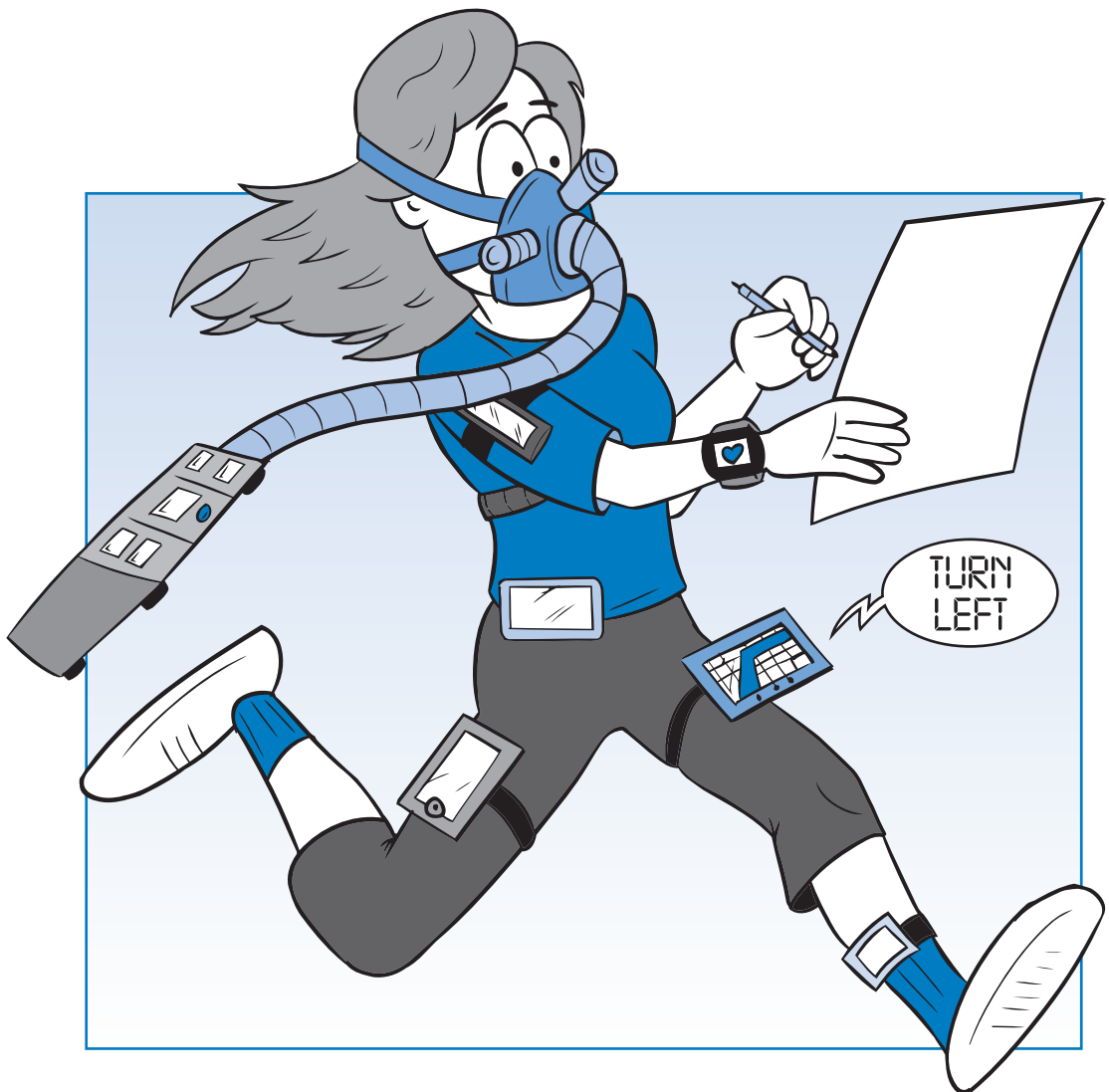


CHAPTER

2

Assessing Your Client's Physical Activity Behavior, Motivation, and Individual Resources

Sonia Lippke, Claudia Voelcker-Rehage, and Ute Bültmann



INTRODUCTION: ASSESSING INDIVIDUALS' PHYSICAL ACTIVITY AND MOTIVATION

Most organizations, like the American College of Sports Medicine (ACSM), provide *guidelines* to perform physical activity regularly (8). Specifically, the ACSM recommends to engage in . . .

- *moderate*-intensity cardiorespiratory exercise training for 30 minutes or more per day on 5 or more days per week, or
- *vigorous*-intensity cardiorespiratory exercise training for 20 minutes or more per day on 3 or more days per week, or
- a *combination* of moderate- and vigorous-intensity exercise to accumulate a total energy expenditure of 500–1000 or more MET minutes per week; and additionally
- *resistance* exercises for each of the major muscle groups a minimum of 2 days per week and
- *neuromotor exercise* (functional fitness training) involving balance, agility, and coordination for each of the major muscle-tendon groups (a total of 60 seconds per exercise) a minimum of 2 days per week.

The activity can be performed in bouts of 10 minutes as part of daily living, or as part of a fitness program. Although these guidelines are helpful, they also raise many practical questions (see Figure 2.1).

To best answer the questions found in Figure 2.1, we require an understanding of motivation and behavior, as well as other individual variables such as needs, wishes, fears, and barriers to physical activity. Such information can be acquired from those individuals whom we want to help. Different aspects or variables are important to assess within a person. Besides these, it is inevitable that environmental characteristics, such as the availability of proper facilities, also influence exercise behavior. *Ecological frameworks*, like the model by Bronfenbrenner (6), describe different levels: individual, social, physical environment, and policy (Figure 2.2).



FIGURE 2.1. Practical questions arising from recommended physical activity guidelines.

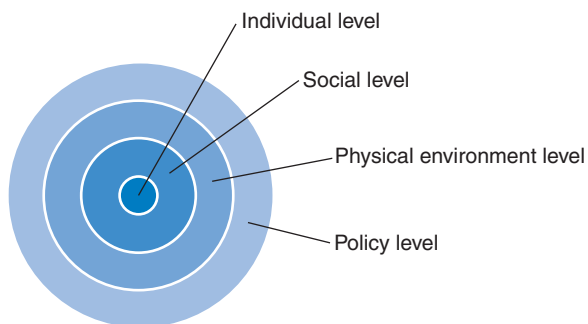


FIGURE 2.2. Ecological model of physical activity.

This chapter will focus only on the two inner levels shown in Figure 2.2 (individual and social levels), as we can directly assess how individuals perceive their environment, and what their expectations and (perceived) barriers are. The two outer levels are important as well, and are presented in Chapter 7.

Step-by-Step

As professionals working with clients, we need information about our clients' thoughts, expectations, perceptions, and competencies regarding health behaviors to help them adequately. For doing so, a good way is to determine:

1. The target population
2. The physical activity behavior of interest
3. Related behaviors of interest
4. Psychological and social (mediator/predictor) variables of interest
5. The measurement strategy

On the basis of this information, a measurement and assessment plan can be set up.

Case Scenario 2.1 demonstrates the practical application of the preceding steps when faced with the task of helping people become and remain physically active. Such a scenario might occur in any environment in which people work, learn, meet, or simply spend time.



Case Scenario 2.1

Consider a university with a relatively small and young campus, with 1,500 students and 450 faculty and staff members (=target population). Currently, *physical exercise programs* exist for students and employees. A *recreation center* hosts a rowing tank, gyms, and a well-equipped fitness facility. The wide variety of fitness equipment includes cardiovascular equipment, free weights, and resistance training machines. Additionally, a *gymnasium* provides athletic grounds and sports equipment, such as balls, nets, and rowing equipment. The question is how many people are performing physical activities within the *physical exercise programs*, in the *recreation center* and the *gymnasium* (=physical activity behavior of interest).

continued

Case Scenario 2.1 *continued*

In addition to changing rooms and bathroom facilities in the center, different buildings on campus provide *showers* for those students and employees who cycle to the campus (=related behaviors of interest).

A small interviewing (=measurement strategy) shows that (a) 30% of the university's students and employees engage in at least one physical exercise program once a week. It also reveals that (b) an additional 25% of students and employees would be interested in using it (=psychological and social variables). Finally, (c) the university board is not satisfied with the user numbers in the recreation center, and seeks better utilization (=psychological and social variables).

For this scenario, we can apply questions exploring how to help individuals engage in and maintain the recommended activity levels. How can we answer the question how to help individuals? There are different approaches:

1. We can generate some solutions ourselves.
2. We can ask students, faculty, staff, alumni, and the public, or a representative sample of those parties, what they desire, like and dislike.
3. We can look into the literature and previous good examples to search for theories and evidence to base our own developments on.

A combination of all these approaches would certainly be the most favorable. However, to meet the needs of the people, we must begin with understanding and assessing them.

CONCEPT OVERVIEW

If our aim is to understand individual and social factors, and design strategies that help to improve the behavior of individuals, we require additional information. Only if we understand what people do (*e.g.*, physical activity level), feel (*e.g.*, perceived barriers to activity), and think (*e.g.*, motivation), can we adequately tailor our intervention to each individual. Moreover, assessment is equally important in order to evaluate if our intervention was satisfactory and achieved desired outcomes.

In particular, describing how to measure aspects of an individual that affect health behavior is imperative for the following chapters of this book, because it allows us to understand individuals and their feelings, thoughts, and aims better. The goal of such measurements is to accurately assess the behavior, needs and preconditions of the client, such as intention or self-efficacy. When this is achieved, results of the assessment and measurement can be used for optimally designing and modifying health interventions to each individual. Further, when we establish which aspects should be changed throughout an intervention (such as intention), or what the outcome of an intervention should look like (*e.g.*, behavior change or behavior maintenance), interventions can be tailored adequately and evaluated accordingly. In this chapter, we provide example assessment scenarios to display practical implications of the information at the individual and social level. We also demonstrate possible tools or items that are useful for assessment. These tools generally originate from validated questionnaires published in research papers, and references to these studies are provided throughout the chapter. Furthermore, we refer to useful Web-sources in which these assessment tools can also be found.

TAKE-HOME MESSAGE

Assessment opens avenues for understanding and addressing individuals' behaviors, motivations, and determinants of behavior. With the results from assessments, we are able to design appropriate interventions and evaluate their effectiveness.

Assessment Modes

A *health behavior* is any behavior that improves health and well-being, which in turn helps to prevent the onset or progression of morbidity, as well as premature mortality. Thus, physical activity can be a health behavior if it is performed with appropriate intensity and frequency. Health behaviors also include risk reduction behaviors, such as limiting sedentary activities like television watching. Although many people are well aware that they should perform health behaviors on a regular basis, reports show that alarming numbers of people are not meeting the physical activity recommendations (8). This is especially the case for those who have disabilities and chronic illnesses.

To better cover different aspects of physical activity behavior, assessment of physical activity could cover the different aspects displayed in Table 2.1.

As you can see, there is more than just the pure behavior in terms of movements an observer would see if he or she monitors the individuals from the outside; psychological aspects such as easiness of execution are important as well. That is, some components of a behavior can be obtained through observation and other objective measures. However, not all facets can be observed or measured by means of physiological indicators, so self-report measures are also used (18). The advantages and disadvantage of various assessment modes are shown in Table 2.2.

Tools for Assessing Self-Reported Information

Self-reported information (questionnaires/interviews) is often used to measure physical activity and its determinants. While physical activity can also be assessed by objective methods, such as observation or physiological measures, influences like motivation are typically measured by self-reports. Although the validity (degree to which measurement actually measures what it should measure) of self-reports of behavior is not always assured, they are rather easy to obtain in comparison to objective measures.

The type of interview used can vary in usefulness, depending on the specific approach. Narrative and unstructured interviews utilize methods in which little or no predefined questions are asked, and questions are instead open ended (*i.e.*, the interviewee can respond

TABLE 2.1 Different Aspects of Behavior Assessment

Aspect	Example
Energy expenditure	kcal, MET (metabolic equivalent)
Length of behavior time	Time (minutes per week)
Frequency of behavior	Number of times per week
Easiness of executing (intensity)	How demanding it is to perform the intended activity

Note: For measuring and calculating MET (1, 7).

TABLE 2.2 Different Assessment Modes: Advantages and Disadvantages

	<i>Subjective Assessment</i>	<i>Objective Measures</i>
Content	Perceived Value	Outside Measures
Method	Person is directly asked about his or her behavior <ul style="list-style-type: none"> • Interviews, • Questionnaires, or • Diary logs and self-monitoring strategies. 	Behavior is monitored with a device, like pedometer or accelerometer (tracking steps or movements), or by direct observation (attendance rates; observing which products are bought or used for exercising, etc.).
Advantage	Individual resources and impediments such as intention, inner temptations, perceived self-efficacy and perceived social support, can only be measured subjectively.	Less likely to be biased by social desirability (tendency to present oneself in a more favorable manner than is actually true) and answering tendencies (e.g., to agree to questions)
Disadvantage	Social desirability (to present oneself in a more positive view) affects validity and reliability of measures.	Most are more challenging (time consuming, expensive) to gather.

in a narrative text form, instead of in the form of “yes-no” or multiple choice answers). These interviews often result in very different outcomes. This can complicate the comparison of information from multiple interviews (e.g., of one person interviewed several times). Alternatively, interviews can also be organized like questionnaires, providing well-defined question-and-answer options. This restricts gathered information to a range of selected answers, making it easier to compare. While the main difference between interviews and questionnaires is how the clients disclose themselves, they each have distinct advantages, as well as some similar traits. An interviewer requires the client to reveal all answers to the interviewer. In a questionnaire, however, the answering procedure is anonymous, which may reduce *social desirability bias*. For example, social desirability bias may cause the client to report more health behavior than they actually performed. Alternatively, interviews allow the interviewer to clarify questions for the client; an advantage not as likely with questionnaires. The anxiety of sharing personal information can occur in both questionnaires and interviews.

Diary log techniques and self-monitoring strategies can be very similar to questionnaires. With these techniques, clients are asked to monitor, say, the amount of their daily steps by carrying a pedometer and entering the daily number it reads into a log. Such a log can be a hard-copy book or an electronic book version. The latter provides the option to receive immediate feedback relating to the performed steps. For example, *individual/ipsative*: “Today, you performed 7000 steps. That is two times more than yesterday.” Or *normative*: “Today, you performed 7000 steps. That is less than the recommended 10,000 steps/day.”

TIME CONSIDERATIONS

When designing self-report surveys to assess information, several aspects are important to consider. First, the nature of the behavior should be considered: Whether the behavior in question may consist of an action performed on a *single occasion*, or a *repeatedly performed action*. For example, we might be interested in learning whether a person participates in regular physical activity (which can be measured by means of the PAR-Q—see the description later in this chapter and 22,23), or in a sports event (single occasion). The answer to either

of these can then only be dichotomous, providing a “yes” or “no” response. Physical exercise, however, has to be performed repeatedly in order to be health promoting. Thus, we are now interested in a repeatedly performed behavior.

Second, physical activity can be assessed over the course of a defined time span (e.g., “How often did you exercise during the last month?”), or measured by questioning the typical quantity and frequency of the behavior (e.g., “How often do you exercise during a typical week?”). Additionally, in the case of an accident or some other health conditions preventing one from performing his or her typical activities, individuals should receive a concrete instruction, such as thinking about the month prior to that incident. Any health incident should be considered and taken into account when evaluating the information.

Third, the optimal period for measurement should be considered. The course of a defined time span should be assessed if there are clear reasons for doing so. Defining a time span is recommended for the following situations:

1. If behavior change process is expected to occur—for example, after an intervention,
2. If a special interval was predicted by social-cognitive variables at an earlier point in time, such as predicting participation in a marathon half a year after measuring the intention to do so, or
3. If the individual has been in an unusual condition—for example, after a surgery or vacation.

Alternatively, having no time frame is sometimes advantageous, as specific time frames might be arbitrary: Why should a person who intends to adopt a physical activity in 6 months and 1 day be different from a person intending to start a physical activity in 5 months and 20 days or from a person intending to change within 6 months? There is no empirical evidence for this specific cutoff of 5 months and 20 days or 6 months. Contemporary assessments measure stages of change (see examples in Table 2.3) without using a specific time frame (10, 11).

PRECISION OF MEASUREMENT

The precision of measurement must also be considered. The level of comprehensiveness of behavior can be very broad (e.g., “I follow an active lifestyle”), or more precisely defined in terms of duration (e.g., “I bicycle to work every day, which takes about 30 minutes”). In order to have precise measurements, questions are asked about frequency and duration of exercising (e.g., “How many days per week did you perform sports activities? How many hours and minutes did one session last?”). Alternatively, the answers can be given on rating scales with verbal anchors (e.g., *less than 1 time a month or never* (1), *1–3 times a month* (2),

TABLE 2.3 Stages of Change Assessment

Instruction: Please think about your typical week. Did you engage in physical activity at least 5 days per week, for 30 minutes or more at a time (or a total of 2.5 hours during the week), in such a way that you were moderately exhausted? From the following statements, please choose the one that describes you most accurately by checking the number.

<i>No, and I do not intend to start</i>	1
<i>No, but I am considering it</i>	2
<i>No, but I seriously intend to start</i>	3
<i>Yes, but it is rather difficult for me</i>	4
<i>Yes, and it is rather easy for me</i>	5

Adapted with permission from Lippke S, Ziegelmann JP, Schwarzer R, and Velicer WF (2009). Validity of stage assessment in the adoption and maintenance of physical activity and fruit and vegetable consumption. *Health Psychology*, 28(2), 183–193.

approximately once a week (3), between 2 and 3 times a week (4), 4–5 times a week (5), and (almost) every day (6). In order to rate statements broadly, answers can be given on a rating scale that ranges from *not at all (1) to exactly (6).*

Objective Measures: Rationale, Tools, and Advantages

Some objective measures (such as steps performed during a week measured with a pedometer, and others as shown in Table 2.4) typically have higher accuracy than subjective ones (measured by means of an interview). This is because individuals do not have to respond to questions themselves. Instead, physical activity level is collected with tools such as physical activity motion detector monitoring (such as a pedometer, or accelerometers).

Modern technologies (*e.g.*, mobile phones, GPS technology), which track movements of the individual, could also be a solution. This must be assessed carefully, however, as accurate instruction and compliance of the individual is required as the main basis for gaining reliable information. Only if the person actually uses the pedometer appropriately, can it monitor physical activity correctly. The devices mentioned are normally small and not cumbersome for the client. They are affordable and come in a variety of brands, most of which should be reliable and valid.

Attendance rates within a recreation center can also be used as an objective observational measure. If members of a recreation center have to check in for their training, these measurements are relatively objective. However, if people forget to check in for a training or someone else checks in for the client, data might be inaccurate. Errors may be occurring if one is not only interested in attendance rates but also general physical activity during the day—*e.g.*, people may also train in other environments (such as a park).

Typical physiological objective measures (Table 2.4) capture the physical activity level, or fitness and functionality of the individual. Physical activity and fitness are related but not the same. Behavior can lead to an improvement in fitness and functionality, and lack of fitness and functionality may obstruct behavior.

TABLE 2.4 Examples of Objective Measures to Assess Physical Activity Level and Physical Fitness

Measure of . . .	Test and Material Needed (Example)
<i>. . . Physical activity</i>	
Number of steps	Pedometer
Acceleration forces	Accelerometer, GPS, mobile phones
<i>. . . Physical fitness</i>	
Cardiovascular fitness	VO ₂ Max test (spirometry) on the treadmill, stationary bike, rowing machine etc. Rockport 1-mile walk test
Heart rate / heart rate variability	Heart rate measurement device
Grip strength	Hand grip dynamometer
Flexibility	Measure tape/stick
Postural stability	Force platform, one leg stance



Case Scenario 2.2

Let's think again about the physical activity of individuals connected to the university. A task force of researchers decides to speak with students, faculty, staff, and alumni, as well as family of staff, and people living in the neighborhood of the campus, to obtain information about these individuals' physical activity levels. The goal is to learn more about their past behavior and experiences at the university, what they like and dislike about the fitness options at the campus, and whether they want support in committing to a weekly routine of physical activity. The process is as follows: First, the task force selects a group of participants representative of the population. To do this, three to five individuals from each group are selected, recruited, and *interviewed*.

Possible questions include:

- “Are you performing 30 minutes of moderate-intensity physical activity daily?”
- If *no*: “What challenges prevent you from doing so?”; “What could be changed to assist you in becoming more active?”
- If *yes*: “What do you think would motivate inactive people to be as active as you are?”

Next, *closed-end questions* are developed on the basis of those answers. The generated questions are sent out by e-mail to all students, faculty, staff, and alumni. Family of staff are to be approached personally. All people of interest then receive questions like:

- “If you think about the following potential changes on campus, would they help you perform 30 minutes of moderate-intensity physical activity daily?” Please indicate your answer on the following scale from “*not at all*” (1) to “*very much*” (6).
 - (a) If you get tips on how to schedule your training into your working day. 1–2–3–4–5–6
 - (b) If you get (more) personal assistance during your workout. 1–2–3–4–5–6
 - (c) If your friends and/or family could work out with you. 1–2–3–4–5–6

This allows people to indicate their past behavior and beliefs.

We now know something about the individuals who answered the questions. With that, we can tailor our interventions to the needs of the individuals.

TAKE-HOME MESSAGE

When assessing behavior, both objective and subject measures can be collected. Motivation and other psychological variables (see the following sections) are typically measured by perceived or subjective means. The variety of objective and subjective assessment options provides a number of different advantages, but also several restrictions. One should be aware of these when choosing a measurement tool or designing a project.

OBTAIN HEALTH INFORMATION/HISTORY TO ENSURE SAFE PARTICIPATION IN PHYSICAL ACTIVITY AND EXERCISE

CONCEPT OVERVIEW

Knowing about the health of oneself or of a client is important in order to exercise appropriately. The health status determines whether a specialist should be consulted to evaluate the safety of exercising. The recommended preparticipation questionnaires according to *ACSM's Guidelines for Exercise Testing and Prescription* (3) are the Physical Activity Readiness Questionnaire (PAR-Q, 22, 23) and the AHA/ACSM Health/Fitness Facility Preparticipation Screening Questionnaire. For a more specific, in-depth, and detailed preactivity screening process, the PAR-Q and AHA/ACSM Health/Fitness Facility Pre-participation Screening Questionnaire may be combined with tools like the Health Risk Appraisal (HRA) or Health History Questionnaire (HHQ) (24).

These four assessment tools—the PAR-Q, the AHA/ACSM Health/Fitness Facility Preparticipation Screening Questionnaire, the HRA, and the HHQ—are all standardized questionnaires used to identify health risk factors of exercising for an individual. Their purpose is to obtain medical clearance for a person, refer a person to his or her doctor, use the information to modify their program, etc. Thus, it is important for both the individual who intends to start exercising, and the professionals who provide the environment, to know about any risk factors and contraindications. Moreover, such assessments provide the opportunity to follow up with clients over time and track improvements and obstacles, and should therefore be repeated on a regular basis, perhaps weekly or annually. More detailed variations of the PAR-Q exist: The PAR-MEDX and the PAR-MEDX for Pregnancy are longer questionnaires. If individuals respond to these more detailed versions properly, exercise prescription can be done more accurately. (See From the Practical Toolbox 2.1 for more information about the PAR-Q, the PARmed-X, and the PARmed-X for Pregnancy.)

The four assessments can be found on the Internet as follows:

- PAR-Q at <http://www.csep.ca/english/view.asp?x=698>
- AHA/ACSM Health/Fitness Facility Preparticipation Screening Questionnaire at <http://circ.ahajournals.org/content/97/22/2283.full.pdf>
- HRA at http://www.cdc.gov/nccdp/hwi/downloads/HRA_checklist.pdf
- HHQ at <http://www.hr.emory.edu/blomeyer/docs/HealthHistoryQuestionnaire2007.pdf>

Two of these assessments will be described briefly in the following subsections.

From the Practical Toolbox 2.1



SCREENING FOR EXERCISE PREPAREDNESS

Lauren Capozzi and S. Nicole Culos-Reed

When screening someone for exercise, it is important to recognize certain population characteristics that may be contraindicated. Using the appropriate screening tool is the first step to ensuring someone's safety.

PAR-Q and YOU

This questionnaire is for people aged 15–69. This one-page form helps people to know if they need to check with their physician before engaging in physical activity. See Figure 2.3; this form is also available at <http://www.csep.ca/english/view.asp?x=698>.

PARmed-X

This is a physical activity-specific checklist used by physicians with patients who have responded “yes” to one or more questions on the PAR-Q. This form is available at <http://www.csep.ca/english/view.asp?x=698>.

PARmed-X for Pregnancy

This is a physical activity-specific checklist used by physicians with patients who are pregnant prior to attending prenatal fitness class or performing other exercise. This form is available at <http://www.csep.ca/english/view.asp?x=698>.

AHA/ACSM Health Fitness Facility Preparticipation Screening

This form (see Figure 2.4) provides an in-depth analysis of specific cardiovascular and other risk factors that could be affected by physical activity participation. It also recommends whether or not someone needs to contact his or her health care provider prior to exercise.

Informed Consent

This form (see Figure 2.5) ensures that individuals are aware of exercise testing and training procedures and that both parties (the individual and the exercise professional) understand the implications related to all possible outcomes.

continued



From the Practical Toolbox 2.1 *continued*

Physical Activity Readiness
Questionnaire - PAR-Q
(revised 2002)

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO	
<input type="checkbox"/>	<input type="checkbox"/>	1. Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?
<input type="checkbox"/>	<input type="checkbox"/>	2. Do you feel pain in your chest when you do physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	3. In the past month, have you had chest pain when you were not doing physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	4. Do you lose your balance because of dizziness or do you ever lose consciousness?
<input type="checkbox"/>	<input type="checkbox"/>	5. Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
<input type="checkbox"/>	<input type="checkbox"/>	7. Do you know of any other reason why you should not do physical activity?

**If
you
answered**

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active — begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal — this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

DELAY BECOMING MUCH MORE ACTIVE:

- if you are not feeling well because of a temporary illness such as a cold or a fever — wait until you feel better; or
- if you are or may be pregnant — talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informal Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME _____

SIGNATURE _____

DATE _____

SIGNATURE OF PARENT
or GUARDIAN (for participants under the age of majority) _____

WITNESS _____

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.



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FIGURE 2.3. Par-Q & You, Physical Activity Readiness Questionnaire (PAR-Q) form. Reprinted from *Canada's Physical Activity Guide to Healthy Active Living* [Internet]. Ontario (Canada): Public Health Agency of Canada; [cited 2007 Jun 15]. Permission from the Canadian Society for Exercise Physiology, <http://www.csep.ca>. © 2002.



Assess your health status by marking all *true* statements

History

You have had:

- a heart attack
- heart surgery
- cardiac catheterization
- coronary angioplasty (PTCA)
- pacemaker/implantable cardiac defibrillator/rhythm disturbance
- heart valve disease
- heart failure
- heart transplantation
- congenital heart disease

Symptoms

- You experience chest discomfort with exertion
- You experience unreasonable breathlessness
- You experience dizziness, fainting, or blackouts
- You experience ankle swelling
- You experience unpleasant awareness of a forceful or rapid heart rate
- You take heart medications

Other health issues

- You have diabetes
- You have asthma or other lung disease
- You have burning or cramping sensation in your lower legs when walking short distance
- You have musculoskeletal problems that limit your physical activity
- You have concerns about the safety of exercise
- You take prescription medications
- You are pregnant

Cardiovascular risk factors

- You are a man ≥ 45 yr
- You are a woman ≥ 55 yr
- You smoke or quit smoking within the previous 6 mo
- Your blood pressure is $\geq 140/90$ mm Hg
- You do not know your blood pressure
- You take blood pressure medication
- Your blood cholesterol level is ≥ 200 mg \cdot dL⁻¹
- You do not know your cholesterol level
- You have a close blood relative who had a heart attack or heart surgery before age 55 (father or brother) or age 65 (mother or sister)
- You are physically inactive (*i.e.*, you get < 30 min of physical activity on at least 3 d per week)
- You have a body mass index ≥ 30 kg \cdot m⁻²
- You have prediabetes
- You do not know if you have prediabetes

None of the above

*If you marked any of these statements in this section, consult your physician or other appropriate health care provider before engaging in exercise. You may need to use a facility with a **medically qualified staff**.*

*If you marked two or more of the statements in this section you should consult your physician or other appropriate health care as part of good medical care and progress gradually with your exercise program. You might benefit from using a facility with a **professionally qualified exercise staff**^a to guide your exercise program.*

You should be able to exercise safely without consulting your physician or other appropriate health care provider in a self-guide program or almost any facility that meets your exercise program needs.

^aProfessionally qualified exercise staff refers to appropriately trained individuals who possess academic training, practical and clinical knowledge, skills, and abilities commensurate with the credentials defined in Appendix D.

FIGURE 2.4. AHA/ACSM Health/Fitness Facility Preparticipation Screening Questionnaire. Individuals with multiple CVD risk factors should be encouraged to consult with their physician prior to initiating a vigorous-intensity exercise program as part of good medical care, and should progress gradually with their exercise program of any exercise intensity. ACSM, American College of Sports Medicine; AHA, American Heart Association; CVD, cardiovascular disease, PTCA, percutaneous transluminal coronary angioplasty. Reprinted with permission from American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 9th ed. Baltimore (MD): Lippincott Williams and Wilkins; 2014; modified from American College of Sports Medicine Position Stand, American Heart Association. Recommendations for cardiovascular screening, staffing, and emergency policies at health/fitness facilities. *Med Sci Sports Exerc*. 1998;30(6):1009–18.

continued



From the Practical Toolbox 2.1 *continued*

Informed Consent for an Exercise Test

1. Purpose and Explanation of the Test

You will perform an exercise test on a cycle ergometer or a motor-driven treadmill. The exercise intensity will begin at a low level and will be advanced in stages depending on your fitness level. We may stop the test at any time because of signs of fatigue or changes in your heart rate, electrocardiogram, or blood pressure, or symptoms you may experience. It is important for you to realize that you may stop when you wish because of feelings of fatigue or any other discomfort.

2. Attendant Risks and Discomforts

There exists the possibility of certain changes occurring during the test. These include abnormal blood pressure; fainting; irregular, fast, or slow heart rhythm; and, in rare instances, heart attack, stroke, or death. Every effort will be made to minimize these risks by evaluation of preliminary information relating to your health and fitness and by careful observations during testing. Emergency equipment and trained personnel are available to deal with unusual situations that may arise.

3. Responsibilities of the Participant

Information you possess about your health status or previous experiences of heart-related symptoms (*e.g.*, shortness of breath with low-level activity; pain; pressure; tightness; heaviness in the chest, neck, jaw, back, and/or arms) with physical effort may affect the safety of your exercise test. Your prompt reporting of these and any other unusual feelings with effort during the exercise test itself is very important. You are responsible for fully disclosing your medical history as well as symptoms that may occur during the test. You are also expected to report all medications (including nonprescription) taken recently and, in particular, those taken today to the testing staff.

4. Benefits To Be Expected

The results obtained from the exercise test may assist in the diagnosis of your illness, in evaluating the effect of your medications, or in evaluating what type of physical activities you might do with low risk.

5. Inquiries

Any questions about the procedures used in the exercise test or the results of your test are encouraged. If you have any concerns or questions, please ask us for further explanations.

6. Use of Medical Records

The information that is obtained during exercise testing will be treated as privileged and confidential as described in the Health Insurance Portability and Accountability Act of 1996. It is not to be released or revealed to any individual except your referring physician without your written consent. However, the information obtained may be used for statistical analysis or scientific purposes with your right to privacy retained.

7. Freedom of Consent

I hereby consent to voluntarily engage in an exercise test to determine my exercise capacity and state of cardiovascular health. My permission to perform this exercise test is given voluntarily. I understand that I am free to stop the test at any point if I so desire.

I have read this form, and I understand the test procedures that I will perform and the attendant risks and discomforts. Knowing these risks and discomforts, and having had an opportunity to ask questions that have been answered to my satisfaction, I consent to participate in this test.

Date

Signature of Patient

Date

Signature of Witness

Date

Signature of Physician or Authorized Delegate

FIGURE 2.5. Sample of informed consent form for a symptom-limited exercise test. Reprinted with permission from American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 9th ed. Baltimore (MD): Lippincott Williams and Wilkins; 2014.

Physical Activity Readiness Questionnaire (PAR-Q)

The PAR-Q (22,23), shown in Figure 2.3, is a general screening tool that can identify factors that increase one's risk for exercise-related health problems. The assessment can be performed by means of a self-administered questionnaire, or with the assistance of a professional.

The questions can be answered with "yes" or "no" responses. Sometimes the answering option "I do not know" or "I do not remember" is also provided. The questionnaire provides direct feedback on the provided answers. If individuals answer "yes" to any items, they should see a physician prior to beginning an exercise program.

Health History Questionnaire (HHQ)

Like the PAR-Q, the HHQ (15) is a tool to screen for risk factors prior to starting physical activity. The HHQ, however, is much more detailed. The first seven items in section I: "I. Physical activity screening questions" assess risk factors with questions such as:

- "Do you know of any other reason why you should not participate in a program of physical activity?"

In section II: "II. General health history questions," 10 further questions evaluate medical conditions such as stroke, diabetes, asthma, orthopedic conditions, high blood pressure, back problems, pregnancy. The HHQ also directly assesses physical activity routines and medications:

- "Do you currently exercise less than 1 or more hour per week? If you answered yes, please describe your activities. . ."
- "Are you currently taking any medication that might impact your ability to safely perform physical activity?"

With the HHQ, feedback has to be given by the professional who is supervising the interviewed person. Thus, the professional must be fully aware of when information represents a risk factor, such as individuals with diabetes who take medication. In these situations, the individual must be advised by their physician to synchronize his or her medication and physical activity in order to prevent adverse reactions. In the case of risk factors or diseases, the professional should recommend consulting a physician for medical clearance. Objective measures to assess health are described in Table 2.5. These measures have been used and validated as objective indicators of health (18).

To illustrate, consider Case Scenario 2.3.

TABLE 2.5 Examples of Objective Measures to Assess Health

Measure	Test and Material Needed (Example)
Waist-hip-ratio, abdominal girth	Tape measure
BMI, body fat	(Normed) Weighting machine, tape measure
Resting heart rate, blood pressure	Blood measure measurement device
Grip strength	Hand grip dynamometer
Postural stability	Force platform, stop watch
Lung volume	Spirometer



Yuri Arzoum / Shutterstock.com

Case Scenario 2.3

Professor R is over 60 years old and suffers from frequent back pain. He knows that specific physical training would be beneficial for his back. Although he experienced in the past that strength training improves his back pain and his general well-being, he is apprehensive to attend the training offered at the university recreation center. He feels he is too old, and that younger colleagues might take part in this class as well and do much better than he would do. So far, he has neither managed to participate in a class at the local sports club nor perform the exercises a physiotherapist showed him some time ago. He would be more willing to start exercising immediately if a fitness center was built on campus that is equipped with resistance training machines and personal trainers. This has materialized now, and Professor R walks straight to the center.

The personal trainer meets Professor R. What should he know about Professor R? What should he ask him, and how?

TAKE-HOME MESSAGE

Assessing medical conditions and possible contraindications for meeting general physical activity recommendations is an important step to prevent risks during exercising. Different assessment tools exist that can help professionals advise their clients. Moreover, these tools can help individuals in assessing their own challenges, and they can simplify the decision of whether or not one should talk to a physician. These approaches can make physical exercise safer, and prevent injuries and bad experiences, as well as support professionals in doing their work and improving maintenance within a program.

ASSESSING PHYSICAL ACTIVITY

CONCEPT OVERVIEW

Physical activity behavior can be performed at very different levels: mild, moderate, or vigorous. What is good for whom, and what are the recommendations in general? If we look at general guidelines for physical activity, the ACSM (3) recommends 30 minutes of moderate-intensity daily aerobic physical activity 5 days a week, or 20 minutes of vigorous-intensity daily aerobic physical activity three days a week, supplemented by 2 days a week of strength training, in order to create *health benefits*. Activity can be performed as part of daily life, in bouts of 10 minutes, or incorporated into a sports program. Recommendations differ with regard to body weight and the general aim of the physical activity (Table 2.6). These recommendations are similar to the 2008 PA Guidelines (4,8,13).

Thus, it is important to assess what the aim of the physical activity is, at what intensity level individuals perform the physical activity (it should be a moderate- or

vigorous-intensity activity), and whether the recommended amount of minutes per week is achieved. As outlined in the “Assessment Modes” section of this chapter, this could be measured by observation (e.g., monitoring attendance rates), by objective measures (e.g., pedometers), or by directly asking the person (i.e., subjective measures / perceptions). In the following subsections, we present some examples of assessment tools to measure behavior at the individual level. The following references provide a good illustration for such tools: *Godin Leisure-Time Exercise Questionnaire* (9) and the modified versions of the *Godin Leisure-Time Exercise Questionnaire* (9,17). Other examples are described in Table 2.7.

Different validated questionnaires exist, which assess physical activity behavior in comparable ways (16). Results of the questionnaire or the information gathered via questionnaire can provide useful information for developing interventions as we learn what people actually do, and where options for improvements may be (for a list of comparable tools, see reference 16, Table 2.7 and the “Web Resources” subsection in the References list).

TABLE 2.6 Recommendations for Weight Loss and Prevention of Weight Gain by the American College of Sports Medicine (4,8)

Moderate Physical Exercise should be Performed with the Aim of . . .	By . . .
. . . Preventing overweight (Body Mass Index \geq 25)	. . . Exercising 150–250 minutes per week
. . . Reducing overweight by exercising	. . . More than 300 minutes per week
. . . Maintaining successful weight reduction	. . . Exercising more than 250 minutes per week

TABLE 2.7 Overview of Physical Activity Measures

Name of Questionnaire (Reference)	Dimensions	Number of Items / Time to Complete Questionnaire
<i>Godin Leisure-Time Exercise Questionnaire (GLTEQ)</i>	Leisure, sports	3 items, 2–5 min
<i>Baecke Questionnaire (BAECKE)</i>	Work, leisure, sports	16 items, 12–15 min
<i>International Physical Activity Questionnaire (IPAQ long version)</i>	Work, leisure, domestic and garden activities, sports	27 items, 15–20 min
<i>International Physical Activity Questionnaire (IPAQ short version)</i>	Work, leisure, domestic and garden activities, sports	7 items, 5–7 min

Source: <https://sites.google.com/site/theipaq/>

TABLE 2.8 Measurement of Different Intensities of Physical Activity, with Explanations

Intensity	Content/Examples
Vigorous physical activities	Heart beats rapidly, sweating
Moderate physical activities	Not exhausting, light perspiration
Mild physical activities	Minimal effort, no perspiration

Levels of Physical Activity

By means of the Godin Leisure-Time Exercise Questionnaire (GLTEQ) (see Table 2.8), one can measure how much behavior was performed during the last month. Behavior is measured in terms of the effort of activities. Clients are asked to report (a) their average number of sessions per week, and (b) the average duration of a session.

Responses for each of these three activity categories can be computed as the product of frequency and duration of physical activity. This can be done for each of the three levels, or as a sum scoring all three together: vigorous and moderate activities on one hand, or vigorous, moderate, and mild activities on the other hand. Alternatively, the three may be used as single indicators. As a result, an approximation of energy expenditure is obtained. A caveat of the GLTEQ is that it does not take different domains of physical activity into account. Physical activity can only be accounted for by means of physical exercise (Figure 2.6).

Domains and Components of Physical Activity

Since physical activity is not only performed as planned physical exercise, it may be worth considering the domain of activities: If interventions target specific subdomains, then these subdomains should be evaluated extensively as well (Figure 2.6). This can be done by assessing behavior with a rating scale that takes the four domains of physical activity shown in the next section into account.

SPECIFIC PHYSICAL ACTIVITY DOMAINS AND THEIR INTERRELATIONSHIPS

If the goal is to explain variance in behavior, domain-specific physical activity (such as physical exercise vs. active commuting) is impacted more easily by domain-specific variables. For instance, a domain specific variable that impacts physical activity is self-efficacy. This can be compared in the following ways: self-efficacy to perform fitness activities versus self-efficacy to commute to work, or motivational self-efficacy important for behavior

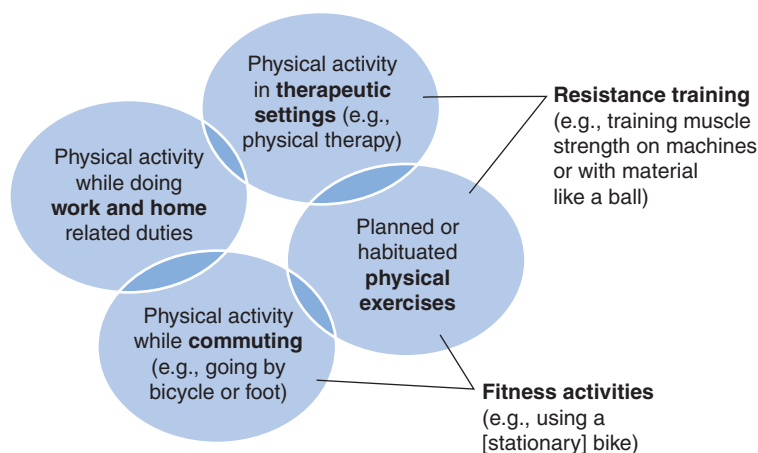


FIGURE 2.6. Domains and components of physical activity, there may be partial overlap (Please note: Physical activity while doing work- and home-related duties is typically not a target of interventions.).

initiation (starting a new behavior) and volitional self-efficacy imperative for behavior maintenance (see the “Evaluate Clients’ Resources” section of this chapter). In contrast to domain-specific activity, if general physical activity (including, for example, commuting and household activities) is considered, specific variables explain less of the behavioral variance.

In clients, physical activity recommendations have to be modified accordingly. The ACSM provides specific exercise recommendations for older adults and individuals with chronic conditions (13).

For example, the recommended goal behavior is 3×40 minutes for cardiac clients per week. Clients can indicate frequency and duration of each behavior area by ticking one of the following options: “less than one time per week for 40 minutes” (1), “at least one time per week for 40 minutes” (2), “at least three times per week for 40 minutes” (3), “more than three times per week for 40 minutes” (4). Answers can then be categorized in such a way that a dichotomous variable results—for example, whether clients performed at least the recommended activity level (1) or not (0). Alternatively, such a Likert scale provides more information about the individual, as well as potential for improvements.

The two measures mentioned in the previous section (4 or 2 answering options) capture mainly:

- weekly frequency of physical activity due to leisure time physical activity, and
- weekly frequency of physical activity while commuting.

However, two other facets may also be considered. These other considerations include:

- weekly frequency of physical activity due to work, and
- weekly frequency of physical activity due to house and garden duties.

To assess these areas of activity, a questionnaire might ask the following questions:

“In the last four weeks I have . . .”

- “. . .performed specific physical activities and sports (*e.g.*, at a fitness center, while playing soccer),”
- “. . .performed physical activity at work (*e.g.*, carrying weights, extensive walking),”
- “. . .performed physical activity due to commuting (*e.g.*, going by bicycle instead of using the car),” and
- “. . .performed physical activity due to daily chores (*e.g.*, physically exhausting care giving, garden work, climbing stairs, cutting the lawn, vacuuming).”

The items can be answered on a Likert scale (indicating the degree of agreement) or by indicating the minutes and sessions per week. Questions like those described in the preceding bullets can also guide observation (monitoring of physical activity behavior). This is illustrated in Case Scenario 2.4.



Case Scenario 2.4

A group of gardeners is employed at a university to keep the campus in mint condition. They cut grass, trees, and bushes; they tear out weeds; and they care for the flowers. Some of the gardeners work as lawn mowers and transport compost with a little motorized vehicle. They carry heavy machines used for garden vacuuming and reforesting trees, and others do a lot of shoveling and cutting.

All gardeners receive the offer to join the recreation center, but no one shows interest in exercising here. How can we assess their activity level at work and in their leisure time? Should they be encouraged to work out in the recreation center? If so, how?

TAKE-HOME MESSAGE

Learning about what kind of physical activity a client is already engaged in enables the improved development of an appropriate exercise plan. Physical activity behavior can be performed in a variety of settings, and consists of very different aspects. To capture these aspects appropriately, and to evaluate whether an individual is meeting the recommendations, questionnaires and interviews should address different aspects of activities. Such questions can also guide observation (monitoring). Alternatively, objective measures like pedometers can be used to assess physical activity level. All measures can provide useful possibilities to follow up with the progress of behavior change:

- Scales to measure behavior (and other characteristics) (4)
- A collection of physical activity questionnaires for health-related research (16).

EVALUATE CLIENTS' MOTIVATIONS

CONCEPT OVERVIEW

If our goal is to know more about human behavior and what drives it, we need to know more about what exactly is going on in individuals' heads: Are they motivated to become or stay physically active? Do they intend to increase their exercising behavior? If our goal is to understand what drives human behavior, we need to appreciate the desires that lead individuals to become or stay physically active. This specific inquiry can be titled "motivation." People might be motivated to perform the recommended physical activity, which is an important prerequisite for actually adopting the behavior. Similarly, if people lack motivation, it is unlikely that a change in behavior will occur. Thus, it is essential to obtain more knowledge about the "readiness" for behavior: how close persons are to actually changing their behavior, or how far they have habituated a behavior.

Evidence

"Readiness to change" is a term typically used to capture even more than behavior and intention. "Readiness to change," also known as "stage (of change)," is conceptualized as a measurable indicator of behavior change and its psychological antecedents. People may or may not intend to change their behavior, which can be measured by intention assessments as well. Individuals could also be distinguished by whether they perform the recommended behavior, which is also measured by the behavior tools described earlier. However, we need further measures if we also want to know about the psychological characteristics: Are people performing physical activity in a *habituated* way—in other words, are they already exercising for an extended period of time? Are they at constant risk of stopping their exercise for certain periods at a time? We could use a special question measuring *habituation*, such as "How difficult is it to be physically active?"; "I exercise regularly without giving much thought to it"; or "How long have you currently been as physically active on a regular basis

as you are now?" The main advantage of measuring stages is the ability to unite behavior, intention, and habituation into one measurement tool (see the following).

Motivation/Intention

Intention to perform behavior should be assessed in a way similar to behavior itself (Table 2.8). This could be accomplished by rating the following three items: "I intend to perform the following activities at least 5 days per week for 30 minutes. . ."

- "Vigorous physical activities (heart beats rapidly, sweating)";
- "Moderate physical activities (not exhausting, light perspiration)"; and
- "Mild physical activities (minimal effort, no perspiration)."

Answers can be assessed (as behavior, see earlier) on a six-point scale from *not at all true* (1) to *absolutely true* (6).

Intention should also refer to physical activity that is outside of work hours, and performed to an extent that is at least moderate. Clients can indicate at what frequency and duration they intend to exercise (see earlier). Again, answers can be categorized in such a way that a dichotomous variable results (active enough or not). Whether cardiac [orthopedic] clients intend to perform at least the recommended activity for three [two] times per week for 40 [20] minutes (1) or not (0); or whether a nonclinical person intends to perform at least the recommended activity, five times per week for 30 minutes (1) or not (0).

Stage of Change

According to stage theories (cf. Chapter 4), health behavior change consists of an ordered set of categories or "stages" into which people can be classified (14). These categories reflect psychological or behavioral characteristics such as motivation and physical activity behavior.

Classical stage assessments take time frames (e.g., 30 days; half a year) into account (18). Contemporary assessments measure stages *without using a specific time frame* (10, 11). Individuals could potentially be asked to think about the last month, and then can be presented with the following question:

- "Did you engage in physical activity for at least 5 days a week for 30 minutes or more?" Replying with "yes" or "no" responses.

Further, they should be asked: "For the following month, do you intend to perform physical activities five times per week for 30 minutes or more?"—with possible answers being "yes" and "no."

Those individuals who indicate they were active in the past are then categorized as actors. People who answer that they were not active, but do intend to perform the recommended goal activity, are labeled intenders. Individuals answering that they have not been active, and are not intending to perform the recommended goal activity in the future, are classified as nonintenders. An example of a more refined stage assessment is shown in Table 2.3.

Based on their answers to the rating scale, individuals are categorized as *nonintenders*, *intenders*, or *actors*. Alternatively, people can be categorized into the following stages (see Figure 2.7):

1. precontemplation
2. contemplation
3. preparation
4. action
5. maintenance

The assessment can also be adapted to other behaviors that are relevant for health promotion (see the "Assessing Other Health Behaviors" section later in this chapter).

TABLE 2.9 Intervention Matrix for Health Action Process Approach (HAPA)-Based Stage-Specific Treatments

	Stage Group		
	Nonintender	Intender	Actor
Risk perception	x		
Outcome expectancies	x		
Self-efficacy (motivational)	x		
Goal setting/ Intention/ Motivation	x		
Action planning		x	x
Coping planning		x	x
Social support		x	x
Self-efficacy (volitional)			x

From Schwarzer R, Lippke S, Luszczynska A. Mechanisms of health behavior change in persons with chronic illness or disability: the Health Action Process Approach (HAPA). *Rehabilitation Psychology*. 2011;56(3):161–70, with permission.

With the necessary information, interventions can be tailored to psychological and behavioral characteristics of the stages. These are known as stage-specific interventions. We can capture stage movements prior to or after the actual behavior change by measuring stages, rather than just behavior (e.g., development of an intention when moving from the nonintentional stage to the intentional stage). These changes might be important if we are interested in following up with changes that might not be visible in behavior change. If the stage assessment is filled out repeatedly—for instance, every half year—it could provide information as to whether individuals are moving forward or backward between stages, a success that might not be visible with behavior measures alone (cf. Figure 2.7). Sharing feedback about these changes can be an important strategy to motivate individuals, as it provides opportunities for ipsative feedback (individual frame of reference) in contrast to mere normative standards (external frame of reference).

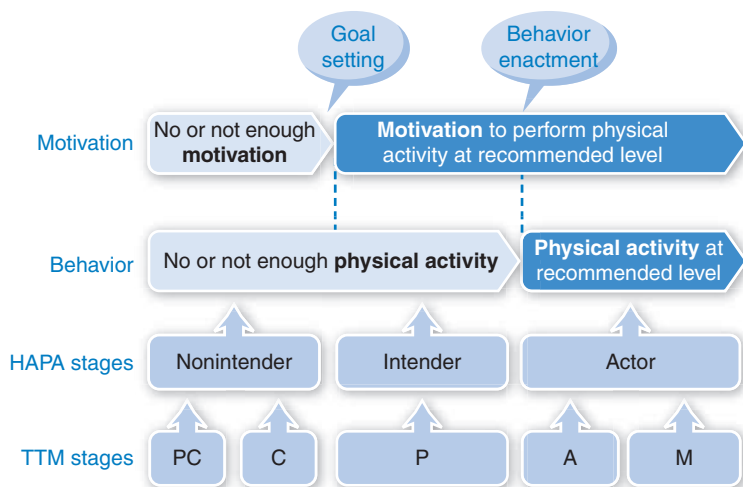


FIGURE 2.7. Motivation and behavior of individuals in different stages. HAPA=Health Action Process Approach (20); TTM=Transtheoretical Model (19); PC=Precontemplation; C=Contemplation; P=Preparation; A=Action; M=Maintenance.



Case Scenario 2.5

Once again, we invite you to think about the university example. This time we would like to know more about what the university members think and feel with regard to exercise—that is, their motivation to engage in exercise behavior. We therefore use the previously described questionnaires to assess the behavior of three selected people. Person A reports exercising on the campus once a week, and would like to extend her training program. Person B expresses that she is not doing anything and person C states that she is physically active every day for at least 30 minutes, but not on the campus.

If we compare the reports with the recommendations, person A and B would both be regarded as insufficiently physically active. Further, as there is a difference between A and B, what should we ask those people to learn about their motivation to exercise? Person C is meeting the recommendation, but still, is there anything that might be important to ask?

TAKE-HOME MESSAGE

If we measure motivation or assess the stage of an individual, we can gain much insight into the “readiness” of an individual to become and remain active. Intention and motivation are important determinants of behavior. Stage assessments also include behavioral aspects, which opens avenues for fast measurements of where people are in the behavior change process, and how close they are to the goal behavior. Such measurements can provide the basis for successful interventions in helping individuals to adopt and maintain their goal behavior.

EVALUATE CLIENTS' RESOURCES

CONCEPT OVERVIEW

Existing theories of such health behavior approaches are the *Social Cognitive Theory* (SCT, 5), the *Theory of Planned Behavior* (TPB, 2), and the *Health Action Process Approach* (HAPA, 20,21).

The HAPA has the advantage that it is a hybrid model, combining continuous models (like the SCT and the TPB) and stages of change (21). However, it is more parsimonious than other stage theories, which makes it easier to address the stages in interventions (21). The HAPA postulates when certain variables are imperative for stage movements (see Table 2.9).

These variables, which will be described in the following subsections, can function as resources for successful behavior change if they are high enough. If they are not high, they can be targeted in interventions to facilitate behavior change.

The HAPA distinguishes between three stages of behavior change (Nonintender, Intender, Actor). In the initial motivation phase of behavior change, known as the nonintentional stage, a person develops the intention to act. Risk perception is seen

continued

as a distal antecedent (e.g., “I am at risk for cardiovascular disease”), but is itself insufficient to enable a person to form an intention or to change behavior. Instead, it serves to enable contemplation processes and further elaborates the thoughts about consequences and competencies of potential risk behaviors. Similarly, positive outcome expectancies (e.g., “If I exercise five times per week, I will reduce my cardiovascular risk”) are chiefly seen as being important during the motivation phase, when a person balances the pros and cons of certain behavioral outcomes. Further, one needs to believe in his or her self-efficacy, which is one’s ability to perform a desired action (e.g., “I am capable of performing my exercise schedule despite the temptation to watch TV”). Self-efficacy operates in concert with positive outcome expectancies, both of which contribute substantially to forming an intention.

These beliefs are needed to form intentions in order to adopt difficult behaviors, such as regular physical exercise. If the intention is successfully formed, the following phase is entered (the intentional stage). This second phase is labeled as volitional, since the regulation of behavior is under volitional control. After a person develops an inclination toward a particular health behavior, “good intentions” must be transformed into detailed instructions explaining how to perform the desired action. However, it is not sufficient to only initiate an action; maintenance of the action is important as well.

Maintenance of the action is achieved by self-regulatory skills and strategies, such as social support. Social support can be conceptualized as either a self-regulatory *barrier* or a self-regulatory *resource*. Missing social support can be a barrier to maintaining behavior, whereas instrumental, emotional, and informational social support can enable the adoption and continuation of behaviors. This was found in many exercise studies with chronically ill people, such as individuals with diabetes (17). Another important self-regulatory factor is action and coping planning, as this enables translation of intentions into behaviors, and maintenance of the behaviors in spite of potential obstacles. Measurements of these variables will be outlined in more detail in the following subsections.

Risk Perception

Risk perception can be measured by items such as “How high would you estimate the likelihood that you will ever have one of the following diseases: (a) cardiovascular diseases (e.g., heart attack, stroke), or (b) diseases of the musculoskeletal system (e.g., osteoarthritis, herniated vertebral disk)?” Any health risk can be added to this measurement, which is especially recommended if the clients harbor diseases / health risks. Responses should be given on a Likert scale like “*very low likelihood*” (1) and “*very high likelihood*” (6).

Outcome Expectancies

Positive outcome expectancies (pros) and *negative outcome expectancies (cons)* can be assessed with the first part of the statement:

- “If I engage in physical activity at least five times per week for 30 minutes. . .”

and a following second part of potential statements assessing pros and cons.

Pros are measured with items such as:

- “I would feel better afterward.”
- “I will meet friendly people.”
- “My ability to stretch would increase.”

Cons can be assessed by items such as:

- “It will probably cost me a lot of money every time.”
- “I would have to invest a lot (*e.g.*, into organizing my weekly schedule).”

Answers for pros and cons are assessed using six-point scales ranging from *totally disagree* (1) to *totally agree* (6). If cons outreach the pros, professionals can work with their clients on these beliefs and barriers.

Self-Efficacy

Self-efficacy can be subdivided into motivational self-efficacy and volitional self-efficacy. Motivational self-efficacy is imperative for generally getting started, while volitional self-efficacy is rather important for maintaining a routine and getting back on track.

MOTIVATIONAL SELF-EFFICACY

Motivational self-efficacy is measured with the statement “I am certain . . .” followed by one of two items: 1. “. . .that I can be physically active on a regular basis, even if I have to mobilize myself” or 2. “. . .that I can be physically active on a regular basis, even if it is difficult”.

VOLITIONAL MAINTENANCE SELF-EFFICACY

Volitional maintenance self-efficacy is measured with the statement “I am capable of performing physical exercise on a regular basis. . .” followed by one of the two items:

1. “. . .even if it takes some time until it becomes a routine,” or
2. “. . .even if I need several trials until I am successful”

Volitional self-efficacy on *recovery self-efficacy* can be described as: confidence to resume a physically active lifestyle, although at times physical activity was not present; or the confidence to resume regular exercise after failures and be prepared for possible failures in the future; and finally, the confidence to resume physical activity after suffering from an illness. The *items* for volitional self-efficacy on recovery self-efficacy can be worded as: “I am confident that I can resume a physically active lifestyle, even if I have relapsed several times in my life” or “I am confident that I will be able to resume my regular exercises after failures, and that I will be able to brace myself for possible failures” or “I am confident that I can resume my physical activity, even when feeling weak after suffering an illness.” Answers can be assessed using six-point scales ranging from *totally disagree* (1) to *totally agree* (6).

Action Planning and Coping Planning

Action planning is making a plan to actually perform the intended behavior. Coping planning is a strategy of what to do in the face of barriers.

ACTION PLANNING

Action planning can be assessed with four items addressing the conditions of when, where, and how. The items could be worded: “for the month after rehabilitation, I have already planned. . .” (1) “. . .which physical activity I will perform (*e.g.*, walking),” (2) “. . .where I will

be physically active (e.g., in the park),” (3) “. . .on which days of the week I will be physically active,” and (4) “. . .for how long I will be physically active.” Answers can be assessed using six-point scales ranging from *totally disagree* (1) to *totally agree* (6).

COPING PLANNING

Coping planning can be measured with the statement “I have made a detailed plan regarding. . .” and the items (1) “. . .what to do if something interferes with my plans,” (2) “. . .how to cope with possible setbacks,” (3) “. . .what to do in difficult situations in order to act according to my intentions,” (4) “. . .which good action opportunities to take,” and (5) “. . .when I have to pay extra attention to prevent lapses.” These items are measured with a six-point rating scale ranging from *never* (1) to *always* (6).

Social Support

Perceived social support can stem from different sources, such as family and friends. Social support regarding physical activity can be assessed with 10 items. First, individuals are asked to rate “my family. . .” and second, to rate “my friends. . .” with the following items: (1) . . . encouraged me to perform my planned activities, (2) . . . reminded me to engage in physical activity, (3) . . . helped me to organize my physical activity, (4) . . .took care of my home, giving me the possibility to engage in physical activity, (5) . . .joined my physical activity program. Alternatively, friends and family can also be combined in order to gain one single item stem. The answers should be given on a six-point rating scale ranging from *never* (1) to *always* (6), or from *totally disagree* (1) to *totally agree* (6). Generally, clients appreciate if the answering options are essentially equal throughout the questionnaire or interview.



Case Scenario 2.6

An employee known as Mr. S receives an invitation for a test training in a new recreation center. He was impressed by both the accessibility and high quality of the facilities. Prior to the first visit, he takes part in a personal training session. The trainer tells him “I highly recommend that you come at least three times per week and work out for 30 minutes or more, as this will improve your fitness and benefit your health.” Mr. S replies “Yes, I will try to.” He is actually thinking, however, that this will not be possible due to his work load and his other activities.

Over the course of the first weeks, he works out three times per week. In the subsequent six weeks, he exercises only once per week. Coincidentally, Mr. S bumps into his trainer. His trainer asks him how his workout routine is coming along, to which he replies that he enjoys working out once a week and although he realizes he should exercise more often, his busy schedule cannot allow for it and he is satisfied with his once-a-week routine.

Perhaps Mr. S should be informed about risks and resources, trained to believe in his own competencies, and supported in how to manage temptations. Any of these options may work, yet a strong theory is needed in order to support individuals in a better way. A theory- and evidence-based approach is the most effective way to understand the client's problems, to develop a properly executed intervention, and to know what to evaluate after the intervention (*i.e.*, what steps should be taken at the end of the personal training session), such as what would come after the personal training session.

TAKE-HOME MESSAGE

If the goal is to increase behavior and intention, specific factors should be addressed. Risk perception and outcome expectancies are especially important for becoming motivated to change. Planning bridges the gap between intention and behavior, and self-efficacy and social support are central factors in all phases of behavior change. Thus, it is crucial to measure the level of these variables, so that any lack of such resources can then be addressed in interventions.

ASSESSING OTHER HEALTH BEHAVIORS

CONCEPT OVERVIEW

Many people hold life goals that can drive different behaviors. For instance, individuals want to socialize, and therefore may engage in activities such as an exercise class with other people, going out for a drink, or smoking. Other people strive for weight loss, and therefore engage in physical activity. At the same time, they follow a specific diet and smoke to suppress their appetite and increase metabolism. A third group might feel highly stressed, and therefore seeks relaxation by watching TV, engaging in special physical activity like yoga, or consuming chocolate.

All of the previously mentioned groups perform physical activity, but with markedly different motivations for executing the activity. All three also display other behaviors that might be beneficial for their health, like following a healthy diet, or may be counterproductive such as smoking and alcohol consumption, or TV watching. A recent study (12) demonstrated that those people who were watching more TV gained more weight within 4 years (0.31 lb more weight for 1 hour more of TV watching per day; <http://www.nejm.org/doi/pdf/10.1056/NEJMoa1014296>).

Different motivations result in different behaviors. For example, the socializing group X might also be fitness-oriented. Thus, drinking alcohol and smoking is conflicting with the groups' goal to become and stay fit. Perhaps they refrain from smoking, but have no further will left for abstaining from sedentary behaviors while in company.

Overall, looking at more behaviors besides physical activity might help to:

- comprehensively understand physical activity, as well as the occurrence of specific problems (Figure 2.4),
- understand why a behavior seems to be ineffective, although it should lead to a specific outcome (such as weight loss),
- make people more satisfied with thriving in their life-goals, and
- improve the healthy lifestyles of clients.

Thus, the assessment and appreciation of other health behaviors is also important (Figure 2.8). This can be done by examining the behavior as well as its determinants, such as intention toward the different physical activities, or stages of change (10,11).

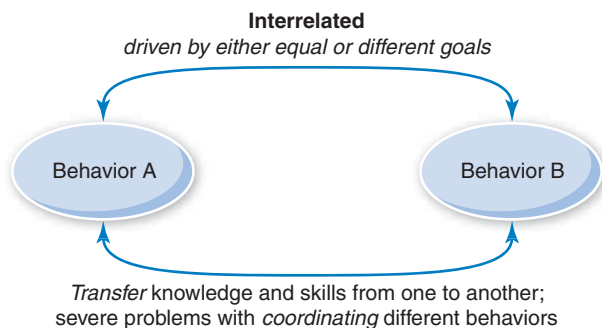


FIGURE 2.8. Interrelations between different behavior domains.

Health-Promoting Lifestyle Profile II (HPLP II)

The HPLP-II (24) measures the degree to which clients engage in an overall health-promoting lifestyle (24). It consists of 52 items, which are divided into six subscales of a health-promoting lifestyle, such as physical activity, nutrition, and stress management etc. Respondents are asked to indicate how often they engage in each behavior (never, sometimes, often, or routinely). The advantage is that the habituated lifestyle factors are assessed, not only single behaviors. Item examples are:

- “Follow a planned exercise program.”
- “Choose a diet low in fat, saturated fat, and cholesterol.”
- “Get enough sleep.”
- “Report any unusual signs or symptoms to a physician or other health professional.”
- “Expose myself to new experiences and challenges.” (24)

The main advantage of this self-report questionnaire is that it covers very different aspects. Also it has been used in many previous studies. However, it is not clear whether the items measure behavior or attitudes and wishes. Thus, in the following paragraph we describe easy ways to measure different behaviors by means of stage assessment, as stages contain both behavior and motivation, and stage assessments have very few items. (See Figure 2.7 and Table 2.3.)

Dietary and Eating Habits

Regarding the *fruit and vegetable consumption stage*, the question should be “Please think about what you have consumed during the last week. Did you eat five portions of fruits and vegetables per day?”

Alternatively or additionally, a *balanced diet stage* can be measured with the instruction: “Do you eat a balanced diet on a typical day? A balanced diet consists of different aspects in addition to fruits and vegetables. Particularly, the five facets are:

1. Choice and appropriate amounts of overall calories
2. Plenty of whole grains and potatoes
3. Moderate amounts of meat, meat products, and eggs
4. Decreasing fat and fatty food intake
5. Limiting sugar and salt intake”

Moreover, a *healthy drinking stage* can be assessed with “Please think about what you typically drink. Do you drink 1.5 liters of nonalcoholic and noncaffeinated beverages (water, juice, fruit, and herbal tea) during the day?”

All behaviors can be assessed in terms of stages (12; Figure 2.7; Table 2.3). Clients can respond by means of a rating scale, with answering options being “no, and I do not intend to start” (precontemplation, PC), “no, but I am considering it” (contemplation, C), “no, but I seriously intend to start” (preparation, P), “yes, but only for a brief period of time” (action, A), and “yes, and for a long period of time” (maintenance, M). (See Figure 2.7 and Table 2.3.)

Smoking

Smoking behavior can be assessed with the standard question: “Do you currently smoke cigarettes?” with a yes/no response option. Current smokers should then be asked to indicate the amount of cigarettes they smoke per day. If clients answer the question “Do you currently smoke cigarettes?” with no, they are then asked, “Have you ever smoked cigarettes?” with a yes/no response option. Responses to these two items can be used to classify respondents as current smokers, former smokers, or never smokers.

Alternatively, some authors also suggest asking directly, and letting individuals indicate the best matching statement: “Are you a . . .”

1. “regular smoker?”
2. “occasional smoker?”
3. “ex-smoker (don’t smoke anymore, but used to)?”
4. “non-smoker (don’t smoke and never did)?” (33)

Alcohol Use

The *alcohol consumption* stage should be assessed with “Please think about what you typically drink. Do you avoid drinking alcoholic beverages on a daily basis (less than a glass of wine or a bottle of beer per day)?” The instruction is the same for all behaviors: “Please choose the statement that describes you best.” Clients should be provided with a rating scale that has the following answering options: “No, and I do not intend to start” (Precontemplation, PC); “No, but I am considering it” (Contemplation, C), “No, but I seriously intend to start” (Preparation, P); “Yes, but this is very difficult for me” (Action, A); and “Yes, and this is very easy for me” (Maintenance, M). (See Figure 2.7 and Table 2.3.)



Case Scenario 2.7

Student Y, an obese student, comes to the recreation center of the university and expresses her desire to lose weight. She has tried different strategies, including regular physical activity. Although she works out regularly, she has not managed to reduce her weight significantly. The instructor interviews her about the kind of exercises she does, and some other lifestyle factors, such as her diet, which contains a lot of fruits and vegetables, including potatoes. It turns out that student Y also has foods such as chips and French fries in mind when talking about potatoes. Student Y admits that she drinks sugar-sweetened beverages regularly. Furthermore, it becomes obvious that she gets less than 6 hours of sleep per night on most nights during the week, and that she watches television for a couple of hours every night.

Is there any chance we can provide support to reduce student Y’s body weight? Can a revised training schedule help student Y? What should the trainer recommend?

TAKE-HOME MESSAGE

Physical activity and different behaviors are interrelated, not only in determining health, but also in terms of facilitating and hindering each other, in which they work in orchestration. They can be driven by equal or different goals. Other psychological mechanisms include the *transfer* of knowledge and skills from one behavior domain to another: One might have learned how to plan the goal pursuit in one behavior domain, such as how to do daily exercises for the back (regarding self-efficacy), and can now apply these skills to another behavior domain, such as managing to commute actively by getting off the bus one station early (with similar self-efficacy). People might also have severe problems with *coordinating* different behaviors, such as being exhausted by active commuting or the attempt to stop smoking, and then not feeling able to eat a healthy diet. To take this into consideration, different behaviors should be assessed.

CHAPTER TAKE-HOME MESSAGE

Assessment is central when the aim is to better understand the individual, and his or her needs and resources. Very different options for assessment exist. All have advantages and disadvantages, thus it is important to decide what to measure and for what purpose. Further, we need information about one's motivation and experiences to optimally individualize and promote health behavior. On the basis of such collected data, effective interventions can be designed, provided, and implemented. Furthermore, on the basis of proper measurement, the effectiveness of interventions can be evaluated.

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FURTHER WEB RESOURCES

- BRFSS as an alternative questionnaire [Internet]. Available from: <http://www.cdc.gov/brfss/questionnaires/english.htm>.
- Different validated scales to measure behavior and guide how to select a measurement [Internet]. Available from: <http://toolkit.s24.net/physical-activity-assessment/>.
- Physical activity resource center for public health: Database of physical activity measures from (University of Pittsburg) [Internet]. Available from: <http://www.parcph.org/assess.aspx>.
- Scales to measure different social-cognitive variables [Internet]. Available from: <http://www.gesundheitsrisiko.de/docs/RACKEnglish.pdf>.
- Scales to measure self-efficacy, barriers, perceived severity, perceived vulnerability [Internet]. Available from: <http://dccps.cancer.gov/brp/constructs/>.
- Scales to measure social support [Internet]. Available from: http://userpage.fu-berlin.de/~health/soc_e.htm.
- Schwarzer, R et al. *Assessment and analysis of variables* [Internet] [cited 2003. Available from: http://web.fu-berlin.de/gesund/hapa_web.pdf.]

