### For Exercise

The following five statements will assess how much you currently exercise in your leisure time (exercise done outside of a job). *Regular exercise* is any *planned* physical activity (e.g., brisk walking, jogging, bicycling, swimming, line-dancing, tennis etc.) performed to increase physical fitness. Such activity should be performed *three or more times* per week for *20 or more minutes* per session at a level that increases your breathing rate and causes you to break a sweat (6).

Do you exercise regularly according to the definition above? **Please mark only ONE of the five statements.**

1. \_\_\_\_ No, and I do not intend to begin exercising regularly in the next 6 months.
2. \_\_\_\_ No, but I intend to begin exercising regularly in the next 6 months.
3. \_\_\_\_ No, but I intend to begin exercising regularly in the next 30 days.
4. \_\_\_\_ Yes, I have been, but for less than 6 months.
5. \_\_\_\_ Yes, I have been for 6 months or more.

#### SCORING

Item 1=Precontemplation; Item 2=Contemplation; Item 3=Preparation; Item 4=Action; Item 5=Maintenance

#### For Physical Activity

The following five statements will assess how much you currently engage in **regular physical activity** in your leisure time. For physical activity to be regular it must be done for *30 minutes* (or more) per day, and be done *at least* 5 days per week (67). For example, you could take three 10-minute brisk walks or ride a bicycle for 30 minutes. Physical activity includes such activities as walking briskly, biking, swimming, line dancing, and aerobics classes or any other activities where the exertion is similar to these activities. Your heart rate and/or breathing should increase, but there is no need to exhaust yourself.

Do you regularly engage in physical activity according to the definition above? **Please mark only ONE of the five statements.**

1. \_\_\_\_ No, and I do not intend to begin regularly engaging in physical activity in the next 6 months.
2. \_\_\_\_ No, but I intend to begin regularly engaging in physical activity in the next 6 months.
3. \_\_\_\_ No, but I intend to begin regularly engaging in physical activity in the next 30 days.
4. \_\_\_\_ Yes, I have been, but for less than 6 months.
5. \_\_\_\_ Yes, I have been for 6 months or more.

#### SCORING

Item 1=Precontemplation; Item 2=Contemplation; Item 3=Preparation; Item 4=Action; Item 5=Maintenance

Questionnaire for exercise: Reprinted with permission from the following source; questionnaire for physical activity: Adapted with permission from the following source:

Nigg CR and Riebe D. The Transtheoretical Model: Research review of exercise behavior and older adults. In: Burbank P and Riebe D, editors. *Promoting Exercise and Behavior Change in Older Adults: Interventions with the Transtheoretical Model*. Springer Publishing Company; 2002, p. 147–80.



## From the Practical Toolbox 1.2

### PROCESSES OF CHANGE SCALE

The following experiences can affect the exercise habits of some people. Think of similar experiences you may be currently having or have had *during the past month*. Then rate how frequently the event occurs by circling the appropriate number. Please answer using the following 5-point scale:

1	2	3	4	5
Never	Seldom	Occasionally	Often	Repeatedly

1. I read articles to learn more about exercise. .... 1    2    3    4    5
2. I get upset when I see people who would benefit from exercise but choose not to exercise. .... 1    2    3    4    5
3. I realize that if I don't exercise regularly, I may get ill and be a burden to others. .... 1    2    3    4    5
4. I feel more confident when I exercise regularly. .... 1    2    3    4    5
5. I have noticed that many people know that exercise is good for them. .... 1    2    3    4    5
6. When I feel tired, I make myself exercise anyway because I know I will feel better afterward. .... 1    2    3    4    5
7. I have a friend who encourages me to exercise when I don't feel up to it. .... 1    2    3    4    5
8. One of the rewards of regular exercise is that it improves my mood. .... 1    2    3    4    5
9. I tell myself that I can keep exercising if I try hard enough. .... 1    2    3    4    5
10. I keep a set of exercise clothes with me so I can exercise whenever I get the time. .... 1    2    3    4    5
11. I look for information related to exercise. .... 1    2    3    4    5
12. I am afraid of the results to my health if I do not exercise. .... 1    2    3    4    5
13. I think that by exercising regularly I will not be a burden to the health care system. .... 1    2    3    4    5
14. I believe that regular exercise will make me a healthier, happier person. .... 1    2    3    4    5
15. I am aware of more and more people who are making exercise a part of their lives. .... 1    2    3    4    5
16. Instead of taking a nap after work, I exercise. .... 1    2    3    4    5
17. I have someone who encourages me to exercise. .... 1    2    3    4    5
18. I try to think of exercise as a time to clear my mind as well as a workout for my body. .... 1    2    3    4    5

From the Practical Toolbox 1.2 *continued*

19. I make commitments to exercise. ....	1	2	3	4	5
20. I use my calendar to schedule my exercise time. ....	1	2	3	4	5
21. I find out about new methods of exercising. ....	1	2	3	4	5
22. I get upset when I realize that people I love would have better health if they exercised. ....	1	2	3	4	5
23. I think that regular exercise plays a role in reducing health care costs. ....	1	2	3	4	5
24. I feel better about myself when I exercise. ....	1	2	3	4	5
25. I notice that famous people often say that they exercise regularly. ....	1	2	3	4	5
26. Instead of relaxing by watching TV or eating, I take a walk or exercise. ....	1	2	3	4	5
27. My friends encourage me to exercise. ....	1	2	3	4	5
28. If I engage in regular exercise, I find that I get the benefit of having more energy. ....	1	2	3	4	5
29. I believe that I can exercise regularly. ....	1	2	3	4	5
30. I make sure I always have a clean set of exercise clothes. ....	1	2	3	4	5

**SCORING**

Consciousness Raising – 1, 11, 21  
 Dramatic Relief – 2, 12, 22  
 Environmental Reevaluation – 3, 13, 23  
 Self-Reevaluation – 4, 14, 24  
 Social Liberation – 5, 15, 25

Counterconditioning – 6, 16, 26  
 Helping Relationships – 7, 17, 27  
 Reinforcement Management – 8, 18, 28  
 Self-Liberation – 9, 19, 29  
 Stimulus Control – 10, 20, 30

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contemplation, and preparation). During the action and maintenance stages, however, these decisional balance measures are much less important predictors of progress.

For *self-efficacy*, remember that your self-efficacy for exercise will increase as you progress along the stage of change continuum. Please refer to the section early on step-by-step procedures for targeting self-efficacy to give people the confidence that they can make and maintain changes in their exercise behavior.

Finally, the *process of change* enables you to understand *how* shifts in intentions and behavior occur. As previously mentioned, there are 10 processes of change that represent the behaviors, cognitions, and emotions that you engage in during the course of changing behavior. To progress through the early stages (*i.e.*, precontemplation, contemplation, and preparation), you apply cognitive, affective, and evaluative processes. As you move toward maintenance, you rely more on commitments, conditioning, contingencies, environmental controls, and support. Different strategies are most effective at different stages of change. For example, counterconditioning and stimulus control can really help you in the action and maintenance stages. But these processes are not helpful for someone who is not intending





## From the Practical Toolbox 1.3

### SELF-EFFICACY/CONFIDENCE SCALE

This part looks at how confident you are to exercise when other things get in the way. Read the following items and fill in the circle that best expresses how each item relates to you in your leisure time. Please answer using the following 5-point scale:

1	2	3	4	5
Not at all confident	Somewhat confident	Moderately confident	Very confident	Completely confident

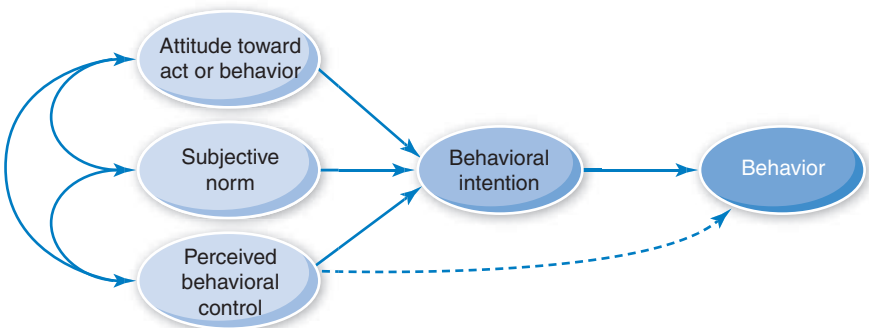
I am confident I can participate in regular exercise when:

1. It is raining or snowing or icy. .... 1    2    3    4    5
2. I am under a lot of stress. .... 1    2    3    4    5
3. I feel I don't have the time. .... 1    2    3    4    5
4. I have to exercise alone. .... 1    2    3    4    5
5. I don't have access to a place for exercise. .... 1    2    3    4    5
6. I am spending time with friends. .... 1    2    3    4    5

### SCORING

All 6 items are a general self-efficacy scale representing the six factors. The long form (3 items per factor) may be obtained from the editor.

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**FIGURE 1.4.** The Theory of Planned Behavior. (Adapted with permission from Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process*. 1991;50:179–211.)

to take action. As another example, consciousness-raising and dramatic relief work better for someone in this stage than in the precontemplation stage.

See Figure 1.4 for a representation of how the TTM constructs work to change people's intentions and behavior.

## From the Practical Toolbox 1.4



### DECISIONAL BALANCE SCALE

This section looks at positive and negative aspects of exercise. Read the following items and indicate how important each statement is with respect to your decision to exercise or not to exercise in your leisure time by filling in the appropriate circle. Please answer using the following 5-point scale:

1	2	3	4	5
Not at all important	Somewhat important	Moderately important	Very important	Extremely important

1. I would have more energy for my family and friends if I exercised regularly. ....1    2    3    4    5
2. I would feel embarrassed if people saw me exercising. ....1    2    3    4    5
3. I would feel less stressed if I exercised regularly. ....1    2    3    4    5
4. Exercise prevents me from spending time with my friends. ....1    2    3    4    5
5. Exercising puts me in a better mood for the rest of the day. ....1    2    3    4    5
6. I feel uncomfortable or embarrassed in exercise clothes. ....1    2    3    4    5
7. I would feel more comfortable with my body if I exercised regularly. ....1    2    3    4    5
8. There is too much I would have to learn to exercise. ....1    2    3    4    5
9. Regular exercise would help me have a more positive outlook on life. ....1    2    3    4    5
10. Exercise puts an extra burden on my significant other. ....1    2    3    4    5

### SCORING

PROS – 1, 3, 5, 7, 9      CONS – 2, 4, 6, 8, 10

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### Case Scenario 1.2

Carla is a 60-year-old couch potato who is overweight. Her doctor recently diagnosed her as prediabetic and has encouraged her to start exercising. She denies having a problem and has no intention of making a change in her physical activity in the next 6 months. Carla also has a lack of motivation to become physically active and has many “excuses” for not being physically active. She does not think that physical activity is valuable in being able to help her lose her excess weight and other related health issues. She feels overwhelmed by barriers such

*continued*

## Case Scenario 1.2 *continued*

as lack of time and lack of knowledge on how to be physically active, and she strongly feels that being physically active is impossible for her.

To help Carla, a practitioner should consider the following:

- **Stage of change:** First, determine the stage of change Carla is in. Because Carla has no intention of beginning an exercise program in the foreseeable future, she is in the precontemplation stage. Knowing her stage of change will enable a practitioner to develop a physical activity intervention that is tailored to that person's stage of change.
- **Decisional balance:** Have Carla list her pros and cons of exercising. You want to make her more aware of the multiple benefits of changing from a sedentary to an active lifestyle. Emphasize the pros of exercising over the cons.
- **Processes of change:** Use the processes of change of dramatic relief, consciousness raising, and helping relationships to move Carla from the precontemplation to the contemplation stage. In order to do this, you can help Carla gather information about the health benefits of being physically active and how it can help her lose weight and reduce her likelihood of developing diabetes (*i.e.*, consciousness raising). You can also have Carla express her feelings about being sedentary and overweight. Finally, have Carla assess how her inactivity affects her friends and family. For example, Carla is not able to actively play with her grandchildren because she does not have the energy to do so. Also, she is not able to go for nightly walks with her husband. Educating Carla about her inactivity is critical in helping her to start thinking about becoming more active.

### TAKE-HOME MESSAGES

Over the past few decades, the TTM has been increasingly applied to examine physical activity behavior. The core constructs of the TTM are the stages of change, processes of change, decisional balance, and self-efficacy.

The most frequently examined construct of the TTM in the physical activity domain has been the stages of change construct. The stages of change assesses your progression and regression through five main stages as you attempt to become physically active: precontemplation (not intending to make changes), contemplation (intending to make changes in the foreseeable future), preparation (immediate intention to change), action (actively engaging in the new behavior), and maintenance (sustaining change over time).

The processes of change are the overt and covert activities that individuals use to alter their experiences and environments to modify behavior change. Decisional balance focuses on the benefits (pros) and costs (cons) of a behavior, and is thought to be important in the decision-making process. Finally, self-efficacy is a judgment regarding one's ability to perform a behavior required to achieve a certain outcome. It is important to apply all the applicable TTM constructs (*i.e.*, processes of change, self-efficacy, decisional balance) when attempting to change people's physical activity motivation and behavior.

## SELF-DETERMINATION THEORY

*Note: This theory is presented here for chapter completeness. A more comprehensive approach for using this theory is presented in Chapter 5.*

## WHAT IT IS AND WHY IT WORKS

Self-Determination Theory (SDT) (24) is a practical theory that was developed to explain affective, cognitive, and behavioral responses in an achievement domain (*i.e.*, an area that you can set goals to strive for, particularly in terms of competence relevant activities such as academics) and it can be applied to physical activity to understand your motives. SDT is based on the concept that you have three primary psychological needs:

- The need for *competence* (*i.e.*, ability to effectively perform a behavior)
- The need for *relatedness* (*i.e.*, social connections with others)
- The need for *autonomy* (*i.e.*, independence to make own decisions)

As a result, you seek challenges to satisfy at least one of these three basic needs.

SDT also suggests that three types of motivation drive your behaviors (see Figure 1.3):

- **Amotivation:** On one end of the continuum, *amotivation* is the absence of motivation. In terms of exercise behavior, you may show amotivation toward being physically active for a number of reasons, such as a lack of self-discipline to fit exercise into your daily routine or the belief that exercise is not necessary and will not result in a desired outcome (*i.e.*, weight loss).
- **Extrinsic motivation:** Next on the continuum is *extrinsic motivation*, which is often viewed negatively and is not an ideal means of motivating you to perform specific behaviors. However, in terms of exercise behavior, it is important to note that being extrinsically motivated to be physically active is not necessarily a bad thing since exercising to lose weight and improve your health are technically considered to be extrinsic motives, but they are great reasons for you to be physically active. Deci and Ryan (24) described four types of extrinsic motivation:
  - **External regulation:** The least self-determined of these four, this is the process of performing a behavior because of an external reward (*i.e.*, exercising to receive praise from others or monetary compensation) or to avoid punishment (*i.e.*, exercising to avoid being scolded by a significant other).
  - **Introjected regulation:** Describes behavior that is contingent on self-imposed pressures such as exercising to avoid feelings of guilt.
  - **Identified regulation:** Is a more autonomous form of extrinsic motivation driven by your personal goals (*i.e.*, exercising to lose weight or running to train for a 5k).
  - **Integrated regulation:** Is the most self-determined type of extrinsic motivation that includes engaging in a behavior to confirm your sense of self (*i.e.*, I am a cyclist or a runner and this is what I do). However, integrated regulation is still considered extrinsic because the goals you are trying to achieve are for reasons extrinsic to yourself, rather than the inherent enjoyment or interest in the task.

*continued*

- **Intrinsic motivation:** Is engaging in a behavior for reasons of pleasure, enjoyment, and fun.

SDT examines predictors of physical activity including factors in the environment (*i.e.*, rewards, positive feedback), within the person (*i.e.*, basic psychological needs), and allows for the examination of important psychological outcomes as a result of the physical activity (*i.e.*, perceived competence) (28). SDT provides useful guidelines for practitioners to use for targeting how to motivate people for physical activity.



## EVIDENCE

Much of the initial research using SDT within the physical activity domain has been correlational in nature (18). Correlational designs are important for identifying the antecedents of physical activity behavior and the underlying mechanisms that are associated with these antecedents, but such designs are limiting. Therefore, experimental designs are needed to establish causality.

There are limited experimental and interventional studies applying SDT within a physical activity context. Most of the early work was focused on the sports domain (20,21,69); but recently researchers have focused on experimental methods that examine specific constructs of SDT and their effects on exercise behavior. Researchers have demonstrated that manipulations designed at changing self-determined motivation resulted in changes in exercise intentions that furthermore resulted in changes in exercise behavior (19). There have also been recent advances in the development of interventions in applied settings using SDT to increase motivation for physical activity in students (26,70), promote leisure physical activity in sedentary young adults (48), understand physical activity motives in cancer survivors (49) and increase physical activity in overweight women (59–61).

Despite these recent successes, there is still a need for further research examining the role of autonomy-supportive techniques to change self-determined motivation and physical activity behavior (*e.g.*, providing participants with options about intensity, frequency, and type of exercise-related activities; praising participants for improvements in techniques and fitness). Researchers and practitioners should teach these strategies to individuals so they have the tools to engage in physical activity behavior on their own after the intervention has ended. Future research is also needed to better understand the underlying mechanisms that are not only important for initial behavior change, but for long-term adherence to physical activity behavior.



## STEP-BY-STEP: HOW TO APPLY SELF-DETERMINATION THEORY TO PHYSICAL ACTIVITY BEHAVIORS

To effectively use SDT to promote physical activity behavior and adherence, Kilpatrick and colleagues (36) developed the following set of guidelines for practitioners:

### Step 1: Provide Choice of Activities to Promote Autonomy

Make a conscious effort to involve people in the decision-making process to promote both autonomy and self-determination. For example, giving a person the ability to choose the type of physical activity they enjoy most will promote autonomy while also increasing enjoyment. These are essential steps in “hooking” a person on engaging in physical activity. Also, providing multiple activities to choose from is more likely to lead to increased independence rather than forcing people to do one activity without any other options.

**Step 2: Provide a Rationale for Activities**

Explain why a person is engaging in physical activity, how the activity has health benefits, and which aspects of fitness will improve as a result of the physical activity. Giving someone a rationale and purpose not only creates a sense of autonomy, but it is also likely to lead to positive perceptions of the activity, which is more likely to foster the development of intrinsic motivation.

**Step 3: Provide Positive Feedback so Individuals Gain a Sense of Competence**

Positive feedback includes praise as well as constructive criticism for improving a behavior. The type of feedback will vary depending on their skill level. For instance, a highly skilled and experienced exerciser may perceive corrective or instructional feedback as more helpful than positive reinforcement, while a novice exerciser may respond favorably to praise and encouragement. Positive feedback has been shown to foster confidence and competence, which in turn will lead to greater enjoyment of the activity and stronger intrinsic motivation.

**Step 4: Promote Process Goals That Are Moderately Difficult**

Process goals focus on the tasks necessary to achieve goals—that is, the specific steps for successfully performing a behavior. Practitioners should create an environment based on competence rather than competition against others and encourage individuals to measure their success relative to their own performances rather than comparing to others. Also, setting moderately difficult goals are likely to result in short-term success that can foster competence. If the goals are too difficult, failure may be more likely to occur, which will lead to decreased confidence and motivation for that behavior.

**Step 5: Promote the development of social relationships**

Adherence is more likely to occur when people build social connections, which in turn leads to greater satisfaction and increases the likelihood of long-term physical activity maintenance.



## Case Scenario 1.3

### INTROJECTED REGULATION

Susie is in her mid 40s. She has been exercising irregularly for the past year (*i.e.*, goes to the gym 4 or 5 days a week for a month and then not again for another 3 months). Her main motivation for going to the gym or going out for a run is to improve her appearance for different events such as a friend's wedding or a party with friends. She is exhibiting extrinsic motives for being physically active driven by a need to look aesthetically better when she has to see friends or family. As a result, Susie is not adhering to a regular exercise regimen or exercising for inherent pleasure or to improve her overall health.

Susie would benefit from a program that requires her to set moderately difficult goals such as exercising every week, 3 to 5 days a week and not quitting once she sees results that she wants. Susie should pick the activities that she wants to do to promote autonomy and to make sure the activities she is engaging in are enjoyable for her. Also, Susie should set personal goals to achieve (*i.e.*, run a 5k) so that she can experience mastery of these tasks as well as feelings of pride and satisfaction (see From the Practical Toolbox 1.5 for an example goal setting sheet). Finally, Susie should be encouraged to take group fitness classes to promote relatedness and satisfy her need for social interactions.



## From the Practical Toolbox 1.5

### GOAL SETTING AND SELF-DETERMINATION THEORY EXAMPLE

Short-term goal #1	Short-term goal #2	Long-term goal #1	Long-term goal #2
<b>Goal:</b>	<b>Goal:</b>	<b>Goal:</b>	<b>Goal:</b>
When do I want to accomplish this goal by?	When do I want to accomplish this goal by?	When do I want to accomplish this goal by?	When do I want to accomplish this goal by?
How will I work on this?	How will I work on this?	How will I work on this?	How will I work on this?
Where will I work on this?	Where will I work on this?	Where will I work on this?	Where will I work on this?
How realistic is it that I will accomplish this goal?	How realistic is it that I will accomplish this goal?	How realistic is it that I will accomplish this goal?	How realistic is it that I will accomplish this goal?
How difficult is this goal for me to achieve?	How difficult is this goal for me to achieve?	How difficult is this goal for me to achieve?	How difficult is this goal for me to achieve?





## Case Scenario 1.4

### AMOTIVATION

Justin was a high school football player who was previously in good physical shape due to team workouts and weightlifting. However, once he entered college, his regular exercise routine stopped and he continued this “no exercise” routine through his 20s. Justin does not see any reason to be physically active now that he is no longer playing football. He lacks any form of discipline or motivation to go to the gym on a regular basis. He knows that he is a few pounds overweight, but does not see any problem with the extra pounds he has gained since high school. He believes he is perfectly healthy and has no need to exercise.

To help Justin, there are several important things a practitioner or interventionist needs to consider. They need to explain to Justin the importance of physical activity for his health. Since Justin is slightly overweight, they should explain the consequences that are likely to occur if he continues to lead a sedentary lifestyle (*i.e.*, development of obesity, metabolic syndrome, heart disease). Justin has no motivation to be physically active; therefore, the goal would be for him to eventually achieve intrinsic motivation toward being active.

A program designed to encourage Justin to develop intrinsic motivation should be aimed at enhancing his sense of competence and autonomy within a positive, supportive environment where social interactions can take place. Justin should be able to choose the types of activities he wishes to engage in so that he has a sense of ownership and control over his workout routine to enhance his sense of autonomy toward exercise. Having choice in the type of activity he does will also make the activity more enjoyable for Justin and increase the likelihood that he continues to be physically active. Also, developing a program that allows Justin to feel successful in mastering his choice of activity will help to develop his feelings of competence. Finally, group exercise may be beneficial in addition to exercising on his own because it fulfills his sense of relatedness and will develop social support toward being active.

As a novice exerciser, Justin would start with simple, low-intensity activities that he can master and thus develop feelings of satisfaction toward being active. It is likely that Justin will first experience extrinsic rewards from being active (*i.e.*, weight loss, improved mood) and hopefully continued exercise behavior will be enjoyable and satisfying, such that Justin develops intrinsic motives for being active. Also, over time, the duration and intensity of his exercise can be increased so that he continues to be challenged and does not get bored with his exercise routine.

Therefore, incorporating all three basic needs (autonomy, competence, and relatedness) are important so that Justin can move from being amotivated to being intrinsically motivated toward exercising. However, it is important to note that it may not be necessary to target all three basic needs when intervening with individuals as it may be too overwhelming for certain individuals. It is important to tailor the intervention design to the individual and target the needs of that individual that will be the most influential in helping them become more intrinsically motivated to be physically active.

## TAKE-HOME MESSAGES

SDT specifies that individuals seek behaviors that satisfy three basic needs: competence, autonomy, and relatedness. The theory furthermore identifies three forms of motivation (amotivation, extrinsic motivation, and intrinsic motivation) that drive individuals' achievement behaviors. Following the recommendations provided in this chapter to target individuals' sense of autonomy and competence, self-determination theory can be easily incorporated into practice to promote and encourage physical activity.

## Theory of Planned Behavior

### CONCEPT OVERVIEW

### WHAT IT IS AND WHY IT WORKS

The Theory of Planned Behavior (TPB) is a theory about the link between your attitudes and behaviors. Ajzen (3) defined behavior in terms of a single action (taking an aerobics class), directed at a specified target (fitness center) in a given context (YMCA community center), and at a specified time (Tuesday nights at 5pm) (27). Ajzen proposed the TPB as an extension of the Theory of Reasoned Action (5). The TPB is one of the most predictive persuasion theories, and it has guided a large majority of the physical activity theory-based research (3). This theory specifies that some or all of the following four main psychological variables influence your behavior (see Figure 1.4):

- **Intention: Intending** to perform a behavior is the main determinant of whether or not you engage in that behavior. Intention is reflected in your willingness and how much effort you are planning to exert to perform the behavior. The stronger your intention to perform a behavior, the more likely you will engage in that behavior. Thus, if you have a strong intent to go biking this afternoon, you are more likely to do it. As might be expected, your intention can weaken over time. The longer the time between intention and behavior, the greater the likelihood that unforeseen events will produce changes in your intention. For example, you may intend to go for a long bike ride on the weekend. However, bad weather may make it difficult to safely take a long ride, and thus, even though you have a strong intent, you will not be able to go for a bike ride. Your intention, or level of motivation, is influenced by your attitude about the behavior, the perceived social pressures to do the behavior (*i.e.*, subjective norm), and the amount of perceived control over performing the behavior (*i.e.*, perceived behavioral control). These are described in more detail in the following.
- **Attitude:** Is your positive or negative evaluation of performing a behavior. For example, an older adult may have a negative attitude toward engaging in a vigorous physical activity such as running, but have a positive attitude toward

walking in the neighborhood. Your attitude toward a specific behavior (whether it be walking or running for example) is a function of your *behavioral beliefs*, which refer to the perceived consequences of carrying out a specific action and your evaluation of each of these consequences. For example, your beliefs about playing doubles tennis could be represented by both positive expectations (*e.g.*, it will improve my social life because I will meet lots of people) and negative expectations (*e.g.*, it will reduce my time with family). In shaping a physical activity behavior, you evaluate the consequences attached to each of these beliefs. Common behavioral beliefs for physical activity are that it improves fitness/health, improves physical appearance, is fun/enjoyable, increases social interactions, and improves psychological health (65).

- **Subjective norm:** Is your perceived social pressure to perform or not perform a particular behavior. Subjective norm is from your *normative beliefs*, which are determined by the perceived expectations of important significant others (*e.g.*, family, friends, physician, priest) or groups (*e.g.*, classmates, teammates, church members) and by your motivation to comply with the expectations of these important significant others. For example, a mother may feel that her pregnant daughter should not exercise during her pregnancy. The daughter, however, may not be motivated to comply with her mother's expectations, and thus she walks regularly throughout her pregnancy.
- **Perceived behavioral control:** Represents your perceived ease or difficulty of performing a behavior. You may hold positive attitudes toward a behavior and believe that important others would approve of your behavior. However, you are not likely to form a strong intention to perform that behavior if you believe you do not have the resources or opportunities to do so (27). For example, you may have a positive attitude and enjoy swimming; however, if you do not have access to a pool, you will not be able to perform this behavior. Perceived behavioral control is a function of *control beliefs*, which represent the perceived presence or absence of required resources and opportunities (*e.g.*, "there is a road race this weekend"), the anticipated obstacles or impediments to behavior (*e.g.*, "the probability of rain on the weekend is 95%"), and the perceived power of a control factor to facilitate or inhibit performance of the behavior (*e.g.*, "even if it rains this weekend, I can still participate in the road race") (4). The most common control beliefs for physical activity are lack of time, lack of energy, and lack of motivation (65).

## EVIDENCE

Several statistical reviews have supported the TPB for explaining and predicting a wide variety of physical activities across many populations, such as ethnic minorities, youth, pregnant women, cancer patients, cancer survivors, and older adults, just to name a few (5,12,29,33,34,66). In general, the research has found that intention is the strongest



## From the Practical Toolbox 1.6

### THEORY OF PLANNED BEHAVIOR BELIEF ITEMS

**Instructions.** The following questions relate to your walking behavior during cancer treatment. List as many that apply to you in the space provided below.

List the main advantages of walking during your cancer treatment [*behavioral beliefs*]

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List the main disadvantages of walking during your cancer treatment [*behavioral beliefs*]

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List the main factors that prevented you from walking during your cancer treatment [*control beliefs*]

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List the main factors that helped you in walking during your cancer treatment [*control beliefs*]

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## From the Practical Toolbox 1.6 *continued*



List the individuals or groups who were/are most important to you when you thought/think about walking during your cancer treatment [*normative beliefs*]

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Source: <http://people.umass.edu/aizen/tpb.html>

determinant of your behavior, followed closely by perceived behavioral control. And your intention to perform a behavior is largely influenced by your attitude and perceived behavioral control, followed by the subjective norm. It is important to note though that the influence of each of the TPB constructs can vary from population and context.

### STEP-BY-STEP: HOW TO APPLY THE TPB TO PHYSICAL ACTIVITY

A strength of the TPB is that an *elicitation study* forms the basis for developing questions to assess the TPB constructs in a specific population. The elicitation study enables you to determine the specific beliefs for a specific population. This is very important because beliefs vary by population and even by activity. For example, the main behavioral beliefs for breast cancer survivors are that physical activity “gets my mind off cancer and treatment, makes me feel better and improves my well-being, and helps me maintain a normal lifestyle.” In comparison, the main behavior beliefs for pregnant women are that exercise “improves my mood and reduces physical limitations common to pregnancy, such as nausea.” Because beliefs vary by population, researchers and practitioners are strongly encouraged to refer to research that has already determined the physical activity beliefs of your specific intervention population (*e.g.*, postpartum women, cancer survivors, high school students). If physical activity beliefs for a practitioner’s population of interest have not been determined, then it is recommended that you conduct a pilot study (*i.e.*, known as an elicitation study) to determine the pertinent beliefs concerning a behavior for your specific population. Protocol suggested by Ajzen and Fishbein (65) for conducting elicitation studies include:

- Using open-ended questions to determine the important behavioral, normative, and control beliefs in a small sample of the targeted population (see From the Practical Toolbox 1.6);
- Carrying out a content analysis (*i.e.*, a simple frequency count) to determine which beliefs are most salient; and
- Developing structured items from the content analysis (see From the Practical Toolbox 1.7).



## From the Practical Toolbox 1.7

### EXAMPLES OF THEORY OF PLANNED BEHAVIOR ITEMS

**Note.** These items are for pregnant women in their first trimester. Reword to reflect the population you are studying.

Regular exercise behavior is participating in 30 minutes of accumulated moderate exercise on most, if not all, days of the week. This exercise can be done at one time (*e.g.*, 30 minutes of continuous walking or jogging) or accumulated in the day (*e.g.*, walking 10 minutes in the morning and 20 minutes in the evening). Examples of activities often done during pregnancy include walking, aqua-aerobics, and low impact fitness classes.

In this survey, we are interested in your personal opinions regarding regular exercise during the first three months of pregnancy (*i.e.*, your first trimester). Although some of the questions may appear very similar, each addresses a somewhat different issue. Please read each question carefully and reply by circling the number that best reflects your opinion.

1. For me to exercise regularly during my first trimester will be:

Useless							Useful
1	2	3	4	5	6	7	

2. For me to exercise regularly during my first trimester will be:

Unenjoyable							Enjoyable
1	2	3	4	5	6	7	

3. For me to exercise regularly during my first trimester will be:

Unpleasant							Pleasant
1	2	3	4	5	6	7	

4. For me to exercise regularly during my first trimester will be:

Foolish							Wise
1	2	3	4	5	6	7	

5. For me to exercise regularly during my first trimester will be:

Boring							Interesting
1	2	3	4	5	6	7	

6. For me to exercise regularly during my first trimester will be:

Harmful							Beneficial
1	2	3	4	5	6	7	

From the Practical Toolbox 1.7 *continued*

7. For me to exercise regularly during my first trimester will be:

Bad							Good
1	2	3	4	5	6	7	

8. Most people who are important to me want me to exercise regularly during my first trimester.

Extremely Likely						Extremely Unlikely
1	2	3	4	5	6	7

9. Most women who are important to me have themselves exercised regularly during their first trimester.

Extremely Likely						Extremely Unlikely
1	2	3	4	5	6	7

10. Most pregnant women will themselves exercise regularly during their first trimester.

Extremely Likely						Extremely Unlikely
1	2	3	4	5	6	7

11. Most people whose opinion I value think that I should exercise regularly during my first trimester.

Extremely Likely						Extremely Unlikely
1	2	3	4	5	6	7

12. Most people I care about would approve of my exercising regularly during my first trimester.

Extremely Likely						Extremely Unlikely
1	2	3	4	5	6	7

13. My doctor or health care provider thinks that I should participate in regular exercise during my first trimester.

Disagree						Agree
1	2	3	4	5	6	7

14. I will exercise regularly during my first trimester.

Definitely Not						Definitely
1	2	3	4	5	6	7

*continued*





## From the Practical Toolbox 1.7 *continued*

15. Whether I exercise regularly during my first trimester is completely up to me.

Disagree						Agree
1	2	3	4	5	6	7

16. Exercising regularly during my first trimester is under my control.

Not at All						Completely
1	2	3	4	5	6	7

17. If I want to, I can easily exercise regularly during my first trimester.

Extremely Likely						Extremely Unlikely
1	2	3	4	5	6	7

18. I intend to exercise regularly during my first trimester.

Definitely False						Definitely True
1	2	3	4	5	6	7

19. I plan to exercise regularly during my first trimester.

Definitely False						Definitely True
1	2	3	4	5	6	7

20. My goal is to exercise regularly during my first trimester.

Definitely False						Definitely True
1	2	3	4	5	6	7

21. I exercised regularly during my first trimester.

Definitely False						Definitely True
1	2	3	4	5	6	7

22. I had the ability to exercising regularly during my first trimester.

Definitely False						Definitely True
1	2	3	4	5	6	7

From the Practical Toolbox 1.7 *continued*

23. For me to exercise regularly during my first trimester is:

Impossible							Possible
1	2	3	4	5	6	7	

24. I am determined to exercise regularly during my first trimester.

Definitely Not							Definitely
1	2	3	4	5	6	7	

### Theory of Planned Behavior Global Items Information

**Attitude:** Items 1, 2, 3, 4, 5, 6, and 7

**Intention** = Items 14, 18, 19, 20, 24

**Subjective Norm:** Items 8, 9, 10, 11, 12, and 13

**Behavior** = Item 21

**Perceived Behavioral Control:** Items 15, 16, 17, 22, and 23

Source: <http://people.umass.edu/aizen/tpb.html>

Ajzen and Fishbein (65) proposed that structured items that arise from the elicitation study should be specific to the target at which the behavior is directed, the action or specificity of the behavior under study, and the context and time in which the behavior is being performed. This means, for example, that when trying to develop a walking intervention for older adults, you should ask a sample of older adults to: “list the main advantages of walking briskly 3 times a week for 30 minutes outside during the summer.” This information will help you develop an intervention based on the salient behavioral beliefs of these older adults that is specific to the behavior. According to the TPB, once beliefs are modified, intention will be altered and the desired behavior change will occur (4,66).

The relative contribution of the TPB constructs may fluctuate from context to context. Thus, before interventions using this framework are implemented, the predictive ability of these constructs with the specific population and specific context should first be tested.

The TPB is useful in identifying psychosocial determinants of physical activity, and thus it is useful for developing community and individual exercise programs. For example, exercise programs that offer a positive experience would obviously increase the intention to exercise, which in turn influences exercise behavior. Positive behavioral beliefs and their evaluation may be enhanced if you are given experiences with enjoyable types of physical activities and then are gradually encouraged to increase the intensity, duration, and frequency of those activities. Perceived behavioral control is an important factor in the intention to be physically active (13,51). When you perceive physical activity as difficult to do, intention is low. Overcoming barriers such as lack of time, competing demands and other obligations, and feelings of inability should enhance perceptions of control about carrying out physical activity. The next step in research using the TPB is to determine whether belief-based programs will lead to increased levels of physical activity and to determine whether beliefs about physical activity behavior change as one initiates and continues to engage in physical activity behaviors (52).



## Case Scenario 1.5

Bill is a 75-year-old retired school teacher who lives alone and likes to garden and do yard work in the summer months. This keeps him very active because he typically spends about two hours a day outside doing various yard activities from mowing the grass to raking to picking weeds. However, during the colder winter months, Bill tends to become sedentary and retreats to watching television to fill the time that he normally spends doing yard work in the summer. Because of Bill's advancing age and the fact that he lives alone, his doctor is concerned that he is not active enough during the entire year. His doctor wants Bill to maintain a more constant level of physical activity during all months of the year so that he has a high level of functional physical activity to ensure that he can perform day-to-day activities such as getting himself dressed, avoiding falling, and doing household chores.

To help Bill, a practitioner should consider the following:

- **Behavioral beliefs:** Have Bill make a list of activities that he may enjoy doing in the winter as well as the summer.
- **Normative beliefs:** Have Bill establish some winter activities that he can do with friends, such as mall walking. Have him identify friends and family that will support the types of activities he will be doing and make sure they are aware of his goals so they can provide the perceived support he needs.
- **Control beliefs:** Provide Bill with a list of issues that may arise (such as bad weather) that may make it difficult to be active in the winter, and then provide Bill with the skills to overcome these issues. For example, if the weather is too cold or stormy to do activities outside, provide him with activities that he can do inside (*e.g.*, exercise videos, home exercise equipment).
- **Intention:** Provide him with a motivational plan for year-round activities.

## TAKE-HOME MESSAGES

Changing your behavior is very difficult to do, especially when you are dealing with a complex health behavior such as physical activity. To increase the success of predicting, understanding, explaining, and changing physical activity behavior, researchers and practitioners should use a theoretical framework such as the TPB as a guide (68). Researchers have found support for the utility of attitude, perceived behavioral control, and to a lesser extent, subjective norm in explaining people's intention to becoming physically active. Also, research has found a strong relationship between your intention to be active and whether you do the behavior. Furthermore, your perception of control over engaging in physical activity can also directly predict behavior. In short, because of the success of the TPB for explaining and predicting physical activity behavior, it offers you a useful framework to guide physical activity interventions.

## OTHER THEORIES TO CONSIDER

While a detailed overview of several, frequently used theories and models applied to physical activity behaviors has been provided in this chapter, there are nonetheless other conceptual frameworks that have been used in the exercise domain. While they have been used less

frequently than other frameworks, these are important to consider because to date there is no single “exercise theory” that consistently and effectively explains and predicts exercise behavior. In the following, you will find a brief explanation of the Health Belief Model, Relapse Prevention, and the Social Ecological Model.

## THE HEALTH BELIEF MODEL

The Health Belief Model (HBM) (32) is one of the most widely recognized conceptual frameworks for health behavior. The main hypothesis is that behavior depends on two conditions: (a) value placed by you on a particular goal and (b) your estimate of the likelihood that a given action will achieve the goal (32). When these two conditions are viewed within the context of health-related behaviors, the focus is either on the desire to avoid illness (or if already ill, to get healthy) or the belief that a specific action will prevent or improve illness. Thus, HBM is most useful as a framework when a chronic disease (*e.g.*, cancer, diabetes, cardiovascular disease) is imminent.

The first component of HBM is *perceived susceptibility*, or your belief that you are personally susceptible to a particular illness (*e.g.*, my chances of developing prostate cancer are high because it runs in the family). *Perceived severity* is your opinion of the seriousness of a condition and its consequences (*e.g.*, cancer is a serious disease that can reduce my quality of life and if not effectively treated, can take my life).

The first four constructs of HBM represent your readiness to take action:

- **Perceived benefits:** Represents your opinion of the efficacy of the advised action to reduce risk or seriousness of impact. For example, whether you believe that engaging in regular physical activity (*e.g.*, 30 minutes of moderate-intensity physical activity a day) can reduce your cancer risk.
- **Perceived barriers:** Are your perceptions of the physical and psychological costs of the advised action. For example, you may believe that physical activity can reduce your cancer risk, but barriers such as inexperience with physical activity, low motivation, lack of time, and physical discomfort (*e.g.*, radiation treatment causes soreness) may reduce or altogether prevent the likelihood that action takes place.
- **Cues to action:** These trigger your readiness to take action and stimulates the actual behavior. Examples of Cues to Action include those that are personal (*e.g.*, breathlessness when walking up stairs or a family member or friend who becomes sick) as well as strategies that provide “how-to” information or instructions on the behavior, promoting awareness about disease risks, and providing reminders or prompts (*e.g.*, phone calls, texts, notes) to initiate the behavior.
- **Self-Efficacy:** This recent addition to the model (for a full description of this construct, see the “Self-Efficacy Theory” section earlier in this chapter), which represents your confidence in your ability to take action. Strategies to increase self-efficacy include training/guided instruction, multiple opportunities for success with the desired behavior, and verbal praise for positive reinforcement.

## RELAPSE PREVENTION

Relapse prevention (40) is a cognitive-behavioral approach with the goal of identifying or preventing high-risk situations. This model is most useful as a framework when setbacks (or relapses) are common, particularly with high-risk behaviors such as substance or alcohol abuse, obsessive-compulsive behavior, and depression. Typically these behaviors are high in frequency and undesired—thus, it may seem less applicable to apply this framework to physical activity, which is a desired behavior, yet often of low frequency. Nevertheless, this model can provide some insight regarding the antecedents of exercise cessation—when you reduce or stop exercising altogether.

Marlatt and Gordon (40) identified three primary triggers of relapse (in the case of exercise, exercise cessation):

- Personal conflict
- Negative emotional states
- Social pressures

In particular, negative emotional states (*e.g.*, depression, anger, stress) and social pressures (*e.g.*, increased pressure from school or work colleagues to engage in activities other than exercise) are common predictors of inactivity.

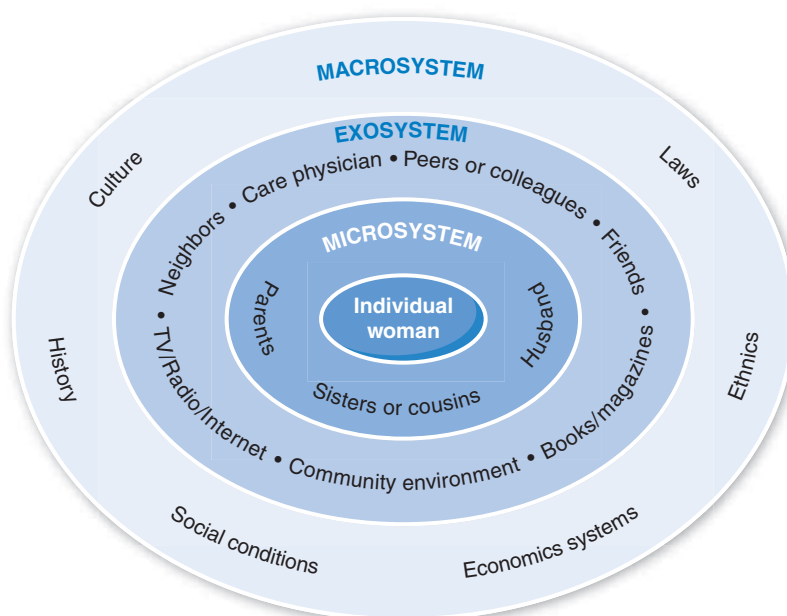
A key to preventing relapse is having effective coping strategies. When coping strategies are strong (*e.g.*, self-awareness, optimistic outlook, supportive family/friends), self-efficacy is higher and you have a reduced chance of relapse (exercise cessation). However, when coping strategies are poor or absent, self-efficacy is low and attributions are negative (*e.g.*, feelings of helplessness, lack of control), and in turn, relapse (or exercise cessation) is likely. Therefore, understanding and identifying effective coping strategies is an effective way to prevent exercise cessation.

## THE SOCIAL ECOLOGICAL MODEL

The Social Ecological Model is a framework for understanding multiple levels of influence on behavior. It emphasizes that the individual is responsible for engaging in healthy behaviors, but it also considers that surrounding social and environmental pressures and manipulations are key determinants of taking action.

This approach has several adaptations. The most commonly used in the exercise domain is based on Bronfenbrenner's (15,16) Ecological Systems Theory which divides environmental factors into four main influences. These factors can be illustrated as an "onion" (see Figure 1.5):

- The *individual* is at the center of this system.
- The next layer is the *microsystem*, or the immediate systems in which you interact (*e.g.*, family, school, work environments, parks, gyms, etc.).



**FIGURE 1.5.** The Social Ecological Model. (Adapted with permission from Bronfenbrenner U. Toward an experimental ecology of human development. *Am Psychol.* 1977;32:513–31.)

- The *mesosystem*, which is the next level of influence, represents the interaction of multiple individual systems. For example, the influences of parents (home microsystem) and teachers (school microsystem).
- The final two systems represent the most global or broader environmental influences. The *exosystem* represents external systems such as school or community boards, and the *macrosystem* encompasses all other systems (e.g., government, economic, social, etc.).

The closer the system is to the individual, the stronger the direct influence it has on that person's behavior.

The Social Ecological Model is a useful framework for guiding physical activity behavior when the role of the environment plays a key factor in the behavior change. For example, in order for a community to be able to engage in active commuting such as biking or walking to work, there must be good access to bike/walking paths, basic infrastructure to support it (e.g., sufficient sidewalk space, good flow of sidewalks and paths to main locations, bike racks, etc.), and connectivity of rural and urban areas (e.g., rails to trails for longer commutes vs. only highway access to main areas). Social ecological models have become more popular in recent years as interest has increased in how the built environment may facilitate exercise initiation and maintenance.

### INCORPORATING THEORY-BASED TECHNIQUES AND PRINCIPLES INTO PRACTICE

Now that the importance of theories and models has been established, and the theories have been explained, the next step is to understand how to incorporate theory-based strategies and principles into practice. Theories provide a logic model or roadmap for where to focus your efforts. They help to identify where to start and how to navigate the journey.

The foundation of a logic model is identifying the *behavioral antecedents*—or factors that precede the behavior—and then understanding how these antecedents influence the likelihood of a future behavior (37). By identifying these important antecedents, you can determine key targets for intervention, and in turn develop and implement more effective programs.

For example, in the Theory of Planned Behavior (1,4), one's intention (level of motivation) is identified as a primary determinant (behavioral antecedent) of behavior. The greater the level of motivation for physical activity, the more likely a person will engage in physical activity behaviors. Thus, according to this theory, in order to get people to be more physically active, you need to target their intention, or motivation, for the behavior.

In the Self-Efficacy Theory (9), the most important source of self-efficacy, or your belief in your abilities, is past performance accomplishments or experiencing mastery. When you successfully carry out a task, you will believe that you have the capabilities necessary to engage in the behavior in the future. For example, if you walk in a 5k event and successfully complete the race, you will have a greater belief that you can accomplish another event like this in the future. Therefore, according to this theory, in order to help promote behavioral change, you need to find ways of creating successful mastery experiences.

In the Health Belief Model (32), behavior depends upon several factors, including your perceived susceptibility of getting a disease, perceived severity of the condition and its consequences, perceived benefits of engaging in the behavior for reducing risk, perceived barriers or costs of doing the behavior, and your confidence in your ability to take action and start the behavior. For example, if you are a sedentary person, you may believe that you could have a heart attack (perceived susceptibility is likely), that inactivity can lead to a heart attack (perceived severity is great), and that starting to engage in physical activity

will reduce this risk (perceived benefits) without causing negative side effects of excessive difficulty (low perceived barriers).

The point is that theories provide you with the basic starting foundation. It is important to note that no single theory or model explains the broad scope of all health behaviors; or more specifically, explains 100% of physical activity behavior. You need to take into consideration the target individual or audience, environmental factors that may influence behavior, as well as other factors. In addition, a combination of theories may provide the best explanation for variations in behavior (37).

## TAKE-HOME MESSAGE

This chapter reviewed the basic principles of behavior change as well as provided an overview of several theories and models that can provide you with a useful foundation to promote physical activity. While there is not a single theory of physical activity behavior change, the most important aspect is choosing a conceptual framework that provides a good understanding of the key factors that influence physical activity behavior in the target population. After all, these antecedents (thoughts, beliefs, barriers, etc.) are what provide us with clues about “the how and why” a behavior occurs (or doesn’t occur) in order to initiate physical activity behavior change and sustain long-term maintenance.

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## FURTHER WEB RESOURCES

The following Web site provides useful information on how to develop theory of planned behavior questionnaires and intervention:

<http://people.umass.edu/aizen/tpb.html>

The following Web site includes an extensive list of questionnaires used to assess constructs of

Self-Determination Theory, with some specifically in an exercise context (*i.e.*, motives for physical activity):

<http://www.psych.rochester.edu/SDT/questionnaires.php>