

Melvin H. Williams



a
personal
choice

Lifetime Fitness and Wellness

fourth edition

Melvin H. Williams

Old Dominion University

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Preface



Happiness! We all want it and tend to seek it in a variety of ways. However, Bertrand Russell, the venerable philosopher, noted that man is an animal whose happiness depends on his physiology more than he likes to think. Unfortunately, many Americans have abused their own natural physiology, the wonderful functioning of the human body that gives us life, so much that the quality of life, or happiness, as well as the quantity of life, or longevity, may be significantly diminished.

Fortunately, the United States is in the midst of a health and fitness boom that has endured for over a decade and continues to grow, with millions of Americans changing their life-styles by initiating exercise programs, shifting to a more natural healthful diet, maintaining an ideal body weight, breaking the smoking habit, decreasing alcohol consumption, recognizing the importance of safe sex practices, and using various stress-reduction techniques, all in order to look and feel better. This movement is a positive one, for these life-style changes may provide us with the immediate health benefits we desire now, and may also help us prevent many of the degenerative diseases that plague our modern society and decrease the quality and quantity of life in later years. Collectively, these healthful changes characterize a Positive Health Life-style, and they are in accord with and based on the health promotion objectives documented in the Public Health Service report, *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*.

The health and fitness boom originated among individuals in their thirties and forties; however, increasing numbers of college-aged students have adopted changes and characteristics of a Positive Health Life-style after being exposed to these concepts in college courses with titles similar to "Personal Wellness" or "Health through Exercise." This textbook is designed to be used in conjunction with such courses, but the presentation of the materials is also suitable for students to use on an individual basis. It provides contemporary information concerning the beneficial effects of a Positive Health Life-style and how to implement and live

such a life-style. With proper knowledge and guidance, the student can design and implement his or her own Positive Health Life-style, one that can last a lifetime. This effort is facilitated by the presence on the campuses of many colleges and universities of Wellness Centers.

This book is organized into twelve chapters. Key concepts and key terms are highlighted at the beginning of each chapter; numerous figures and tables are included to help explain the major concepts. Contemporary research findings that support the chapter content are documented at the end of each chapter, grouped as books that provide broad overviews, reviews that synthesize and interpret current research, and specific studies that focus on a particular topic of interest.

Chapter 1 establishes the basis for adopting a Positive Health Life-style. Chapter 2 presents an overview of human energy systems and basic principles of designing and implementing an individualized exercise program and other life-style changes.

The heart of the textbook, chapters 3 through 9, offers specific guidelines for adopting a Positive Health Life-style. Chapter 3 covers aerobic exercise programs; chapter 4 focuses upon resistance-training programs for muscular strength and endurance; chapter 5 deals with the development of flexibility; chapter 6 provides the basis for healthy nutrition; chapter 7 integrates the roles of diet, exercise, and behavior modification in weight control; chapter 8 explores stress reduction techniques; and chapter 9 discusses the potential health consequences associated with various high-risk behaviors, such as substance abuse (particularly cigarette smoking and alcohol intake) and unsafe sex practices.

Chapter 10 covers several health issues of particular interest to females, while chapter 11 stresses a Positive Health Life-style as a lifelong program of contributing to healthful aging. This chapter emphasizes the impact of a Positive Health Life-style upon a number of major degenerative diseases in our society today, such as cardiovascular diseases, metabolic disorders, and musculoskeletal

problems. Finally, chapter 12 provides a brief discussion of adherence, or maximizing the ability to stay with the Positive Health Life-style for a lifetime.

Other features include Laboratory Inventories, which help assess an individual's current health life-style and provide guidelines for modifications; a glossary of terms; and five appendices—the Food Lists of the American Dietetic Association and the American Diabetes Association; scoring charts for Dr. Kenneth Cooper's aerobic fitness tests; caloric expenditure for a variety of physical activities; calories, fat, and cholesterol in products sold in common fast-food restaurants; and energy expenditure in METS for a variety of daily activities. Parts of this text, particularly nutrition components in chapters 6 and 7, have been excerpted from *Nutrition for Fitness and Sport*, Fourth Edition, by Melvin H. Williams and also published by Brown & Benchmark.

This text asks the individual to think about the possible consequences of his or her current life-style, not only for now but for the future. More importantly, it provides a mechanism for change by actively involving the student in a number of laboratory inventories designed to help implement a Positive Health Life-style. There are thirty-four Laboratory Inventories that will, among other things, help you evaluate your current life-style related to various health behaviors, determine which life-style changes you may be able to undertake successfully, evaluate your fitness level and plan an appropriate exercise program, assess the quality of your diet, determine your healthy body weight, survey factors that may increase your level of stress, and give you an idea of your predisposition to substance abuse. We learn best by doing, so taking the appropriate laboratory inventory and initiating appropriate life-style changes may help you implement a life-style that will become lifelong.

Overall, this text will provide you with the essential knowledge necessary to implement and maintain a Positive Health Life-style. However, since it covers so much territory, the amount of information offered is somewhat limited. If you

develop an interest in a specific area covered in this text, such as nutrition, exercise, or stress management, check with your university or college catalogue, or with your advisor, to see if an advanced course, such as a basic course in nutrition, will work into your degree program of study.

Additionally, there are numerous professional employment opportunities in the health sciences and health education areas. As you most likely know, health care reform is a major focus of governmental activity to help reduce the financial burden associated with health care in the United States. One effective way to decrease health care costs is through health promotion, and professionals are needed to help educate the American public regarding the various components of the Positive Health Life-style, and to help them implement such life-style changes. Such career opportunities should increase in the 1990s and beyond, particularly as the population of our nation becomes increasingly older.

I would like to acknowledge the late Mr. Ed Jaffe, editor for Wm. C. Brown Publishers, who encouraged me to write this textbook. I would also like to thank my current editors at Brown & Benchmark Publishers, Scott Spoolman and Megan Rundel, and my production editor, Jane Morgan, for their invaluable assistance throughout the various stages of development.

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Melvin H. Williams
Virginia Beach, VA

Contents

Laboratory Inventories ix
Preface x

1

A Positive Health Life-Style 1

- Key Terms 1
- Key Concepts 1
- Introduction 2
- Aging and Health Risk Factors 3
- Life-Style Health Risk Factor Assessment Inventory 4
- The Positive Health Life-Style 5
 - Mind-Body Interrelationships and the Dimensions of Wellness 5
 - Promotion and Prevention Versus Treatment 6
 - Prudent Health Behaviors 6
- Benefits of a Positive Health Life-Style 8
- Personal Choice and Health Promotion Behaviors 9
 - Personal Choice 9
 - Personal Health Promotion Behaviors 9
- References 11

2

General Guidelines for Your Personal Exercise Program 13

- Key Terms 13
- Key Concepts 13
- Introduction 14
- Fitness, Physical Activity, and Exercise 14
- Importance of Exercise in Health Promotion 15
- Personal Physical Fitness Programs 17
 - Your Personal Fitness Needs—Assessment 17
 - Your Personal Fitness Goals and Objectives—The Basis of Planning 17
 - Starting and Staying with the Plan—Implementation and Adherence 18
 - Medical Clearance 18
 - Benefit/Risk Ratio 18
 - Skills and Equipment 19
 - Adherence 19
 - Meeting Your Objectives—Evaluation 20

General Principles of Training 20

- The Overload Principle 20
- The Principle of Progression 21
- The Principle of Specificity 21
- The Warm-Up Principle 21
- The Principle of Recuporation 22
- The Principle of Reversibility 22
- Exercise As a Prescription 22
- References 23

3

Aerobic Exercise 25

- Key Terms 25
- Key Concepts 25
- Introduction 26
- Human Energy 26
 - Energy Forms in the Body 26
 - Human Energy Systems 27
 - Energy Equivalents 27
- Aerobic Fitness 29
- Measurement of Aerobic Fitness 32
- Prescription for Aerobic Exercise 34
 - Goals 34
 - Mode of Exercise 35
 - Warm-Up and Warm-Down 35
 - Stimulus Period 36
- The Threshold Stimulus 36
 - The Target Heart Rate 36
 - The Target RPE 38
- Modes of Aerobic Exercise 39
- Implementing an Aerobic Fitness Program 41
 - General Guidelines 41
 - Determination of Your Target Heart Rate and Target RPE 41
 - Progression 42
- Aerobic Exercise Programs 42
 - Aerobic Walk-Jog-Run Programs 42
 - Aerobic Dancing 43
 - Rope Jumping 45
 - Other Aerobic Activities 45
- Aerobic Competitive Sports 46

Aerobic Leisure and Unstructured Physical Activity 47

Benefit-Risk Ratio 47

Risks 48

Hidden Heart Problems 48

Muscular Soreness and Injuries 49

Heat Illnesses 51

Cold-Weather Running 52

Safety Concerns 52

Other Risks 53

Benefits 53

Potential Benefits of Aerobic Exercise 53

References 54

4

Muscular Strength and Endurance 57

Key Terms 57

Key Concepts 57

Introduction 58

The Muscular System 58

Muscle Structure 58

Muscle Function 59

Muscular Strength and Endurance 60

Muscle Hypertrophy 61

Principles of Resistance Training 61

The Overload Principle 61

The Principle of Progressive Resistance Exercise (PRE) 62

The Principle of Specificity 62

The Principle of Exercise Sequence 62

The Principle of Recuperation 62

Benefits and Risks of Resistance Training 63

Benefits 63

Risks 63

Preexisting Health Problems 63

Safety Concerns 64

Program Design Considerations 64

Goals and the Strength-Endurance Continuum 64

Types of Muscle Contraction 66

Methods of Training 68

A Basic Resistance-Training Program for Muscular Strength, Muscular Endurance, and Increased Muscle Mass 68

Abdominal Strength and Endurance 69

Recommended and Nonrecommended Abdominal Exercises 81

Circuit Aerobics 83

References 84

5

Flexibility 86

Key Terms 86

Key Concepts 86

Introduction 87

Principles of Flexibility Exercises 87

Types of Flexibility and Methods of Training 87

Measurement of Flexibility 91

Basic Guidelines for a Flexibility Program 92

Flexibility Exercises for the Low Back Area 92

Flexibility Exercises for Round Shoulders 94

Flexibility Exercises for Tight Upper Back and Neck 94

Flexibility Exercises for Joggers, Runners, and Other Aerobic Exercisers 94

Benefits/Risks 100

References 102

6

Basic Nutrition for Healthful Eating 103

Key Terms 103

Key Concepts 103

Introduction 104

The Major Nutrients 105

Carbohydrates 106

Health Implications of Dietary

Carbohydrates 106

Fat 108

Health Implications of Dietary Fat and

Cholesterol 111

Protein 112

Health Implications of Dietary Protein 112

Vitamins 113

Health Implications of Vitamins 113

Minerals 117

Health Implications of Mineral Nutrition 117

Water 117

Health Implications of Water Intake 119

The Basis of Diet Planning 119

The Recommended Dietary Allowances (RDA) 120

Key Nutrient Concept 120

Nutrient Density 120

The Food Guide Pyramid and the Food Exchange

Lists 121

Food Labels 123

Healthier Eating 126

A Dozen Guidelines for Healthier Eating 127

The Vegetarian Diet 131

References 134

7

Weight Control Through Proper Nutrition and Exercise 138

Key Terms 138

Key Concepts 138

Introduction 139

Body Composition 140

Major Body Components 140

Minerals 140

Carbohydrate 140

Protein 141

Fat 141

Water 141

Techniques for Measuring Body Composition 141

Healthy Body Weight 143

Height-Weight Table Approach 144

Body Mass Index (BMI) Approach 144

Body Fat Percentage Approach	145
The Waist : Hip Ratio	145
Basic Principles of Weight Control	145
The Calorie	145
Metabolism	146
Body Weight Regulation	147
Caloric Concept of Weight Control	149
Comprehensive Weight-Control Programs	150
The Role of Diet in Weight Control	150
General Dietary Guidelines	151
Your Personal Diet	153
The Role of Exercise in Weight Control	154
Exercise and the Metabolic Rate	154
Exercise Programs	156
Intensity	156
Duration	158
Frequency	159
Walking, Running, Swimming, and Bicycling	159
Resistance Training	160
Spot Reducing	160
The Role of Behavior Modification in Weight Control	160
Identifying and Modifying Eating and Exercise Behaviors	161
Special Considerations in Weight Control	162
Prediction of Weight Loss	162
Rate of Body-Weight Losses	163
Dieting and Rate of Weight Loss	163
<i>Very Low-Calorie Diets</i>	163
<i>Weight Cycling</i>	164
Exercise and Rate of Weight Loss	164
Dieting Versus Exercise for Weight Control	165
Gaining Body Weight	166
Dietary and Exercise Considerations for Gaining Body Weight	167
References	170

8

Stress-Reduction Techniques 175

Key Terms	175
Key Concepts	175
Introduction	176
Effects of Stress on the Body	176
State and Trait Anxiety and Your Health	178
Your Stress Profile	180
Methods to Reduce Stress	180
Removing the Stressor	181
Psychological Stressors	181
Environmental or Situational Stressors	182
Dietary Stressors	183
Rest and Sleep	183
Breathing Exercises	183
Meditation	184
Imagery	185
Autogenic Relaxation Training	185
Progressive Relaxation Training	185
Active Exercise	186
References	188

9

Health Effects of High-Risk Behaviors 191

Key Terms	191
Key Concepts	191
Introduction	192
Substance Abuse	192
Alcohol and Health	193
Common Dietary Sources	193
Metabolism and Function of Alcohol	194
Alcohol and a Positive Health Life-Style	196
<i>Abstinence</i>	196
<i>Moderation</i>	197
<i>Heavy Drinking</i>	198
<i>Recommendations</i>	198
Caffeine, Coffee, and Health	199
Cigarette Smoking and Health	200
Physiological Effects of Tobacco Use	200
Tobacco Use and Your Health	201
Cigarette Smoking and a Positive Health Life-Style	203
<i>Suggestions to Help You Quit Smoking</i>	204
Smokeless Tobacco	206
Marijuana	206
Cocaine	208
Methamphetamine (Ice)	209
Anabolic Steroids	210
Legal and Illegal Drugs	211
Sexually Transmitted Diseases (STDs)	211
Vaginitis	212
Genital Warts	212
Genital Herpes	212
Chlamydia	213
Gonorrhea	213
Syphilis	214
Acquired Immunodeficiency Syndrome (AIDS)	214
Safer Sex Practices	215
References	217

10

Exercise and Nutrition Concerns for Women 222

Key Terms	222
Key Concepts	222
Introduction	223
The Role of Weight Control, Exercise, and Nutrition in the Menstrual Cycle	223
Weight Control and the Menstrual Cycle	224
Exercise and the Menstrual Cycle	226
The Premenarche Stage	226
The Menstrual Stage	226
<i>Increased Health Risks</i>	227
<i>Possible Health Benefits</i>	227
The Post-Menopausal Stage	228
Nutrition and the Menstrual Cycle	228
Exercise, Nutrition, and Stress Management in the Treatment of the Premenstrual Syndrome and Dysmenorrhea	228

The Role of Nutrition and Exercise in Pregnancy 230

- Nutrition and Pregnancy 230
- Exercise and Pregnancy 231
- Physically Fit Women 231
- Sedentary Women 233
- High-Risk Women 233
- Fetal Health 233
- Lactation 233

Running Safety 233

References 234

11

Healthful Aging: Reducing the Risk of Chronic Health Problems 237

Key Terms 237

Key Concepts 237

Introduction 238

Aging and Longevity 238

- Theories of Aging 239
- Longevity 239
- Premature Death 239

Chronic Health Problems 240

Cardiovascular Diseases 241

- Coronary Heart Disease (CHD) 242
 - Arteriosclerosis 242
 - Risk Factors 243
 - Serum Lipid Profile 244
 - High Blood Pressure 245
 - Smoking 245
 - ECG Abnormalities 245
 - Obesity 246
 - Diabetes 246
 - Stressful Life-Style 246
 - Dietary Intake 246
 - Sedentary Life-Style 246
 - Oral Contraceptives 246
 - Family History 246
 - Gender 246
 - Age 246
 - Race 246
 - Positive Health Life-Style 246
- High Blood Pressure (Hypertension) 247
 - Positive Health Life-Style 248
- Stroke 249
 - Positive Health Life-Style 250
- Peripheral Vascular Disease (Claudication) 250
 - Positive Health Life-Style 250

Metabolic Disorders 250

- Obesity 250
 - Positive Health Life-Style 251

Diabetes 251

Positive Health Life-Style 252

Cancer 253

Positive Health Life-Style 254

Musculoskeletal Disorders 257

Low Back Pain 257

Positive Health Life-Style 258

Osteoporosis 262

Positive Health Life-Style 262

Arthritis 263

Positive Health Life-Style 264

Summary 265

References 266

12

Staying with the Positive Health Life-Style 271

Key Terms 271

Key Concepts 271

Introduction 272

Adherence 272

- Attitude 272
- Self-Efficacy and Self-Esteem 273
- Planning Goals and Objectives 273
 - Record Keeping 273
 - Reward System 274
 - Relapse Prevention 274
- Social Environment 274
- Health/Fitness Clubs and Commercial Weight-Loss Centers 274

Summary 275

References 276

Laboratory Inventories 277

Appendices

- A. Food Exchange Lists 375
- B. Scoring Tables for Cooper's Distance Tests of Aerobic Capacity 383
- C. Approximate Caloric Expenditure per Minute for Various Physical Activities 385
- D. Calories, Percent Fat, and Cholesterol in Selected Fast-Food Restaurant Products 393
- E. Approximate Metabolic Cost of Various Occupational and Recreational Activities in METS 395

Glossary 397

Credits 408

Index 411

Laboratory Inventories



- 1.1** The Health Life-Style Assessment Inventory **277**
- 1.2** Self-Efficacy Potential for Health Behavior Change **281**
- 2.1** Exercise Program Implementation **283**
- 2.2** Revised Physical Activity Readiness Questionnaire (rPAR-Q) **289**
- 3.1** Heart Rate Palpation **291**
- 3.2** Determination of Target HR and RPE **293**
- 3.3** Cooper's Distance Tests **297**
- 3.4** Step Test **299**
- 3.5** The Rockport Fitness Walking Test **301**
- 3.6** Exercise Prescription and Contract **303**
- 4.1** Tests of Upper Body Strength and Endurance **305**
- 4.2** Test of Lower Body Strength **307**
- 4.3** Test for Abdominal Muscle Endurance **309**
- 4.4** Weekly Resistance-Training Record **311**
- 5.1** Sit-and-Reach Test for Lower Back and Hamstring Flexibility **313**
- 5.2** Shoulder Rotation Test for Shoulder Joint Flexibility **315**
- 5.3** Ankle Flexion Test for Ankle Flexibility **317**
- 6.1** Classification of Daily Food Intake into the Six Exchange Lists and Determination of Caloric, Carbohydrate, Fat, and Protein Intake **319**
- 6.2** Center for Science in the Public Interest How's Your Diet? **323**
- 7.1** Prediction of Body Fat Percentage **327**
- 7.2** Determination of Desirable Body Weight **333**
- 7.3** Calculation of Daily Energy Expenditure Based on the Physical Activity Factor Classification System **339**
- 7.4** Calculation of Daily Caloric Deficit Needed to Lose Two Pounds of Body Fat per Week **343**
- 7.5** Developing Your Personal Diet **345**
- 7.6** A Guide to Weight Gaining **347**
- 8.1** Daily State Anxiety **349**
- 8.2** Stress and You **351**
- 9.1** Do You Have a Problem with Substance Abuse? **355**
- 9.2** Self-Test on Drinking Habits and Alcoholism **357**
- 9.3** Why Do You Smoke? **359**
- 9.4** Do You Really Want to Quit Smoking? **363**
- 10.1** Monthly Record of Physical and Psychological Symptoms During My Menstrual Cycle **365**
- 11.1** Cardiovascular Disease Risk Factor Inventory RISKQ: A Heart Hazard Appraisal **367**
- 12.1** Self-Motivation Assessment **373**

1

**A POSITIVE HEALTH LIFE-STYLE****Key Terms**

behavior modification
chronic diseases
chronological age
disuse phenomena
epidemiological research

experimental research
functional age
health promotion practices
health protection services

health risk appraisal (HRA)
personal choice
Positive Health Life-style
preventive services

prudent health behavior
relative risk (RR)
risk factor
self-efficacy

Key Concepts

- Of the three major classes of health objectives developed for the nation by the Public Health Service, health promotion practices are primarily under the control of the individual.
- Chronological aging is inevitable, and although the catabolic effects usually associated with the chronological aging process also appear to be inevitable, you may maintain a younger functional age by following a Positive Health Life-style.
- Four major components of a Positive Health Life-style are a properly planned exercise program, a balanced nutrition program, appropriate methods to enhance mental health, and the avoidance of substance abuse.
- Personal health promotion and preventive medicine encourage personal choices of positive health behaviors that will help counteract key risk factors. Self-responsibility is a key to personal health promotion.
- Key preventable risk factors associated with the onset of chronic diseases include physical inactivity; excess body weight; a diet high in fat, cholesterol, and salt; high blood pressure; excessive stress; smoking habits; and excessive alcohol intake.
- Health risk appraisals, educational tools designed to analyze your current health life-style, offer a general idea of areas in your life that may pose a health risk.
- A Positive Health Life-style is not solely concerned with the prevention of chronic diseases; it is also concerned with helping you achieve the healthiest body and mind possible, within natural limitations.
- Although the development of a Positive Health Life-style should be encouraged as early in life as possible, the benefits of adopting such a life-style may be achieved at almost any age.
- A Positive Health Life-style helps you meet the short-term goals of looking better physically and feeling better mentally, and also helps you to meet long-range goals of preventing the onset of chronic diseases.

INTRODUCTION

Health is often defined as the general condition of the body and mind. Good health is normally associated with vigor and vitality, while poor health is identified with disease or other ailments. The two major factors that impact on your health status are your genetic background and your personal environment, respectively often referred to as nature and nurture. In relation to diseases, some are caused purely by genetics (e.g., sickle cell anemia), others are caused purely by environment (e.g., lead poisoning), while most are caused by the interaction of genetics and environment (e.g., heart disease). Although in the future genetic engineering research may enable scientists to repair faulty genes and prevent the development of certain genetic disorders, at the present time we can do little regarding our genetic predisposition to various diseases. However, for most of us, environmental factors exert the most significant effects on our health status, either directly or by interacting with our genetic predisposition, and we can do much to influence these environmental effects by making healthy choices throughout life. Healthy choices in various aspects of your life, which we shall designate as the **Positive Health Life-style**, underlie the concept of wellness.

One factor that influences your perception of your health status is your age. College and university student populations are becoming increasingly diverse, particularly in relation to age. It is not uncommon for a typical college-aged student (one aged eighteen to twenty-four) to take courses, even fitness and wellness courses, along with students in their thirties, forties, and beyond. If you are a young college student, most of your concerns about the quality of your physical and mental health are probably grounded in the present. Basically, you want to look good physically and feel good mentally—*now*. You probably do not spend a great deal of time worrying about the distant future, such as whether or not you will develop heart disease, cancer, or diabetes, how you will take care of yourself during your retirement years, or how long you are going to live. However, such thoughts may have crossed your mind at one time or another. On the other hand, if you are older than the typical college-aged student, these thoughts may have become increasingly important to you.

Regardless of your age, you can make a number of changes in your current life-style that will probably help you to look better physically and to feel better mentally in a relatively short time. Interestingly, these rather simple life-style changes that center around fitness and wellness may not only improve the quality of your life in the present, they will help enhance the quality of life over time and improve longevity. Although genetics plays an important role in your future health, we know more about health promotion and preventive medicine today than our parents and grandparents did in the past, so we may be able to prevent some of the health problems that they experienced. Genetics is an important factor relative to your health, but so too is how you deal with your personal environment. Nature deals you a set of cards, but you play them.

Fitness and wellness are two key buzzwords of the 1990s. Just look around. We have best-selling books focusing on nutrition and exercise, popular magazines called *American Health and Eating Well*, wellness newsletters by universities and consumer-protection organizations, separate sections in our daily newspapers covering health and fitness, television

channels devoted almost exclusively to medicine and health, videotapes by movie stars and television celebrities on how to become physically fit at home, and the increased use of health and fitness to advertise products ranging from breakfast cereals to beer.

In the United States, an increased emphasis on fitness and wellness developed in the 1960s and stimulated considerable research activity regarding the effects of various life-style changes, such as increased exercise participation and low-fat diets, on the development of various diseases. Numerous studies over the past three decades, as shall be documented throughout this book, have provided substantial evidence supporting the manifold health benefits of appropriate life-style modifications, and many individuals have initiated personal fitness and wellness programs designed to enhance their health status. However, recent surveys suggest that Americans, in general, appear to be exercising less, eating less sensibly, and getting fatter.

In order to improve the health status of more Americans, in 1991 the Public Health Service (PHS) of the United States Department of Health and Human Services released a document entitled *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*. This document outlines a national strategy for significantly improving the health of the nation. More than three hundred specific health objectives fall into three major categories: health protection, preventive services, and health promotion. There are also several subclassifications for each major category.

Health protection services are those related to environmental or regulatory measures that confer protection on large segments of the population, such as water fluoridation for prevention of tooth decay and legislation requiring seat belt use. Others generally perform these services to protect our health.

Preventive services include screening, counseling, or other services provided in a clinical setting. Included in this category are screening programs for the early detection of high blood pressure and immunization to prevent the development or spread of certain diseases. Again, others usually provide these services for our health benefit.

Health promotion practices focus upon eight major areas, five of which are most relevant to this text: physical fitness and exercise, nutrition, mental health, smoking and health, and misuse of alcohol and drugs. In contrast to health protection services and preventive services, health promotion practices involve life-style factors basically under the control of the individual. Moreover, health protection and preventive services will not succeed unless personal health promotion practices are observed. For example, legislation to enforce seat belt use will be ineffective if you do not wear your seat belt every time you drive, as will an education program to prevent the development of cancer if you do not practice certain recommendations, such as regular breast or testicular self-examination.

Although many of the health objectives are designed to address immediate health problems, such as avoidance of unintentional injuries, much of the emphasis behind recent governmental support for health promotion and preventive medicine programs is the reduction of the magnitude of future health care costs associated with the "graying of America." For example, individuals born during the baby boom era of the late 1940s, now in their late thirties and early forties, will soon

be in their sixties, the time of life when serious health problems begin to become magnified. **Chronic diseases**, such as coronary heart disease, cancer, diabetes, and osteoporosis, generally occur with advancing age, particularly if individuals had unhealthy life-styles during earlier adulthood. Thus, from a financial point of view, it is important for the government to keep people healthy for as long as possible. Research has indicated that health promotion programs focused on the elderly may reduce health-care costs.

On the other hand, many of the specific health objectives for the nation include the young, not only young children and adolescents, but also young adults of college age. If healthy life-styles can be developed early, they may be more likely to persist throughout the years and thus exert a significant impact upon one's health later in life. Consequently, by attempting to educate the young about healthier life-styles, the federal government is looking even further down the road to help reduce health-care costs.

However, many young adults exercise or diet to improve their appearance and to feel good about themselves now, not to prevent later health problems such as coronary heart disease or cancer. Fortunately, with the selection of proper health-related behaviors, both short-term and long-term benefits may be achieved concomitantly.

Although relevant information regarding health protection and preventive services will be discussed, this book focuses upon health promotion practices. It is designed to help you develop a set of health behaviors that constitutes a high energy life-style, known throughout this text as a Positive Health Life-style, a life-style fashioned after the concept of positive health developed in 480 B.C., by Hippocrates, the Greek physician known as the Father of Medicine. Such health behaviors stress responsibility for one's health and should enable you to increase control of your life, to maximize your ability to operate or function at or near your potential, or as a popular advertising phrase goes, to "be all that you can be." A Positive Health Life-style can maximize your ability to work at your potential in the present and will enable you to experience the joys of aging without the handicaps.

As Browning wrote, "Grow old along with me! The best is yet to be."

Aging and Health Risk Factors

Although we age in different ways, we all begin to age from the first day of conception. **Chronological age** represents the passage of time. It is marked by our birthday each year and is relatively easy to determine. **Functional age** represents the capacity of the body to perform certain specific tasks and is usually evaluated in a variety of ways, such as tests of vision and hearing, physiological functioning during exercise, psychomotor ability, and health status.

Some of the changes in the aging process (such as your external appearance) are readily observable, while other internal changes are not as easily detected (fig. 1.1). We can note rather easily such changes as gray hair, impaired hearing and vision, increased body weight, stiff joints, and wrinkled skin; however, clogged arteries, less efficient lungs and heart, and diminished function of certain glands may not readily be noticed.

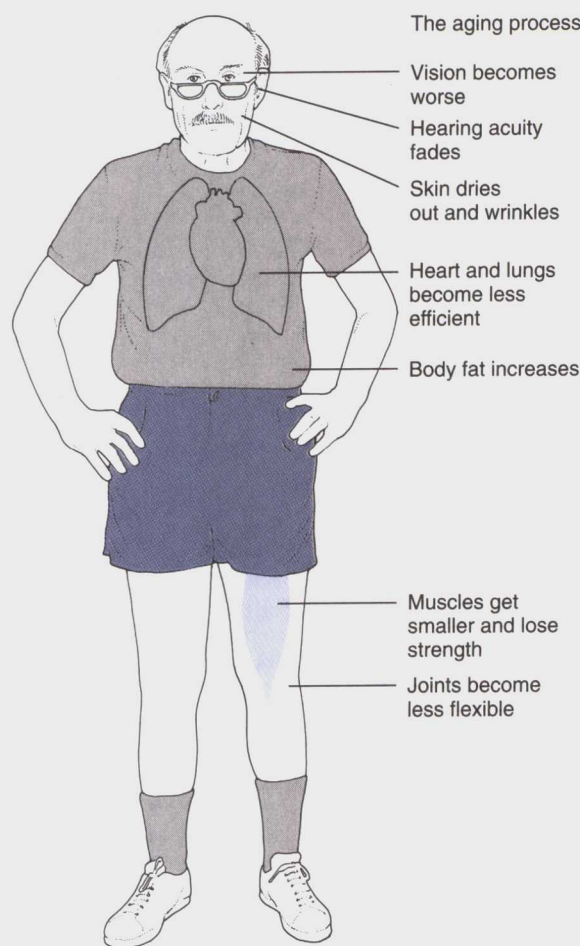


Figure 1.1 Physiological changes associated with the aging process. A number of physiological changes occur during the natural aging process. Some of the changes, such as decreased visual ability, are not too preventable. However, others, such as decreased cardiovascular functions, may be prevented to some degree by a Positive Health Life-style.

At the present time, chronological aging is inevitable, and many of the changes in body functions that accompany the aging process and increase functional age also appear to be inevitable. However, in an affluent society that places a high value on a youthful appearance, certain technological and medical advances may counteract some of these adverse effects. We can obtain an almost undetectable aid to improve hearing, use soft contact lenses to correct vision, or undergo plastic surgery to smooth facial wrinkles. Some of these applications, however, may be unnecessary. Hearing losses may or may not be preventable, depending on whether hearing loss is a natural occurrence of the aging process or is brought about by exposure to continuous periods of loud noise during younger years. Wrinkling of the skin may be minimized by avoiding prolonged exposure to the sun or excessive use of tanning beds.

Although there exists this close general relationship between chronological and functional ages, there may be marked differences between the two, particularly in relationship to physiological functioning and health status. In other

Table 1.1 Risk Factors and Some Associated Health Problems

Risk Factor	Associated Health Problems
Excessive body weight	Coronary heart disease Diabetes
Low leisure-time physical activity	Coronary heart disease Obesity
Low levels of planned exercise	Coronary heart disease Obesity
Poor diet habits	Cancer Obesity
High fat and cholesterol diet	Atherosclerosis Obesity
High salt diet	High blood pressure Stroke
High blood pressure	Coronary heart disease Stroke
Excessive stress	Coronary heart disease Mental illness
Cigarette smoking	Lung cancer Coronary heart disease
Excessive alcohol consumption	Cirrhosis of the liver Motor vehicle accidents
Poor driving habits	Accidents
Poor physical exam habits	Cancer
Indiscriminate sex habits	Sexually transmitted diseases

words, depending upon your life-style, you may have a younger or older functional age compared to your chronological age. For example, studies from Scandinavia and from the National Institute of Aging revealed that highly physically active individuals in their fifties and sixties were able to reduce the risk of functional decline and had exercise capacities and body fat levels comparable to those of healthy but sedentary twenty-five-year-olds. Conversely, some individuals in their twenties who have abused their health may have the health status of someone in their forties or fifties.

Although some of the genetic effects of aging may be inevitable, many that impact upon your health may be under your control. By identifying and eliminating or minimizing factors in your life-style that may be potentially harmful to your health, you may be able to reduce the rate at which you age functionally. Although you cannot stop the clock chronologically, you can slow down functional aging and maintain the physiological function and health status of a twenty-year-old for years to come.

Since your functional age may be evaluated on the basis of your health status, usually determined by the number of health risks you possess, it is often referred to as your risk age. Over the years, scientists in the field of epidemiology (the study of disease patterns in human populations) have identified a number of life-style factors considered to be health risks; these life-style practices are known as risk factors.

A **risk factor** is a health behavior or personal characteristic that has been associated with a particular disease. A cause-and-effect relationship does not have to be present in

order to label a particular factor as a risk to health, but some form of statistical relationship between the risk factor and the presence of the disease in a given population group should be evident.

Table 1.1 presents a broad overview of some major risk factors that may be favorably modified with proper health promotion practices, or the implementation of a Positive Health Life-style. One or two of the possible health problems that may occur is listed with each risk factor.

Life-Style Health Risk Factor Assessment Inventory

There are numerous health assessment inventories available today. Such inventories are often known as **health risk appraisals**, or **HRAs**. Some are very simple and can be completed in less than a minute, giving you a general measurement of your health life-style. Other versions are computerized and may take an hour or so to complete; they offer you an estimate of the probability of developing a particular chronic disease or forecast how many years you will live by determining your functional, or risk, age. Because validity studies of these more extensive inventories are not yet available and the reliability of several widely used HRAs has been reported to be less than desirable, we cannot verify their accuracy and will not duplicate them here. Those who are interested in such an analysis may contact several of the companies or agencies that administer them. A listing can be found in the pamphlet *Health Risk Appraisals: An Inventory*, which may be obtained by writing to the National Health Information Clearinghouse, P.O. Box 1133, Washington, D.C., 20013. Your course instructor may have a source, or you may wish to contact local distributors of computer software to see what programs are available. The major point to keep in mind concerning any of these inventories is that, although they may be effective health-education tools, they are not to be used for diagnosis or for general medical screening purposes.

However, an HRA may alert you to health risks in your present life-style. Moreover, you may use a health risk appraisal to retest yourself after you have implemented behaviors consistent with a Positive Health Life-style. It might be interesting and informative to keep the results of your initial assessment and compare them to a reassessment at the end of this course.

The Health Life-style Assessment Inventory (Laboratory Inventory 1.1) is designed to assess your current health life-style and to give you a general idea of areas in your life that may need to be modified to achieve an optimal Positive Health Life-style. The inventory is educational in nature and will help you get a broad look at your overall health life-style. Several more detailed inventories, presented in later chapters, deal with specific topics such as dietary habits and stress profiles.

Since this inventory is general and educational in nature, it has some limitations. For example, it does not take into account family history of diseases that may exert a significant

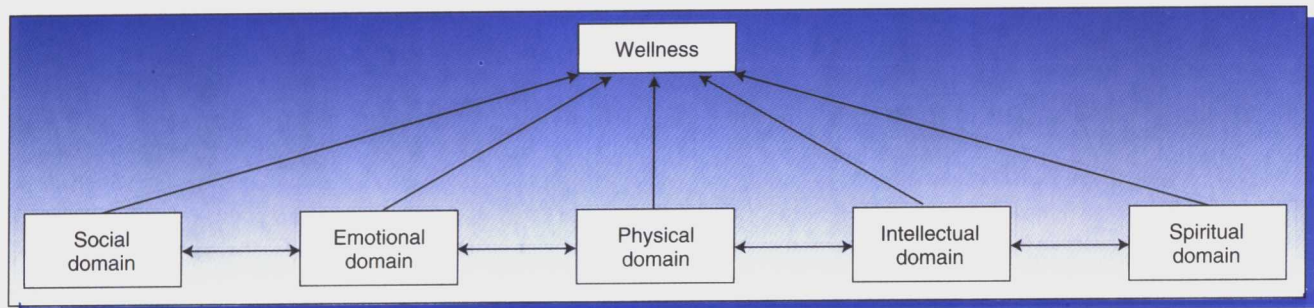


Figure 1.2 The domains of wellness. Total wellness is dependent upon interactions of the social, emotional, physical, intellectual, and spiritual domains.

influence on your future health. A number of chronic diseases appear to be related to genetic predisposition and, thus, tend to run in some families. Moreover, it does not look at your personal health history. You may have or have had diabetes, asthma, allergies, rheumatic heart disease, or other disorders, that may influence your health life-style. With these limitations in mind, please complete The Health Life-style Assessment Inventory on page 177 before reading any further.

The Positive Health Life-Style

The health objectives published in *Healthy People 2000* are an extension of a previous endeavor. In 1980 the Public Health Service established a series of health objectives for the nation with the hope of meeting these objectives in the 1990s. In subsequent years, a number of studies conducted by the PHS to evaluate progress toward these objectives found that many had already been met. In most cases, gains were in the areas of health protection services and preventive health services and were the result of legislative action or intensive national programs. For example, many state legislatures have passed laws requiring the use of seat belts; this has resulted in a decrease in motor-accident deaths. In addition, a national campaign has led to the early detection and subsequent treatment of high blood pressure in millions of individuals, resulting in a significant decrease in the incidence of heart disease and stroke.

On the other hand, the PHS has noted that other areas continue to pose challenges, particularly the health promotion area. Little progress has been made in meeting the objectives related to nutrition, body weight, fitness and exercise, and stress control. The development of a Positive Health Life-style is consistent with the health objectives set forth by the PHS in the area of health promotion.

However, a Positive Health Life-style is not concerned solely with preventing the onset of chronic disease later in life; that is only a secondary goal. Its primary goal is to achieve the healthiest body possible within natural limitations; to achieve a style of life characterized by high energy levels and a *joie de vivre*; in other words, to enhance the quality of life by increasing your healthy life expectancy. In order to attain optimal function and optimal health, you must intellectually learn and understand how the human body functions and how to treat it well. You need to develop a life-style that,

according to current medical evidence, provides you with the greatest statistical probability of remaining healthy. Adopting a Positive Health Life-style is not going to guarantee protection against all chronic diseases and health problems, but it may delay the onset of such diseases or reduce the severity of disabling symptoms and enable you to enjoy life to the fullest.

Mind-Body Interrelationships and the Dimensions of Wellness

A Positive Health Life-style is based on a wellness model that views the individual as a whole, such that there is a sense of unity between the mind and body. One model of wellness, depicted in figure 1.2, segments the mind and body into various domains, most notably the social, emotional, physical, intellectual, and spiritual domains, the health implications of which are described briefly below.

- The social domain focuses on the development of meaningful personal relationships with family and friends.
- The emotional domain focuses on the development of self-confidence and a positive self-concept, the ability to handle stress, the ability to express emotions appropriately, and to accept one's own limitations.
- The physical domain focuses on the ability to exercise properly, to eat a healthful diet, and to avoid high-risk behaviors.
- The intellectual domain focuses on the ability to think critically, to identify and solve problems, and to use information to enhance personal development.
- The spiritual domain focuses on the ability to find meaning and purpose in life, to develop faith in nature, religion, or some other higher entity to enhance moral and ethical development.

The specific domains in this model are related to the mind-body concept; the social, emotional, intellectual, and spiritual domains are closely associated with the mind, while the physical domain is associated primarily with the body. However, all of these domains are interrelated so that disease processes or disturbances in one can cause disease in either the mind or the body. In this book, the term psychological health will be used to encompass those health behaviors that influence the mind, while physical health will relate to health

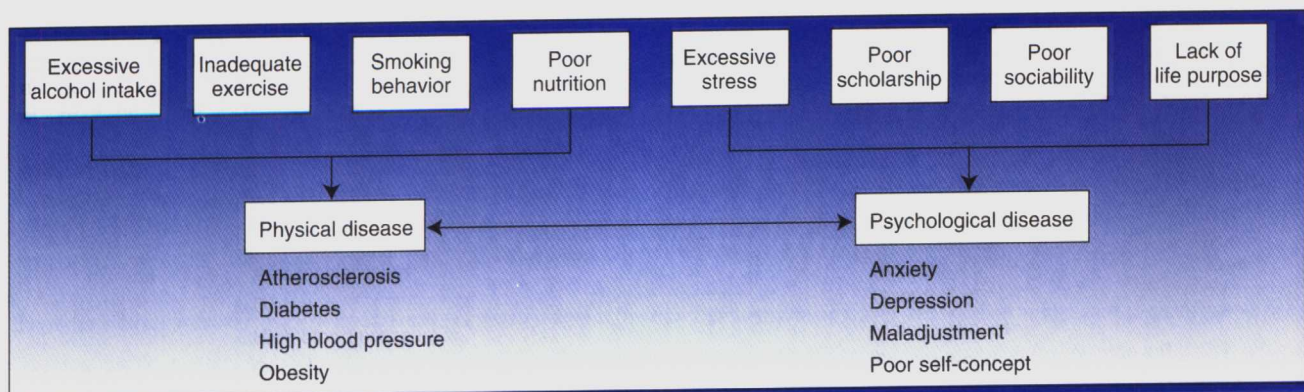


Figure 1.3 Mind-body interrelationships. Physical disease may lead to psychological disease, and vice versa. Contributing risk factors to each type of disease may be modified by positive health behaviors.

behaviors that influence the body. Figure 1.3 illustrates the interrelationships between the mind and the body and some possible contributing factors to physical/psychological diseases. For example, disturbances in the physical domain, such as improper exercise habits and diet, may contribute to obesity (a physical disease) which may lead to the development of a poor self-concept and maladjustment (psychological problems). Conversely, poor sociability may lead to depression (psychological disorder), which may contribute to the development of obesity by promoting sedentary behaviors and excessive food intake.

Promotion and Prevention Versus Treatment

Most of us have been exposed to individuals who have developed a chronic disease and are aware of the excellent treatment they have received from our technologically sophisticated medical community. Today, physicians and hospitals are equipped with a wide array of diagnostic tools, advanced surgical techniques, medicines, and drugs to treat some of the major chronic diseases. In many cases, what may have been a fatal disease in the past now has a favorable prognosis for partial or complete recovery. Medical advances have been phenomenal during the first 50 to 60 years of this century and have been instrumental in eradicating many of the previous causes of premature death—tuberculosis, polio, diphtheria, etc. Moreover, medical advances in the past 30 years have been even more phenomenal and are helping to treat the major chronic diseases that are now the main threats to our health. The research and development of these modern medical techniques for treating chronic and other diseases, however, has been extremely costly, with medical care costs expanding at an extremely rapid rate during the past decade. For example, at the time of this writing, a coronary artery bypass operation costs \$30,000, while a liver transplant costs \$250,000.

This rapid rise in medical care costs and an increasing tendency towards national health care legislation have helped to begin to change the focus of medical care from treatment to prevention. A spokesperson for the American Medical Association has noted that 90 percent of the health problems in the

United States are preventable to one degree or another, stressing personal health decisions as the key to preventing disease. In support of these remarks, a study published in the *Journal of the American Medical Association* has revealed that excess deaths from nine major chronic diseases (coronary heart disease, stroke, diabetes, chronic obstructive pulmonary disease, lung cancer, breast cancer, cervical cancer, colorectal cancer, and chronic liver disease) in the United States could be prevented by simple life-style changes, such as stopping cigarette smoking, controlling high blood pressure, eating a healthier diet, reducing body fat, moderating alcohol consumption, becoming physically active, and using available screening techniques for early detection of cancer.

Prudent Health Behaviors

How do we know what effect a particular life-style change will have upon our health? To find answers to specific questions of concern to you, you should rely primarily on the findings derived from scientific research. Since this book presents a number of general recommendations concerning the impact of life-style changes on fitness and wellness, it is important to review briefly the nature and limitations of scientific research with humans that support these recommendations.

Several research techniques have been used to explore the effect of life-style on health, but the two most prevalent have been epidemiological and experimental research. **Epidemiological research** involves studying large populations to find relationships between two or more variables. For example, obesity is a risk factor associated with the development of diabetes in adulthood. Individuals who become obese have a higher statistical probability of developing diabetes than those who remain at a healthy body weight. However, no exact cause (obesity) and effect (diabetes) relationship has yet been determined, although some plausible theories are being studied. Thus, if you become obese you may not develop diabetes, but you will increase your risk of doing so. Researchers often establish a **relative risk (RR)** regarding the association between some health behavior and a disease. An RR of 1.0 means there is neither an increased nor a decreased risk, an RR of 2.0 means individuals may be twice as likely to develop the disease, while an RR of 0.5 indicates individuals are

only at half the risk. In some cases, such as the association between cigarette smoking and certain forms of cancer, the RR may be 10 or even much higher.

Epidemiological research is useful in identifying relationships among variables and inferring causality, but **experimental research** is essential to help verify a cause-and-effect relationship. In such studies an independent variable or variables (cause) is manipulated so that changes in a dependent variable or variables (effect) can be studied. With some risk factors, a direct cause-and-effect relationship can be observed. The results of epidemiological research, such as cirrhosis in alcoholics due to chronic excessive alcohol intake, often stimulate experimental research in order to establish a cause-and-effect relationship. For example, experimental studies with humans have shown significant deteriorative effects in liver function tests with the consumption of excessive amounts of alcohol over a short period of time, while experimentation with animals over a longer period of time has shown that excessive alcohol consumption causes cirrhosis of the liver. Experimental research currently is being conducted with many risk factors in order to help establish such cause-and-effect relationships.

However, it is important to realize that the results of one study with humans, even though published in a respected medical journal, do not prove anything. Studies need to be repeated by other scientists and a consensus developed; the experimental evidence should support the epidemiological findings. Unfortunately, such a consensus is often lacking to support recommendations about specific modifications for improved health, for it is very difficult to conduct experimental research with humans regarding the effect of a single life-style change on health. For example, many diseases, such as cancer and heart disease, are caused by the interaction of multiple risk factors and may take many years to develop. It is not an easy task to control all of these risk factors in freely living human beings in order to isolate one independent variable, such as dietary fat, and to study its effect on the development of heart disease over 10 to 20 years.

Nevertheless, a tremendous amount of both epidemiological and experimental research has been conducted regarding the effect specific life-style behaviors may have upon health and wellness. Although in many cases we still do not have absolute proof that a particular health behavior will produce the desired effect, we do have sufficient information to make recommendations that are prudent, meaning that they are likely to do some good and cause no harm. Thus, the recommendations offered in this text should be considered to be **prudent health behaviors**; they are based upon a careful analysis and evaluation of the available scientific literature, including specific studies or comprehensive reviews of the pertinent research by individuals or public and private health organizations. When a sufficient number of research studies is available a meta-analysis, which provides a statistical comparison of the results of all selected studies, may provide one of the most significant means to evaluate specific health behavior recommendations.

What are some recommended prudent behaviors that may have a positive effect on your health, happiness, and general well-being? Several surveys have been conducted to determine whether there are any behaviors that appear to help attain or maintain a state of good health. As a general overview of what is to come in later chapters, a synthesis of these reports suggests that the following behaviors are associated with a healthy life-style.

1. Exercise. Get at least 20 minutes per day of regular, moderate, aerobic exercise at least three to four days a week. Or, do 30 minutes of moderately-intense exercise, such as gardening, stair-climbing, and walking, during your leisure time on most days of the week. Exercise is inexpensive medicine.
2. Nutrition. Eat wholesome, natural foods, including a good breakfast and two other healthy, well-balanced meals per day; avoid unnecessary snacking. Let your food be your medicine.
3. Body weight. Maintain an optimal body weight through a sound exercise and diet program.
4. Rest. Get about 7 to 8 hours of restful sleep each night; use relaxation techniques when necessary.
5. Alcohol. If you do drink, use alcohol in moderation.
6. Smoking. If you do not smoke, do not begin; stop smoking if you currently do smoke.
7. Personal environment. Avoid toxins and pollutants when possible; use care with insecticides and pesticides.
8. Personal injury. Be safety conscious; when driving, use seat belts and avoid excessive speed or use of alcohol or drugs.
9. Stress. Use socially acceptable, yet effective techniques to deal with daily problems and to reduce hostility and anger.
10. Healthy sexuality. Practice safe sex habits.
11. Self-worth. Develop a feeling of personal value, a feeling that you are in control of your personal environment, a feeling that you are able to make personal choices. Do not equate money with success.
12. Intelligence and memory. Exercise your mind. Practice memory techniques.
13. Social ability. Practice social skills. Resolve to be cheerful and helpful. Learn to talk less and listen more.
14. Relationships. Develop friendly relationships within your family and with others at school, work, or other situations.
15. Laughter. Laugh more often. Laugh heartily. Read the comics or watch funny shows. Look for humor in everyday events.

Total health involves a balanced relationship between the mind and the body. To be totally healthy, you should possess an optimal level of both physical and psychological fitness. Both types of fitness are interrelated and very complex. Although our concern in this book is primarily with