Handbook of Personality and Health

Edited by

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and
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About the Editor

Margarete E. Vollrath is Professor of Personality Psychology at the University of Oslo in Norway and affiliated with the Norwegian Institute of Public Health, Division of Mental Health. She has been a member of the Board of Directors of the European Association of Personality Psychology. She completed a PhD and obtained the *venia legendi* in psychology at the University of Zurich in Switzerland. Dr. Vollrath joined the Psychological Institute of the University of Oslo in Norway in 2001.

Dr Vollrath began her career with research on the epidemiology and course of mental disorders in young adults. She then turned to exploring the influence of personality and personality disorders on stress, coping, and risky health behaviors both in psychiatric patients and healthy young adults. In recent years, her interests have gradually shifted to child health. In a study conducted with University Children's Hospital in Zurich, she investigated how children with diabetes, cancer, and injuries adjust to their situation. In another project, a large cohort study in Norway, she is examining the impact of child personality traits on early appearing health behaviors, such as eating and physical activity.

The idea to edit this Handbook stems from her long experience in teaching health psychology at the Universities of Zurich and Oslo and the vivid discussions with her students during her seminars and lectures.

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Introduction: Who Becomes Sick and Who Stays Healthy, How and Why, and What Can be Done About It

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WHY WE SHOULD STUDY PERSONALITY IN HEALTH PSYCHOLOGY

Since the beginning of the twentieth century, the leading causes of mortality and morbidity in the Western world are no longer infectious diseases but diseases of the heart, cerebrovascular diseases, cancer, chronic obstructive pulmonary diseases, and diabetes. The death of children, adolescents, and young adults is caused mainly by unintentional injuries (Kochane, Murphy, Anderson & Scott, 2004). Psychological factors, such as health-compromising behaviors as well as stress, are involved in all of these causes of death. Not surprisingly, health psychology, which is dedicated to explaining and preventing these behaviors, has been one of the fastest growing disciplines in psychology since the 1980s.

Among the psychological factors that impact health, personality—that is, stable individual differences in thinking, feeling, and behaving—plays a pivotal role. Indeed, the strength of the effects of personality on health can be similar to those of known biological risk factors, such as cholesterol (Hampson, Goldberg, Vogt & Dubanoski, 2006).

Why is this so? Most of the leading causes of death mentioned above are chronic diseases that develop slowly over an extended period. Even being involved in an accident tends to be the consequence of repeated exposure rather than of a single chance event. Consequently, the behaviors that precede and predict both good and ill health need to be enduring or repeated to achieve lasting effects on health. Lung cancer does not follow from smoking a few cigarettes in a lifetime; being overweight does not follow from eating fatty or sweet foods on a single occasion. The psychological characteristics necessary to achieve long-term effects on experiences and behavior, in turn, need to be stable across situations and over sufficient periods. Personality traits meet this requirement, as they develop early and show increasing continuity over the life span (Caspi, Roberts & Shiner, 2005).

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Indeed, personality traits identified in childhood predict *health outcomes* occurring many years later in life such as overweight and obesity, unintentional injuries, the metabolic syndrome, and even longevity. This has been demonstrated by impressive longitudinal studies tracking young children's lives for over 20 years into young adulthood (Caspi et al., 1997; Pulkkinen, 1995; Pulkki-Råback, Elovainio, Kivimäki, Raitakari & Keltikangas-Järvinen, 2005), for 40 years into middle adulthood (Hampson, Goldberg, Vogt & Dubanoski, 2006), and for 65 years into old age (H.S. Friedman et al., 1993; Martin et al., 2002). There is no other conceivable psychological predictor showing an impact that is comparable to that of personality.

Historically, research on the impact of personality on health has had a rich and long tradition both in psychology and medicine. One of the best known fields of investigation, widely popular also among the general public, is the research on the coronary prone personality (Dembroski & Costa, 1987) that is characterized by Type A behavior or Hostility (M. Friedman & Rosenman, 1959). These findings have become part of general knowledge today. A kindred topic is that of the distress-prone personality, which is characterized by vulnerability to stress and a proclivity to experience and report symptoms of distress. Because the distress-prone personality exhibits many bodily symptoms resembling those caused by coronary and other physical diseases, there has been a dispute about the delineation between these two personalities (H.S. Friedman, 1990; Stone & Costa, 1990). Another heated debate arose on the cancer-prone or Type C personality, which is characterized by depressed mood and the repression of feelings. This concept became quite popular, because many cancer patients do show signs of depression. To date, large prospective studies have proven that personality is not a risk factor for cancer (Nakaya et al., 2003), and the debate has quieted down, but the myth of a cancer-prone personality is still alive. Decidedly fewer studies have been conducted on the personality precursors of accidents or unintentional injuries—the accident-prone personality (Manheimer & Mellinger, 1967). Yet, consistent findings have been accumulating gradually, showing that childhood impulsivity predicts injuries both during childhood and later in life (Caspi, Begg, Dickson, Langley et al., 1995; Schwebel, 2004).

Stress and stress-related diseases are considered to be the health scourge of modern times. Personality researchers have been opening many parallel avenues of research on the contribution of personality to stress. One avenue explores which personality traits lead to increased exposure to stressful events and how this exposure is brought about (Headey & Wearing, 1989; Robins & Robertson, 1998). Another avenue is concerned with traits that increase the intensity and duration of physiological reactions, such as Hostility (Smith, Pope, Rhodewalt & Poulton, 1989), and the circumstances that trigger these reactions. A third avenue, stimulated by the influential theories of Richard S. Lazarus (Lazarus & Folkman, 1984), revolves around personality influences on cognitive appraisals and coping strategies (Vollrath, 2001).

A more recent pursuit is directed at positive health outcomes, such as happiness, self-fulfillment, and growth, animated by the emerging field of positive psychology (Snyder & Lopez, 2002). Here, two approaches to the study of personality can be distinguished. One of them is dedicated to the relation between personality traits and various measures of well-being and happiness and the mechanisms that mediate this relationship (DeNeve & Cooper, 1998). The other approach addresses the consequences of positive traits such as Positive Affectivity and Happiness for various health outcomes and longevity (Danner, Snowdon & Friesen, 2001; Lyubomirsky, King & Diener, 2005).

Parallel research efforts have been guided at more fine-grained analyses of *mechanisms* that act at the interface between personality and health. A major arena involves the study of *biological processes*, such as cardiovascular reactivity, cortical reactivity (Eysenck, 1967), neuroendocrine functioning (Cloninger, 2000), and lately also immune functioning (Miller, Cohen, Rabin, Skoner & Doyle, 1999). Another field is occupied with *illness behaviors*, i.e., the perception and reporting of symptoms of various diseases and the use and abuse of medical treatment. Illness behaviors are significantly affected by personality as well, particularly by Neuroticism or Negative Affectivity (Costa & McCrae, 1985; Larsen, 1992). This discovery emphasizes that objective measures of health are necessary if we are to study the relation between personality and stress or health (Costa & McCrae, 1990). Discovering the personality correlates of *risky health behaviors*, such as smoking, excessive drinking, and unprotected sex has fascinated personality researchers since the 1960s, not the least prompted by the confrontation with the hippie lifestyle. In this field, a major issue has been the biological foundation, delineation, and measurement of personality traits characterizing individuals with greater needs for stimulation and reward, such as Extraversion (Eysenck, 1973), Sensation Seeking (Zuckerman, 1979), and Novelty Seeking (Cloninger, 1987).

In the late 1970s, the tide changed back to family and friendship. Landmark prospective population studies disclosed remarkable effects of supportive *social relationships* and marriage on morbidity and health (Berkman & Syme, 1979; House, Landis & Umberson, 1988), adding a new domain to health psychological research. However, it took a long time before personality was put on to the map as a factor involved in the establishment, maintenance, and perception of social support (Sarason, Sarason & Shearon, 1986). In the last 15 years, a growing literature has shown that personality factors are implicated in a multitude of ways in the formation and transformation of social relationships (Asendorpf & Wilpers, 1998). To date, the notion that social support reflects personality differences just as much as differences of the social environment is still foreign to many researchers in the field.

LIMITATIONS AND PERSPECTIVES

There are several important research domains that are not represented by separate chapters in this book. One of them concerns the role of personality in coping with and adjustment to chronic diseases in children and adults (Eiser, 1993; Maes, Leventhal & DeRidder, 1996), where influences of personality on the physical as well as the psychosocial outcomes of diseases have been documented (Scheier et al., 1989; Sebregts, Falger & Bar, 2000). A separate field investigates cognitive belief systems, such as Hardiness (Kobasa, 1979), Optimism (Scheier & Carver, 1985), and life-goals (Little & Chambers, 2004), and their effects on health. An emerging field addresses pain-related disorders and their relation to personality, particularly Neuroticism and personality disorders (Ellertsen, 1992; Weisberg, 2000). Moreover, there is a growing awareness that temperament and personality is implicated in eating behavior and the development of overweight, which is one of the greatest threats to health today. These relations are already detectable from very early childhood (Agras, Hammer, McNicholas & Kraemer, 2004). Because the same temperamental and personality factors that are evident early on—Negative Emotionality, lack of Constraint, Hostility—determine a wide range of health outcomes from injuries to cardiovascular and endocrinological health, more studies ought to begin by early childhood and common genetic pathways leading to both personality and health outcomes should be explored.

Finally, the relation of various aspects of health with personality disorders, which are intimately related with normal personality traits (Saulsman & Page, 2004), would definitively deserve a large space in this Handbook as well. Future volumes on personality and health ought to include and explore these avenues both more broadly and in greater depth.

OVERVIEW OF THE CHAPTERS

This Handbook brings together state-of-the-art reviews on key domains of research addressing the complex relationship between personality and health, presented by outstanding researchers across Europe and the United States. The first part of the Handbook deals with the influence of personality on major health outcomes, in particular cardiovascular diseases, cancer, unintentional injuries, subjective well-being, and stress. The second part of the Handbook is dedicated to the mechanisms that mediate the relation between personality and health, including physiological and immunological pathways, illness behaviors, social relations, and risky health behaviors. This part is concluded by a call for an alternative approach, by taking the perspective of the persons, not their traits. The third part has an applied focus and looks at the possibilities of putting knowledge on personality into the service of specific and targeted strategies of prevention and intervention.

The following provides a brief sketch of the chapters.

Part I: Personality and Major Health Outcomes

Chapter 1 by Martha C. Whiteman focuses on the relationship between personality and cardiovascular disease. It includes a brief overview of the recent history of this research area, showing how results differ depending on how hostility and cardiovascular disease are assessed. The chapter discusses challenges for public health that arise from the research. In addition, it explores how life-course studies of interpersonal traits are helping to identify critical periods in which high hostility might develop and how it interacts with other risk factors. The chapter argues that these findings suggest new possibilities for interventions to prevent high hostility and reduce cardiovascular risk.

Chapter 2 by Adelita Ranchor and Robbert Sanderman discusses the role of personality in the onset of and survival from cancer. Studies with a sound methodological design were reviewed. A variety of operationalizations of the cancer prone personality (Type C personality) and of personality factors that supposedly influence survival were included in these studies. It is concluded that there was no evidence for a causal role of personality in relation to cancer. As to cancer survival, there seems to be a predictive role for helplessness/hopelessness in cancer survival. Other personality factors that were considered in relation to survival proved not to be predictive. Ranchor and Sanderman call for further research that can disentangle the pathways that are responsible for the relationship between helplessness/hopelessness and survival.

In Chapter 3, David C. Schwebel and Benjamin K. Barton address the relation between children's temperament and their risk for unintentional injuries. After presenting an extensive review of the literature in the field, which comprises large epidemiological studies, clinical studies, and laboratory studies, Schwebel and Barton conclude that the three key traits involved in children's greater injury risk are low Inhibitory Control, high Impulsivity, and high Activity Level. Mechanisms underlying this relation include increased exposure to

risky environments, risky behavior when in unsafe environments, and reduced preventative behaviors. The authors also discuss methodological problems characterizing the field and point out potential implications of the findings for injury prevention.

In Chapter 4, Norbert K. Semmer extensively covers the complex relations between personality, stress, and coping. In a first section, Semmer discusses the mechanisms relating personality with the experience of stress, including exposure to, appraisal of, and dealing with stressful situations. The second section is devoted to the role of traits, goals, and motives for the experience of stress. In the third section, the concept of the vulnerable vs. resilient individual is discussed. The fourth section is dedicated to coping, with a special focus on the difficult concept of emotion focused coping. While the chapter clearly points to the important role of personality in the experience of stress, the contributor concludes with a note of caution, emphasizing that environments tend to reinforce and sustain vicious circles that reinforce stress.

In Chapter 5, Espen Røysamb puts the good life on the agenda. Subjective well-being is not only a valued positive health outcome in itself, but also a predictor of mental and physical good health. Røysamb discusses genetic and environmental influences on subjective well-being and proposes pathways through which these factors influence both stability and change in well-being. Røysamb demonstrates that subjective well-being is related to personality, chiefly Neuroticism, but also Extraversion, and – to a lesser degree – Agreeableness, Conscientiousness, and Openness. Finally, several avenues for future well-being research are suggested.

Part II: Mediators of the Personality Health Relationship

Chapter 6 by Deborah J. Wiebe and Katherine T. Fortenberry introduces this part of the book by providing an overview of mechanisms through which personality may predict physical health. The authors examine four broad models explaining personality-health associations: (1) transactional stress-moderation models; (2) health behavior models; (3) illness behavior and illness self-regulation models; and (4) biological models. The utility of these models is then selectively reviewed in the context of three personality variables documented to prospectively predict objective health outcomes (i.e., hostility, neuroticism/negative affectivity, and optimism). Although existing models are plausible, the authors conclude these models have not been fully tested, and provide suggestions for developing and testing more realistic and comprehensive models of personality-health associations.

In Chapter 7, Paula G. Williams discusses how personality influences illness behaviors such as symptom reporting, functional disability, treatment adherence, and health care utilization. Williams presents research showing that Neuroticism predicts greater frequency of reporting physical symptoms, being functionally disabled, and using health care. Optimism and Conscientiousness predict less disability and better treatment adherence, respectively. Williams points out that the literature is still small and that future research ought to include a broader range of personality traits and include mediators, such as emotional disorders, and moderators, such as gender and socioeconomic status. Moreover, curvilinear and interactive effects of personality traits ought to be considered.

In Chapter 8, Suzanne K. Segerstrom and Timothy W. Smith review evidence that personality is related to two organ systems, the cardiovascular and immune systems that are the basis of physiological pathways from personality to health and disease. One main pathway is cardiovascular reactivity, which is viewed either as an independent trait or as a mediating

mechanism between personality and cardiovascular disease. The other main pathway implicates inflammatory and immunosuppressive processes, which in turn relate to a myriad of pathologies. For each of these main pathways, the contributors discuss evidence for a link to the personality traits of hostility, sociability, optimism, and repression. Segerstrom and Smith conclude their contribution with a call for studies tying all three elements together: personality, physiological and immunological mediators, and disease outcomes.

Chapter 9 by Franz Neyer and Judith Lehnart addresses the relation of personality, social relationships, and health outcomes such as longevity, well-being, depression, and psychosocial stability. In contrast to a traditional perspective viewing relationships as a single causal factor for physical and psychological health, the authors argue from a transactional view that dynamic transactions between personality and relationships may affect health outcomes. From this perspective, characteristics of the individual personality can lead to relationship outcomes that either promote or impair health; yet, at the same time, relationship experiences may induce personality change, which in turn can influence health. The chapter gives an overview of the various kinds of personality-relationship transactions and discusses the multiple pathways of how these may contribute to health outcomes.

Chapter 10 by Svenn Torgersen and Margarete E. Vollrath addresses the extent to which personality, conceived of as both traits and types, is involved in a broad range of risky health behaviors spanning from abuse of psychoactive substances to risky sex. The first part of the chapter draws a line back to the Blocks' types, their modification by Caspi and collaborators, and recent attempts at a validation of these types across different samples and measures. Then, Torgersen's alternative typology is presented. In the second part of the chapter, the authors sketch out the existing body of research on the link between the Big Three personality factors (Neuroticism, Extraversion, and Constraint) and risky health behaviors. By also providing analyses from their own body of work on Torgersen's types, the contributors show how the study of types can explain inconsistencies in current research findings and improve our understanding of how major personality traits act in combination.

In Chapter 11, Suzanne C. Ouellette and David M. Frost describe untapped resources within basic personality research for the responsible depiction and understanding of personality and health – their changes and relationships. Ouellette and Frost demonstrate that the majority of personality and health studies continue to rely on a limited conceptualization of personality as simple traits. Drawing from the longstanding study of lives tradition and new developments in narrative studies, using concepts such as self, identity, and discourse, they argue that researchers can conceptualize personality as that which involves whole persons as they live within complex interpersonal, social, and cultural settings. Ouellette and Frost claim that researchers must do so if we are to understand and meaningfully do something about health and illness. The contributors provide examples of narrative studies of health and personality from their own research and the general field of social science and medicine. These narrative and life studies reveal the person amongst health and illness phenomena, address the person in context, recognize individual subjectivity and agency alongside the power of social structures, and illustrate ethical research practice.

Part III: Targeting Personality: Prevention and Intervention

Personality researchers are often confronted with skeptical questions: if individuals are 'set like plaster' (Costa & McCrae, 1994), then intervention and prevention will be of no value.

However, even if we might not be able to change the causes—the personality—we might be able to address the consequences—the behavior. This is what Part III of this book is about.

Chapter 12 by Redford W. Williams and Virginia Williams (1) addresses the adverse impact of hostility, along with other psychosocial risk factors, on the risk of developing cardiovascular disease and other medical disorders, (2) discusses biological and behavioral mechanisms that mediate this relationship, and (3) describes the cognitive behavioral approach, including Williams and Williams' own program that has strong potential to both prevent the development of hostility in healthy persons and to reduce it in persons whose health has already been affected.

Chapter 13 by Amanda C. Jones and James W. Pennebaker deals with the beneficial effects of writing. Writing about important personal experiences in an emotional way for as little as 15 minutes over the course of three days brings about improvements in both mental and physical health. Jones and Pennebaker discuss inhibition theory, cognitive processing theory, and affective processing theory, which are the most commonly proposed mechanisms for explaining how writing improves health. All three theories tie directly to personality and individual differences that may influence the effectiveness of expressive writing. In their contribution, Jones and Pennebaker explore who is most likely to benefit from expressive writing and under what conditions. Implications for personality theory are discussed.

In Chapter 14, Lewis Donohew describes a theoretical perspective on information exposure and processing that holds that, beyond verbal content, message characteristics such as intensity, movement, or novelty interact with biologically-based personality characteristics of the audiences to play a major role in attracting and holding attention. Donohew's central focus is on media messages, individual differences in how they are attended, and implications for media-based interventions designed to reach individuals most likely to engage in risk-taking behaviors such as drug abuse or risky sex.

In Chapter 15, Derek Freres and Jane E. Gillham discuss the potential linkages among optimism, depression, and physical health. Freres and Gillham describe a cognitive-behavioral intervention for young adolescents, The Penn Resiliency Program (PRP), which is designed to prevent depression by promoting more optimistic and accurate thinking styles. Consistent with cognitive-behavioral theories, increasing optimism (and accuracy) is hypothesized to prevent depression and through direct and indirect pathways may also promote better physical health. Studies evaluating the effects of the PRP on depression, optimism (often through explanatory style), and in some cases physical health are reviewed. The contributors also include a discussion of their work in progress and future research plans.

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PART I

Personality and Major Health Outcomes

CHAPTER 1

Personality, Cardiovascular Disease and Public Health

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INTRODUCTION

People who have higher levels of hostility and anger are at greater risk for heart disease and atherosclerosis. This is the main pattern of findings from the many investigations into the relationship between personality and cardiovascular diseases over the past 50–60 years. However, that general conclusion is not as straightforward as it seems. This chapter discusses some of the history and progress of research into personality and cardiovascular diseases, covering measurement of disease and personality, pathways and networks of risk, and implications of the findings for public health. I will focus in this chapter on studies of the risk of the development of cardiovascular disease for the first time. The research into personality and recovery from and treatment for cardiovascular disease is rather different, and will be discussed by R.B. and V. Williams in Chapter 12 in this volume. Various aspects of personality have been investigated in relation to cardiovascular disease, such as depression (e.g., Frasure Smith & Lespérance, 2005; Joynt & O'Connor, 2005), but a large proportion of the research has concentrated on hostility. It is the association between hostility and cardiovascular disease that will be the focus of this chapter.

In section 1, I will briefly discuss the different types of cardiovascular disease and their assessment in research studies. Section 2 covers the definition and measurement of the personality traits of hostility and related concepts. Section 3 discusses the studies of personality and cardiovascular disease themselves, covering different study designs and different measurements. Section 4 discusses pathways of risk and challenges for public health that arise from this research, especially the complications that stem from hostility's close association with other major risk factors for cardiovascular disease such as socioeconomic status (SES) and smoking. I will also discuss new directions in research that may help public health psychologists understand these relationships better: life course studies of health and interpersonal risk that may help identify lifetime risk factors and critical periods for intervention. Section 5 summarises and concludes the chapter. But first, cardiovascular diseases.

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1. CARDIOVASCULAR DISEASES

There are several cardiovascular diseases. Some of them are heart-related (such as myocardial infarction, or 'heart attack') and some of them occur elsewhere in the body, such as stroke (in the brain). Narrowing of the arteries in the heart results in coronary heart disease (CHD), while narrowing of the arteries in the legs may result in leg pain. Investigations of personality and cardiovascular diseases may include any of these types of disease, and the results of the research may differ depending on the particular disease studied.

1.1 Coronary Heart Disease (CHD)

Coronary heart disease (CHD) results from a narrowing of the arteries that supply blood to the heart because fat deposits have built up on the arterial walls (these fat deposits are known as atherosclerosis). A person who has CHD may have one or more specific heart-related disorders such as angina pectoris (intermittent chest pain) or myocardial infarction (heart attack) (Henderson, 1996). The underlying cause of CHD is thought to be the coronary artery atherosclerosis, which reduces the amount of oxygen that can get to the heart muscle, which in turn causes the chest pain (angina) or, if the lack of oxygen is severe enough, muscle damage (myocardial infarction) (Maseri, 1995).

1.2 Myocardial Infarction (MI)

A myocardial infarction (MI) is said to have occurred when heart tissue dies because of severe, acute interruption of the heart's blood supply caused by a build-up, or 'rupture' of atherosclerotic deposits (Henderson, 1996; Julian & Cowan, 1992). Its main feature is severe chest pain that is extremely intense and that may radiate widely across the whole chest, into the jaw or the arms. In most cases the pain lasts for more than 20 minutes, and there are characteristic changes on the electrocardiogram (ECG) that can be traced during and after the MI (Julian & Cowan, 1992; Tunstall-Pedoe, 1997). The MI may be fatal, but if the person survives the first few minutes, the risk of death recedes over the hours and days following the MI. For research purposes, the MI is known as an 'objective' event, because it is verifiable by medical practitioners. That is, the electrocardiogram and other investigations confirm that the MI has taken place. With other types of cardiovascular disease, it is not always possible to verify that the disease is present, and the diagnosis may be made on the basis of the symptoms that a patient reports to the doctor. This can happen with angina pectoris, another of the CHD syndromes.

1.3 Angina Pectoris

Angina pectoris, often known simply as angina, is a pain or discomfort in the chest, and sometimes in the jaw or arm, caused by a temporary shortage of blood supply to the heart (Julian & Cowan, 1992). The term 'angina' refers to the symptoms, but the condition is usually only diagnosed if there is sufficient cause to believe the pain is caused by coronary

atherosclerosis and reduced oxygen getting to the heart (Henderson, 1996). The pain is almost always brought on by physical effort (Tunstall-Pedoe, 1997). The diagnosis of angina is often based primarily on the patient's report of symptoms and the description of the onset and nature of the pain (Maseri, 1995). Further investigations can be carried out to verify the diagnosis, but these are expensive and carry some risk, so in most research studies, it is not warranted to follow up reported angina in this way. Therefore, the diagnosis of angina is more 'subjective' than the diagnosis of MI, because it depends so heavily on a person's report of their symptoms. The distinction between objective and subjective diagnosis is important, because some personality traits are associated with the perception of pain (e.g., Matthews, Deary & Whiteman, 2003). Therefore, the personality pattern of risk for objective versus subjective CHD diagnoses may be quite different.

1.4 Other Cardiovascular Diseases

A build-up of atherosclerosis can occur widely throughout the body. Strokes, for example, may occur because of a build-up of atherosclerosis in the arteries of the neck or brain that then causes an insufficient supply of blood flow and oxygen to one part of the brain. The arteries of the legs may also become partially blocked. If the atherosclerosis in the legs is severe enough to cause a shortage of oxygen to leg muscles then the affected person may experience pain when walking, particularly if walking quickly or uphill. Atherosclerosis in the legs can be measured using the ratio of leg blood pressure to arm blood pressure (ABI, or ankle-brachial index) (Fowkes et al., 1991). The extent of atherosclerosis in the arteries in the neck (carotid arteries) can also be assessed non-invasively, using special ultrasound scanners. The measurement is of the width of the artery (or 'intima'), so the shorthand is 'carotid IMT' (carotid intima-media thickness).

1.5 Risk Factors

Some people are at higher risk of developing CHD than others. Intensive research into the causes of CHD has identified several, now quite well known, risk factors. Three of the main risk factors for CHD are high blood pressure, high cholesterol levels in the blood, and smoking; additional factors are diet, obesity, diabetes, social class and family history of CHD (e.g., Pearson et al., 2003). In addition, men are at a higher risk than women up until the age of about 55, and the risk of CHD rises as a person gets older (e.g., Tunstall-Pedoe, 1997). Despite this improvement in our understanding of risk factors and preventive treatments, it has proved impossible to explain every case of CHD on the basis of these 'traditional' risk factors, and personality has been identified as another contributing factor (e.g., Miller, Smith, Turner, Guijarro & Hallet, 1996). However, because the evidence is so strong for the traditional factors, it is often necessary to use statistical techniques to take account of these factors before estimating the impact of personality that is 'independent' of the well known risk factors. All the studies I will describe in this chapter will have taken account of at least some of the traditional risk factors when examining the relationship between personality and CHD. Some of the complications of statistical adjustment in relation to socioeconomic status will be discussed in Section 4.

1.6 Section Summary

Cardiovascular diseases result from atherosclerosis in heart or other arteries in the body. The most widely known manifestation of coronary heart disease (CHD) is myocardial infarction, or heart attack. This is a diagnosis that is verifiable by medical practitioners; that is, it is an 'objective' diagnosis. Angina, or intermittent chest pain caused by atherosclerosis and insufficient oxygen to the heart muscle on exertion, is another common manifestation of CHD. For research purposes, this is sometimes referred to as a 'subjective' diagnosis, because it can be diagnosed on the basis of the symptoms alone, without further verification by medical practitioners. The extent of leg artery atherosclerosis can be verified objectively by using a simple index of blood pressure in the leg and arm (the ABI). The extent of disease in the carotid arteries can also be assessed non-invasively by measuring the intima-media thickness (IMT). These various types of cardiovascular diseases have all been examined in relation to personality, and the results suggest that hostility is another risk factor for CHD, in addition to well-established risk factors such as high blood pressure, high cholesterol levels and smoking. It is to the personality trait of hostility that I turn next.

2. PERSONALITY TRAITS: HOSTILITY

Personality, or 'an individual's characteristic patterns of thought, emotion, and behaviour' (Funder, 2001, p. 2), for the purposes of CHD research, can be thought of in terms of major, broad traits, such as the 'Big Five' of neuroticism, extraversion, openness, agreeableness and conscientiousness (e.g., Costa & McCrae, 1987), or in terms of narrower 'facets' or aspects of those broad traits, such as hostility or anger. There is broader agreement over the definition and measurement of the Big Five traits (Matthews et al., 2003) than on hostility and anger. The different ways of defining and measuring hostility and anger have made it somewhat difficult to make sense of the findings on the relationship between these traits and CHD (e.g., Miller et al., 1996), and some studies have begun to use the Big Five as an additional measure to try to overcome this (e.g., Smith & Williams, 1992; Whiteman, Deary & Fowkes, 2000). Nonetheless, careful analysis of the pattern of relationships across many studies has shown that outwardly expressed hostility is related to the risk of a first MI, while more inwardly focused 'neurotic' hostility is related to more subjective CHD diagnoses such as angina (Miller et al., 1996) as well as to other bodily symptom reporting (e.g., Stone & Costa, 1990; Matthews et al., 2003). The particular instrument used to measure hostility or anger makes a difference. Why?

2.1 Hostility and Related Concepts

Hostility has several components, which may include a negative attitude towards others, cynicism and mistrust of others' motives (a belief that they will be hurtful) and an evaluation of others as mean, non-social and dishonest (Barefoot, 1992; Eckhardt, Norlander & Deffenbacher, 2004; Whiteman, Fowkes & Deary, 1997). These attitudes and cognitions may then predispose a person to anger, an intense emotion that is coupled with physiological