A CONFLICT-THEORY APPROACH TO UNDERSTANDING ADOLESCENTS' HEALTH BEHAVIOUR

Thesis submitted for the degree of

Doctor of Philosophy

at the University of Leicester

by

Frederick Kanayo Amaechi Umeh BSc (Hons) (Nigeria)

Department of Psychology

Nene College

February 1998

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ACKNOWLEDGEMENTS

I would like to express sincere gratitude to my supervisor, Dr Gillian Penny, for her constant guidance and support during my period of registration as a full-time PhD student. Sincere thanks also to Dr Jim Robinson, my external supervisor. Both supervisors shed light on numerous theoretical and empirical problems which formed the basis of many interesting and lively discussions, and pushed me ahead when my mind was dominated by doubt. I am grateful to Dr Penny and Dr Julia Bush who, after that interview in the spring of 93, offered me the opportunity to study for my doctorate.

This project would simply not have happened without the enthusiastic involvement of the staff and students of Kingsthorpe Upper School. Thanks to Mr Maw (the head teacher) and also John, Andy and Bob (teachers) for letting me disrupt school lessons/activities in order to conduct interviews and distribute questionnaires. I shall never forget the warmth, friendliness and discipline of the boys and girls who actually took part.

Special thanks to those academics who, despite their busy schedules, made time to chat with me about my work. Dr Ruchira Leisten, Dr Kevin Buchanan, Dr Peter King and Dr Adina Lew were always willing to talk and all offered useful advice. I am grateful to Dr Peter King for boosting my spirits during those many lonely weekends I spent at college, working on my thesis.

I thank Professor Andrew Steptoe for reading an early draft of my thesis and drawing my attention to key publications, and Professor Howard Leventhal for our brief but lively discussion about conflict-theory at the BPS SGHP Conference (Bristol, 95).

An important part of my work involved the use of psychometric instruments. Special thanks to Professor Leon Mann for sending the Flinders Questionnaire, Professor Ralf Schwarzer (Self-efficacy scales), Professor Susan Folkman (Ways of Coping Questionnaire), Dr Paul Norman and Dr Mark Conner (Health Questionnaire) and Dr Charles Carver (COPE Questionnaire). I am grateful to Janis Lord for her help with preparing diagrams. Big thanks to fellow PhD student, Ghulam Nabi, for his patient and constructive criticism of my work.

Finally, I am heavily indebted to my girlfriend, Donna Johnson (Baby girl!), who over the years endured my mood swings, believing strongly in my abilities to transcend the intellectual limits I had set for myself. The thesis would not have been complete without the patience of Michael Pickering, my landlord, who was very understanding of my financial difficulties. Special thanks to Charlie Mullin, Keith Walmsley, and Pravin Parmar, the psychology technicians who readily came to my assistance during numerous computer 'crashes' that threatened the timely completion of the thesis. Last but not least, I am thankful for the encouragement offered by my parents, brothers, and friends, and also staff and students at the Nene College research center and Psychology Department of the University of Central Lancashire.

I dedicate this to my parents,

Eric (snr) and Beatrice,

and my brothers,

Eric (jnr) and Chuks.

ABSTRACT

The relationship between adolescents' health decisions and their coping reactions to threat has been the focus of some empirical research. A relevant theoretical perspective is the Conflict-Theory Model (Janis, 1983) which specifies several modes by which people cope with threat, including vigilance (objective appraisals), defensive avoidance (evasion of anxiety) and hypervigilance (panic). Developed to explain adult decision making, Conflict-Theory postulates were applied to health decisions in adolescents, thus extending the model to a new population.

Conflict-Theory proposes that coping styles moderate relations between health beliefs and decisions, such that perceptions of threat and response-efficacy better predict health decisions in persons high on vigilance, or low on defensive avoidance or hypervigilance. These postulates were tested in a large-scale cross-sectional survey (Umeh, in press). The study involved 885 adolescents (aged 13-17 years) and focused on several important health behaviours (substance use, regular exercise, dietary fat consumption, unsafe sex).

There was little evidence that dispositional coping styles moderate relations between health beliefs and decisions. Beliefs about the efficacy of using protection during sexual intercourse predicted intentions to have unprotected sex as a function of vigilance. However, the pattern of this moderator effect contradicted Conflict-Theory postulates: efficacy beliefs better predicted intentions in participants low on vigilance. There was no evidence that relations between health beliefs and decision are affected by levels of defensive avoidance or hypervigilance. Each coping style predicted intentions to exercise regularly and (vigilance only) have unprotected sex, independent of health beliefs.

Conflict-Theory also proposes that high levels of vigilance relate to low levels of health risk-taking, whereas high levels of defensive avoidance and hypervigilance relate to high levels of health risk-taking. These postulates were

tested in a secondary survey focusing on cigarette use (using a subsample of 104 participants from the main study). Coping patterns were associated with health risk-taking in accordance with Conflict-Theory.

Overall, there was no evidence that the proposed role of coping styles in belief-decision relations apply to adolescents. However, there was some evidence for vigilance as a moderator, and coping styles as predictors of decisions irrespective of health beliefs. Coping also relates to health risk-taking. Overall, the importance of Conflict-Theory coping styles in adolescents' health decisions, whether as moderator or predictor variables, varies across coping constructs and health behaviours.

PUBLICATIONS/CONFERENCE PAPERS

(1) Umeh, K.F. (in press) Coping styles as moderators of cognition-decision relations amongst adolescents. *Psychology and Health.*

(2) Umeh, F.A.K. (1997) Adolescent health beliefs and behavioural intentions: The moderating role of dispositional coping styles. *Proceedings of the British Psychological Society*, 5(1), 16-17.

(3) Umeh, F.A.K. (1997) Threat coping patterns and risk-taking in adolescents. *Proceedings of the British Psychological Society*, 5(1), 60.

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CHAPTER ONE

AN OVERVIEW OF THE THESIS

1.1 INTRODUCTION

Macfarlane and McPherson (1993) concluded their brief review of threats to adolescent health with the assertion, "The motivations behind [teenagers'] risk-taking behaviour is highly complex at any age. The gap between teenagers' knowledge - which is often good - about what endangers their health, and how they use this knowledge is largely uncharted territory" (p.19). This view reflects the growing interest, over the past decade or so, in the role of psychological factors in adolescents' health decisions (see review by Nutbeam & Booth, 1994).

Health psychologists recognise that many health-damaging behaviours observed in adults have their origins in adolescence, a period characterised by rapid and often traumatic physical, cognitive and social development that brings about a feeling of indestructability and a predisposition for risk taking (Nutbeam & Booth, 1994; Macfarlane & McPherson, 1993). Epidemiological research has revealed considerable variation in adolescents' performance of various health behaviours (*The Health of the Nation*, 1993; Jacobsen, Smith & Whitehead, 1991). Other research has shown that a variety of factors are important in differentiating between adolescents who do, and those who do not, perform specific health behaviours. These include cognitive factors, such as knowledge and health beliefs; social factors, for example peer and family pressures; demographic factors including age, gender and social class; emotional factors, such as fear and anxiety; factors relating to access to medical care, for example having a family doctor; and personality factors, including neuroticism (see reviews by Nutbeam & Booth, 1994; Conner & Norman, 1996; Norman & Conner, 1996).

The role of cognitive factors, particularly health beliefs, in health-related decisions has generated a great amount of research (see reviews by Adler & Matthews, 1994; Van der Pligt, 1994; Sheeran & Abraham, 1996; Boer & Seydel, 1996; Schwarzer & Fuchs, 1996). There are two reasons for this interest. First,

cognitive processes are assumed to be proximal determinants of health decisions and mediate the influences of other nonpsychological factors such as demographic variables and aspects of the micro-social environment (e.g., family, peers). Secondly, perhaps more importantly, cognitive variables are more amenable to change than the factors which they mediate, an important quality for health promotion (Conner & Norman, 1996).

Most adolescents are cognisant of the major health threats (Rimberg & Robin, 1994), and believe that their lifestyle affects their health (Steptoe & Wardle, 1992). Despite these health beliefs, many teenagers continue to engage in health-risky activities, such as smoking and having unprotected sex.

This apparent discrepancy between health beliefs and decisions has prompted interest in the role of other psychological processes, in particular, motivational factors (Eiser & Van der Pligt, 1988; Eagly & Chaiken, 1993; Van der Pligt, 1994). *Threat coping patterns* have been strongly implicated in health decisions (see review by Eagly & Chaiken, 1993). For example, the reluctance of many adolescents to take steps to protect their health has been attributed partly to their *denial* of personal risk (Gladis, Michela, Walter & Vaughan, 1992; Nutbeam & Booth, 1994). Social psychologists have long recognised that threat can generate strong emotional reactions. Health-related issues in particular may provoke anxiety due to their personally threatening contents. Such emotional forces can motivate a variety of cognitive, emotional and behavioural coping responses, with significant implications for health decisions (see reviews by Sutton, 1982; Eagly & Chaiken, 1993; Van der Pligt, 1994).

A relevant theoretic framework is Janis and Mann's (1977a) Conflict-Theory model. This framework offers testable postulates about how different styles of coping with threat - vigilance (objective information search and appraisal), defensive avoidance (evasion of anxiety) and hypervigilance (panic-like and

impulsive behaviour) - interact with health beliefs - perceptions of response-efficacy (cognitions about the effectiveness of a protective behaviour in reducing threat), and threat (cognitions about the seriousness of threat, and ones vulnerability to threat) - to enhance or diminish the strength of associations between health beliefs and decisions. The model also makes predictions about the relations between each threat coping pattern and health risk-taking.

Developed to explain adults' decision making, this project aimed to apply Conflict-Theory postulates to health decisions in adolescents, extending the model to a new population. There is some evidence to suggest that Conflict-Theory coping styles can inform our understanding of health decisions among this age group (e.g., Burnett, Mann & Beswick, 1989).

1.2 STRUCTURE OF THE THESIS

The project comprised one main investigation (Umeh, in press) and a secondary study. The main study tested the validity of Conflict-Theory postulates about the role of threat coping patterns as moderators of relations between health beliefs and decisions. The secondary investigation examined postulates concerning relations between coping patterns and health risk-taking.

The thesis is divided into six Chapters. *Chapter* 1 provides a brief overview, *Chapter* 2 comprises the main introduction, *Chapter* 3 constitutes the literature review, *Chapter* 4 covers the main investigation of the project (i.e., methodology, results, discussion), *Chapter* 5 reports the secondary study, while *Chapter* 6 presents an overall summary of the research and considers its main implications and conclusions.

Chapter 2 begins by considering the nature of adolescence, and reviewing the epidemiological data which indicates a disturbing prevalence of health-damaging lifestyle activities amongst adolescents. The health behaviours considered in this

project have been identified as areas of public health priority where research would have significant benefits for public health (Jacobsen *et al*, 1991). They are cigarette smoking, alcohol consumption, dietary fat consumption, having unprotected sex, drug use and physical exercise. It is these behaviours that are the focus of the main study. Given the existing large body of epidemiological data on adolescent health behaviours, it was deemed sensible to focus on data from the UK and the USA. However, where available, data from continental European countries are also considered.

Following this, factors are considered which have been implicated in adolescents' health decisions, starting with general factors (demographic, social, and environmental variables) and moving on to cognitive variables (knowledge, attitudes, cognitions) and threat coping patterns, notably denial of vulnerability.

The relevant background literature on the role of threat coping patterns in health decisions is considered, notably the Yale researchers Fear-Drive Model (Hovland *et al*, 1953), and Family-of-Curves Model (Janis, 1967), Leventhal's (1970) Parallel-Response Model, cognitive consistency perspectives (Abelson, 1968; Festinger, 1957) and Protection Motivation Theory (Rippetoe & Rogers, 1987). Conflict-Theory (Janis & Mann, 1976) is introduced as a relevant theoretic framework, with descriptions of its specified coping styles (vigilance, defensive avoidance, hypervigilance), their mediating cognitions, and characteristic information preferences. Finally, Conflict-Theory predictions about the implications of vigilance, defensive avoidance and hypervigilance for decision making are outlined.

Chapter 3 critically reviews studies which have tested the validity of Conflict-Theory postulations in relation to health-related decisions. This review identifies a number of problems with the existing literature, the main issues being that existing studies employed largely adult subjects (aged over 20 years) and focused on coping

styles as mediators belief-decision relations. Thus little is known about applicability of coping patterns to *adolescents*' health decisions, particularly as *moderators* of relations between health beliefs and decisions. This is considered a crucial gap given that previous studies relating health beliefs to decisions in adolescents have yielded mixed results (e.g., Rise & Holund, 1990; Fruin *et al*, 1991; Abraham *et al*, 1994, 1996). The Chapter ends by presenting the rationale for expecting Conflict-Theory postulations to be applicable to adolescents, and then specifying research questions and hypotheses.

Chapter 4 reports the methodology, results and discussion of the main investigation (Umeh, in press). This study tests, in a sample of over 800 adolescents, and with respect to several health-related lifestyle factors, Conflict-Theory predictions concerning coping styles as moderators of belief-decision (intention) relations. The study is based on a questionnaire survey design and employs measures developed by one of the original proponents of Conflict-Theory, Professor Leon Mann.

Chapter 5 reports the secondary study which examines, in over 100 teenagers (a subset of participants from the main study), Conflict-Theory postulations regarding relations between coping styles and health risk-taking. The study was based on a combined interview and survey design and focused on adolesents' responses to the health threats posed by cigarette smoking.

Chapter 6 summarises the methodology of the two studies, and then spells out the main conclusions of the project. Findings from the main study offer no support for Conflict-Theory postulates. Nonetheless, there was some evidence that coping behaviour (i.e., vigilance) moderates belief-decision relations, albeit in the opposite direction to that suggested by Conflict-Theory. Furthermore, results from the secondary study show that the coping constructs incorporated in the model relate to health risk-taking. Specific issues are identified which might explain the

weaknesses of the models' postulates, and hence suggest how these predictions can be modified to enhance their external validity.

CHAPTER TWO

INTRODUCTION

2.1 ADOLESCENCE: A PERIOD OF HEALTH RISK

Adolescence is a period in the lifespan characterised by major physical, cognitive and social changes that mark the transition from childhood to adulthood. In many western countries, this period is generally marked by the onset of puberty (about 10.5 and 12.5 years for girls and boys respectively) and 'terminated' at around the point (about age 19) when the individual becomes economically independent, perhaps commencing a vocation (Nutbeam & Booth, 1994). For the purpose of the present project, the age period from 10 to 19 years will be used as a broad definition of adolescence.

2.1.1 Developmental factors

The developmental changes which characterise adolescence directly or indirectly predispose them to avoidable and unnecessary risk-taking behaviours, making adolescent health a special area of interest (Nutbeam & Booth, 1994). Cognitive function develops rapidly in adolescence, enabling the individual to engage in abstract and hypothetical thinking and reasoning, generating and testing out ideas and options, in order to find workable solutions to various threats and challenges confronted (Irwin & Millstein, 1986). Since teenagers lack personal experience in living, their reasoning may be superficial, failing to take adequate account of genuine dangers and risks (Van der Pligt, 1994). This may be characterised by a "personal fable", that is, a sense of personal immortality and omnipotence, that leads to increased risk-taking (Elkind, 1967).

2.1.2 Epidemiological data

There is abundant evidence that adolescents take serious risks with their health as compared with adults and younger children (e.g., Gardner, 1993; Wordarski, 1990; Bury, 1991; Read, Harveywebster & Usinger-Lesquereux, 1988). In the mid 1980s,

the major causes of premature mortality amongst 15- to 24-year olds were accidents (53.5%), suicides (13.5%), and homicides (10.7%), outcomes which are closely related to behavioural decisions (Gardner, 1993). Activities such as cigarette smoking, alcohol use, drug use, dietary fat consumption, unprotected sex and physical inactivity have been identified as adolescent behaviours which have significant implications for future health (Jacobsen *et al*, 1991).

Cigarette smoking. Nelson, Giovino, Shopland, Mowery, Mills and Eriksen (1995) assessed trends in adolescent smoking from 1974 through to 1991, using data from three nation-wide surveys conducted periodically from 1974, in the USA. Overall, smoking prevalence declined much more rapidly from 1974 to 1980 than from 1985 through to 1991. However, recent research suggests over one-half of US adolescents have smoked tobacco at least once (Stevens, Whaley, Youells & Linsey, 1995). There are no nation-wide statistics on adolescent smoking in Britain. However, an *Office of Population Censuses and Surveys* (1994) study revealed that up to 12% of the pupils (aged 11-15) in England, 9% of those in Wales and 12% of those in Scotland were regular smokers (i.e., at least one cigarette per week). These levels reflect little change from previous surveys (*The Health of the Nation*, 1991; *Office of Population Censuses and Surveys*, 1992). An earlier survey (see Aaro *et al*, 1986) found similar trends in several European countries.

Alcohol consumption. Most adolescents have consumed alcohol at least once. In the USA, the "Monitoring the Future" surveys indicate that between one-third and half of high school students report a pattern of consumption that can be described as "heavy drinking" (see review by Swadi, 1992). In Britain, unlike the USA, there are no national statistics on adolescent drinking. However, in one *Office of Population Censuses and Surveys* (1992) study, almost one in ten adolescent (aged 11-15) drinkers in England, 13% in Wales, and 15% in Scotland, had drunk at least 15 units (one unit being equivalent to half a glass of wine), in the preceding week.

Among 15-year olds, up to 20% of boys in England drank 15 units or more, the corresponding figures being 33% and 28% for Wales and Scotland respectively.

Dietary habits. Surveys suggest excessive consumption of diets with elevated fat and sugar contents (Davidson, Hayek & Altschul, 1986; French *et al*, 1994) and low adherence with public health diet recommendations (Read, Harveywebster & Usinger-Lesquereux, 1988) amongst US adolescents. There is little or no regular information on the dietary habits of adolescents in the UK. Nonetheless, a survey of 10-14 year olds in Britain in 1983 indicated that childrens' diets were not as healthy as those of adults and that the average proportion of energy calories accounted for by fat was 37-39%. About one-third of children derived more than 40% of their energy from fatty foods (Jacobsen *et al*, 1991). More recently, a review of British studies on the nutrition habits of school children revealed that young people consume diets often high in fat and refined carbohydrates (Bull, 1992).

Exercise. Recent research suggests that while most adolescents appear to get adequate levels of exercise (i.e., up to three 20-minute sessions weekly), many do not (Marti & Vartiainen, 1989; French, Perry, Leon & Fulkerson, 1994; Steptoe & Wardle, 1992). Nutbeam *et al* (1989) reviewed the results of a WHO survey which assessed exercise habits of school children from Norway and Wales. Overall, there was a generally low level of physical activity. In Norway, for example, exercise levels of 30 minutes or less per week were reported by 24%, 23% and 22% of boys and 26%, 22% and 20% of girls with an average age of, respectively, 11.5, 13.5 and 15.5 years. Thus, while most teenagers appear to be sufficiently active (i.e., 30 minutes or more exercise per week), a significant sub-group appears to be getting little or no exercise.

HIV/AIDS-related contraceptive use. In Britain, 49% of the female cases and 38% of the male AIDS cases were in the 25 to 34 year age group, suggesting that seroconversion occurred in more than a third of cases aged 15-24 years, given the

lengthy HIV to AIDS incubation period (median=9 years). In southern Europe, two-thirds of all HIV cases are among people aged 18-24 years (Graham, 1994). Graham (1994) summarises the mostly worrying findings from a large number of studies on condom use among adolescents. These investigations have shown (1) reduced rates of condom use among older adolescents, (2) reduced rates of condom use among those with multiple sex partners or with more regular partners, and (3) rates of "last occasion" use of condoms between 30-60%, but consistent condom use will tend to be much lower. Bury (1991) also documents evidence indicating that contraceptive use in teenagers is inconsistent with some studies suggesting that the majority of adolescents do not use contraception regularly.

Drugs. Nation-wide surveys carried out in the USA since 1975 reveal a pronounced increase in the use of cocaine amongst adolescents (see review by Swadi, 1992). In Britain, there are no nation-wide data about adolescent drug use. However, a series of surveys up till 1992 (*Office of Population Censuses and Surveys*, 1992) provide some useful data from various parts of the UK. In general, about 5-20% of school aged children in Britain have tried a drug, with 2-5% using drugs weekly or more often (see review by Swadi, 1992). The *Office of Population Censuses and Surveys* (1992) study showed that 1% of pupils in England currently used drugs while 4% had done so in the past. The equivalent proportions were similar in Wales but higher in Scotland, where about 2% were current users and up to 7% had done so in the past. Swadi (1992) states that up to 5% of teenagers in the USA may be described as "dependent" and it is only a matter of time before British rates reach similar levels.

2.1.3 Summary

Adolescence in western countries is a period marked by rapid and dramatic social, cognitive and physical changes that predispose teenagers to risk-taking. Recent

epidemiological data suggests disturbing trends in adolescents' performance of risky behaviours such as cigarette use, alcohol consumption, drug use and dietary fat consumption. Risky behaviours adopted in adolescence may persist into adulthood with significant implications for health. Not surprisingly therefore, adolescence is a period of special interest in the study of health and health behaviour. The following section considers factors which have been implicated in adolescents' health-related decisions.

2.2 FACTORS IMPLICATED IN ADOLESCENTS' HEALTH DECISIONS

A variety of factors have been implicated in adolescents' health-related decisions (see reviews by Conrad, Flay & Hill, 1992; Nutbeam & Booth, 1994; Irwin & Millstein, 1986), including demographic variables such as age, social class, gender (e.g., Cohen, Brownell & Felix, 1990), previous behaviour (e.g., Fruin *et al*, 1991), social factors, for example parental and peer pressure (e.g., Eiser, Morgan, Gammage & Gray, 1989), emotional factors including fear and anxiety (e.g., Van der Pligt & Richard, 1994) and cognitive factors, for example knowledge, health beliefs (e.g., Brandon & Baker, 1991). Of these, the role of cognitive factors has been of special interest to health psychologists. Knowledge and beliefs are thought to mediate the influences of other factors and, perhaps more importantly, can be modified with a view to changing health behaviour (Conner & Norman, 1996).

2.2.1 Cognitive factors

Knowledge. Studies have shown that, in general, most adolescents are aware of the major health risks, such HIV/AIDS, cardiovascular disease and cancer (see Memon, 1990; Modeste, Francis & Matshazi, 1994; Bagnall & Plant, 1991; Abraham, Sheeran, Abrams, Spears & Marks, 1991; Sutton, 1992; Rimberg & Lewis, 1994). Most teenagers have fairly accurate knowledge of the health risks associated with

important behavioural risk factors like cigarette smoking, drug use and unprotected sex, whether or not they have engaged in these behaviours (e.g., Sutton, 1992; Abraham *et al*, 1991; Wardle & Steptoe, 1991).

For example, Wardle and Steptoe (1991) found that almost the entire sample of 419 UK students (aged about 19 years) was aware that smoking was related to lung cancer, that dietary fat was linked to heart disease, and that exposure to the sun could lead to skin cancer. Other important behaviour-health links such as smoking for heart disease and alcohol for high blood pressure, were known by considerable proportions of the sample (60.5% and 62.3%). Memon (1990) reviewed 10 studies published between 1988 and 1990 in the UK on young people's knowledge and cognitions about HIV and AIDS and found that the surveys, conducted in different parts of the country, showed that most young people were aware of the major transmission routes. McNeil (1992) considered a large scale study on the smoking habits of school children and concluded that an overwhelming majority of adolescents knew about the health risks of cigarette use.

There is compelling evidence that adolescents' risk awareness is not related to their health behaviour (e.g., Botvin, Baker, Tortu, Dusenbury, & Gessula, 1989; Kraft, 1993; Bastiaens, 1995; Modeste, Francis & Matshazi, 1994; Rimberg & Lewis, 1994; Morrison, Baker & Gillmore, 1994; Rosenthal, Hall & Moore, 1992).

Steptoe and Wardle (1992), for example, examined the relevance of risk awareness in relation to the prevalence of health behaviours (dietary fat avoidance, regular exercise, smoking and alcohol consumption) and the performance of these behaviours among 7153 adolescents and young adults (mean age=19 years) from eight European countries. Levels of knowledge about the health problems medically linked with each behaviour varied considerably across countries, with levels being especially high in Western countries (e.g., Germany, England, Ireland, Spain). Risk awareness showed no significant relationship with the prevalence of

smoking and exercise. The cross-country correlation between risk knowledge and alcohol consumption was significant, but contradictory to the expectation that drinking would be more common in countries where risk awareness was low. When risk awareness was used to predict the performance of behaviours, the results were mixed. A simple model would suggest that risk knowledge would be greater among those practising a healthy option. However, this pattern was observed only for fat avoidance. The results for smoking and alcohol consumption showed significant inverse relations between knowledge and behaviour. Risk awareness failed to predict exercise behaviour. Steptoe and Wardle concluded that knowledge was not a deterrent to smoking or drinking nor a promoter of physical activity.

Beliefs. A variety of health beliefs have been applied to adolescents' health decisions. These include vulnerability (perceived susceptibility to health threats), severity (perceived seriousness of health threats), response-efficacy (perceived effectiveness of preventive action in reducing threat) and self-efficacy (perceived control over performance of behaviour) (Conner & Norman, 1996).

Research suggests that many adolescents hold 'appropriate' health beliefs (e.g., Sutton, 1992; Steptoe & Wardle, 1992; Abraham, Sheeran, Abrams & Spears, 1994). For example, most adolescents acknowledge the life-threatening quality of well known health problems such as heart disease, cancer and AIDS, leading to a consensus regarding the severity of these conditions. Abraham, Sheeran, Spears and Abrams (1992) found that 80% of 351 adolescents thought that between one half and all of those infected with HIV develop AIDS and 70% thought most, almost all, or all those with AIDS died due to the disease. This pattern has been observed in other research on HIV/AIDS in adolescents (Abraham *et al*, 1994, 1991; Sheeran & Abraham, 1996).

The majority of adolescents acknowledge the link between well-known behaviours like smoking, drinking, fat consumption and use of seatbelts, and health

risks (Wardle & Steptoe, 1991; Steptoe & Wardle, 1992). For example, Steptoe and Wardle (1992) found that 7153 young people were broadly convinced that lifestyle (avoiding dietary fat, not smoking cigarettes, not drinking too much alcohol and taking regular exercise) was relevant to health. Across eight countries, most mean ratings on a scale from 1 (low importance) to 10 (high importance) were above 6. Sutton (1992) found that 92% of adolescents in a large scale study reported that they would be less likely to "feel really healthy" if they smoked regularly at the age of 15 than if they didn't smoke, 87% indicated that they would be more prone to "start to get lung cancer", and 79% reported that they would be more likely to "get out of breath". Sutton concluded that "There wasn't much evidence for the view that young people do not appreciate the health risks of cigarette smoking" (p.22).

Like knowledge, there is convincing evidence that adolescents' attitudes and cognitions are not always related to their health behaviour (see review by Heaven, 1996). For example, studies have found no relations between preventive intentions/behaviour and severity beliefs (Arnold & Quine, 1994; Wurtele & Maddux, 1987; Abraham *et al*, 1992, 1994), vulnerability cognitions (Rogers & Mewborn, 1976) and efficacy of behaviour (Wurtele & Maddux, 1987; Fruin *et al*, 1991).

2.2.2 Threat coping patterns

How adolescents cope with threat has been implicated in their health decisions. In particular, the reluctance of many teenagers to protect their health is often attributed to their *denial* of vulnerability to health risks (e.g., Moore & Rosenthal, 1992; Gladis, Michela, Walter & Vaughan, 1992; Moore & Rosenthal, 1992). It has been suggested that this phenomenon could account for some of the negative findings in the literature when empirical tests fail to document associations between health

belief and decision measures (e.g., Joseph, Montgomery, Emmons, Kirscht, Kessler, Ostrow, Wortment & O'Brien, 1987).

Indeed, some research has shown that adolescents do underestimate their susceptibility to major health threats like AIDS, heart disease and cancer (Moore & Rosenthal, 1992; Whalen, *et al*, 1994). For example, Whalen *et al* (1994) conducted a comprehensive study to determine: (a) whether adolescents, like adults, see themselves as relatively invulnerable to health and environmental risks, and (b) the degree of differentiation in adolescents' risk judgements across an array of health and environmental risks. Participants were 244 sixth-grade adolescents aged from 10 to 13 years. Results showed that these individuals underestimated their own chances of confronting a wide array of risks, including AIDS, heart attack, cancer, allergies, broken bone, toxic waste, chemicals in food and air pollution. For the health problems, participants were most prone to deny vulnerability to AIDS, cancer and heart disease. These trends did not change much when the adolescents were asked questions by means of a private interview instead of a group administered questionnaire.

Denial of personal vulnerability to health (and other) risks has generally been construed as a means of *coping* with the anxiety and worry presumably generated by threat (Van der Pligt, Otten, Richard & Van der Velde, 1993; Van der Pligt, 1994; Bauman & Siegel, 1987; Rippetoe & Rogers, 1987; Van der Pligt & Richard, 1994). In adolescents, such minimisation of personal risk seems consistent with the continual bombardment of warnings and messages about a wide range of environmental and health risks, threats which most adolescents are prone to be concerned about (Ollendick *et al*, 1994; Heaven, 1996).

For over four decades, social psychologists have recognised that threat can generate, in addition to cognitive responses, strong emotional reactions. Health-related messages, in particular, may generate fear and anxiety simply by

virtue of their personally threatening contents. Indeed, it has been argued that health warnings concerning such issues as cancer and heart disease, arouse at least some degree of emotional tension in most people (Hovland, Janis & Kelley, 1953). Psychologists also recognise that the emotional forces evoked by threat can motivate a variety of cognitive, emotional and behavioural coping responses, with significant implications for decision making (see reviews by Sutton, 1982, 1992b; Eiser & Van der Pligt, 1988; Eagly & Chaiken, 1993; Van der Pligt, 1994). For example, knowledge and/or perception of threat may result in coping responses (e.g., denial of personal vulnerability) which protect the individual from the perceived threat without generating threat-reducing behaviour (Abraham *et al*, 1994).

The role of different threat coping styles in adolescents' health-related decisions has been the focus of several studies (e.g., Wills, 1986; Gladis *et al*, 1992; Abraham *et al*, 1994; Fruin *et al*, 1991). For example, Abraham *et al* (1994) examined the relationships between adolescents' HIV-related cognitions (e.g., perceived susceptibility to HIV/AIDS, perceived severity of HIV/AIDS, perceived condom efficacy), motivation to engage in HIV-preventive behaviour (e.g., intentions to use condoms, intention to limit partners), and use of several threat coping patterns, including wishful-thinking (e.g., "If I caught the AIDS virus it would not be long before a cure is found") and denial (e.g., "No matter what precautions you take you might still get the AIDS virus"). Both cognitions and intentions were related to coping styles. For example, perceived condom efficacy predicted higher levels of wishful-thinking, and denial predicted lower intentions to use condoms! Wills (1986) observed relations between teenage substance use and use of 'distraction coping' (e.g., "Try to put the problem out of your mind"), 'behavioural coping' (e.g., "Something to try to solve the problem"), and 'cognitive coping' (e.g., "Try to see the problem in a different light"). Higher levels of substance use were related to

greater levels of distraction coping, and lower levels of behavioural and cognitive coping.

Overall, the findings of these studies support the view that how adolescents cope with threat is relevant to understanding their health-related decisions.

2.2.3 Summary

Adolescents' health decisions are determined by a wide variety of factors, including cognitive factors and threat coping patterns. Cognitive factors are thought to mediate the effects of other factors, and can be modified with a view to changing health behaviour. Many teenagers continue to engage in risky behaviour, despite being aware of the relevant health risks, and believing that their lifestyle affects their health. Coping patterns have been implicated in the discrepancy between adolescents' health beliefs and decisions. For example, failure to take health-protective steps, in the face of threat, has been partly attributed to denial of personal vulnerability.

2.3 THREAT COPING FACTORS IN HEALTH DECISIONS: THEORETICAL BACKGROUND

The view that threat elicits a variety of cognitive, emotional and behavioural coping responses that impinge on decision making is central to two broad theoretical traditions; the reinforcement perspective of the Yale Communication and Attitude Change Program (e.g., Janis & Feshbach, 1953, 1954; Hovland *et al*, 1953; Janis, 1967; Janis & Mann, 1976; see reviews by Sutton, 1982, 1992b; Eiser & Van der Pligt, 1988; Eagly & Chaiken, 1993) and the cognitive consistency perspective

(e.g., Festinger, 1957; Heider, 1958; Abelson, 1968; see reviews by Janis & Mann, 1977a; Eiser & Van der Pligt, 1988; Eagly & Chaiken, 1993)[1].

2.3.1 The fear-drive model

The Yale researchers proposed that failure to take precaution in the face of threat is the motivational consequence of anxiety aroused by threat. Hovland *et al* (1953) formulated a *Fear-Reduction Model* which assumes that fear serves as a drive which provokes trial-and-error behaviour. A reduction in the strength of the fear or anxiety reinforces the learning of any new response that accompanies it. For example, an adolescent who, following condom use during intercourse, experiences a reduction in the level of fear generated by the threat of AIDS, will be motivated to use condoms in subsequent sexual encounters. When confronted with fear-arousing communications or stimuli, people become motivated to experiment with alternative cognitive and/or behavioural responses that seem to be capable of reducing the unpleasant emotional state.

The fear-reduction model suggests that high levels of fear may fail to induce attitudinal and behavioural change because "silent rehearsal" of presumably reassuring recommendations fails to alleviate emotional tension. For example, a teenage smoker who, on becoming aware of the threat of lung cancer, experiences fear and continues to feel anxious even after "thinking about" giving up smoking, is likely to continue to smoke. People respond to fear-arousing messages in a variety of spontaneous and relatively unselective self-protective ways, not solely by contemplating the message's recommended attitudes or behaviour. Responses such as discounting a threat's importance or likelihood of occurrence, or denying its

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[1] Another major theoretical tradition on the role of motivational factors in decision making is the *functional approach* in which attitudes are thought to serve specific personality functions (e.g., value-expression) for the individual. The conceptions of this approach are not directly relevant to the present thesis, but for a review, see Eagly and Chaiken (1993, pp.479-490).

personal relevance, are more likely than the message's recommendation to reduce high emotional tension, and hence be reinforced. Hovland *et al* (1953) believed that such "minimising" responses were common immediate defensive reactions to threat.

They identified three other fear-motivated defensive reactions which inhibit persuasion: (1) the individual receiving the information may fail to pay attention to what is being said or communicated. Inattentiveness may be a motivated effort to avoid thoughts which elicit feelings of anxiety, and may manifest as overt attempts to change the subject of conversation to a less stressful topic: (2) the person may become aggressive toward the communicator for inflicting such an unpleasant ("punishing") experience. Such aggression may take the form of rejecting the communicator's statements: (3) finally, if the anxiety aroused by a fear appeal is not fully relieved either by the reassurances contained in the message or by self-delivered reassurances, "the residual emotional tension may motivate defensive avoidances, i.e., attempts to ward off subsequent exposures to the anxiety-arousing content. The experience of being unable to terminate the disturbing affective state elicited by a discussion of a potential threat can give rise to a powerful incentive to avoid thinking or hearing about it again; this may ultimately result in failing to recall what the communicator said, losing interest in the topic, denying or minimising the importance of the threat" (Janis & Feshbach, 1953, pp.78-79).

2.3.2 Janis and Feshbach's experiment

This idea that fear may motivate defensive behaviours that impede persuasion originally derives from a widely cited study by Janis and Feshbach (1953). Janis and Feshbach began by recognising that when cognitions and attitudes change, learning processes are involved in which motivational processes play an important role. Aspects of public communications can be manipulated in such a way as to

arouse socially acquired motives such as the need for group conformity (Milgram, 1963), achievement (Atkinson & Raynor, 1978), security (Lopes, 1987) and the more emotion-laden drives arising from guilt, anxiety, aggression, and fear. Fear in particular is often aroused in persuasive communications in order to influence attitudes and/or behaviour.

Implicit in the use of "fear appeals" is the assumption that when emotional tension is generated, an audience will become more strongly motivated to accept the reassuring recommendations and cognitions advocated by the communicator. Although defensive reactions such as those identified by Hovland and colleagues (1953) were observed primarily in clinical studies of psychoneurotic patients during psychoanalytic or psychotherapeutic sessions, Janis and Feshbach expected that such reactions occur even among normal persons during, or after, exposure to communications which make them more aware of serious threats of real danger. They designed an experiment to explore the effects of a fear-appeal on persuasion, with particular interest in the potentially adverse outcomes which may result from defensive reactions of the sort identified above.

High school students were presented with one of three communications designed to encourage them to take better care of their teeth. In the "strong appeal" condition, subjects received a lecture emphasising the painful consequences of tooth decay, diseased gums, and other dangers that can result from improper dental hygiene, and illustrated by highly vivid and realistic photographs portraying tooth decay and mouth infections. They were also given gruesome warnings about the dangers of secondary infection. Compared to this, those in the "moderate" and "minimal" appeal conditions were shown photographs of less severe oral pathology, or X-ray pictures and diagrams, and administered a greatly "toned-down" version of the lecture. One of the main features of the strong appeal was the use of personalised threat-references explicitly directed at the audience (e.g., "this can happen to you").

Both the moderate and minimal appeals, on the other hand, described the dangerous consequences of improper dental hygiene in a more factual way, using impersonal language.

Immediately after exposure to the communications, the students were asked questions concerning the feelings they had just experienced (e.g., "Felt worried - a "few times" or "many times" - about own mouth condition"). Their responses showed that the fear stimuli were effective in arousing anxiety: subjects in the strong appeal condition reported feeling more worried about decayed teeth and decayed gums than did those in the other two groups; the moderate group, in turn, tended to feel more worried than the minimal group. Subjects were also assessed on their attitude toward the communication (e.g., "The illustrated talk does a very good teaching job", "The slides do a very good job", "The illustrated talk definitely should be given to Connecticut high schools"). The strong group responded more favourably than the other two groups.

Although these findings suggested greater interest in and acceptance of the communication amongst the strong group, Janis and Feshbach noted that this conclusion applied only to relatively impersonal and objective ratings of the communication. Additional evidence based on questions of a more personal character (e.g., "Was there anything in the illustrated talk that you disliked?") revealed more unfavourable attitudes among the strong group compared to the other two groups. In response to open-ended questions asking for criticisms of the lecture, a higher percentage of the strong group complained about insufficient material on ways and means of preventing tooth and gum disease, suggesting to the authors that the strong appeal created a need for reassurance which persisted after the communication was over, despite the fact that the communication incorporated a large number of reassuring recommendations.

One week later, subjects were assessed on their conformity to the dental hygiene recommendations (e.g., the way they currently brush their teeth, the type of stroke used etc). The greatest amount of conformity was produced by the minimal appeal condition. The strong group (8%) showed reliably less change than the minimal group (36%); indeed, the strong group did not differ significantly from a no-treatment control group (0%), whereas the minimal group showed a significant increase in comformity compared with the control group. Furthermore, the percentage in each group who had followed recommendations to visit their dentist during the week following the lecture were 10%, 14%, 18% and 4% for the strong, moderate, minimal and control groups, respectively.

Subjects' susceptibility to counterpropaganda was assessed by having them read, and indicate their agreement with, a brief statement that contradicted one of the lectures' recommendations - that subjects should use a particular type of toothbrush (i.e., one with "medium hard bristles"). The statement was attributed to a "well-known" dentist and asserted that, despite the claims of "so-called experts", any "ordinary" toothbrush was effective in preventing toothdecay. Using subjects' prelecture agreement with the latter view point as a baseline, it was found that only control subjects were persuaded by this counterpropaganda; the negative susceptibility scores for the three fear appeal conditions indicated that each conferred resistance to the contradictory message. Yet, equating the conformity data, it was found that the minimal appeal produced greatest resistance to the counterpropaganda (40%) compared to the strong (8%), moderate (14%) and control (20%) groups.

Some clues to mediating processes were obtained by asking the students to respond to an open-ended question which asked them to "give the reason" for their attitudes after exposure to the lecture. A systematic analysis was made of answers given by subjects who had disagreed with the counterpropaganda. Refutations

based on material presented during the illustrated lecture one week earlier were given more frequently by the minimal group (59%) than by the strong (43%), moderate (38%) and control (28%) groups. Although the group differences were not uniformly reliable, Janis and Feshbach suggested that the trend revealed an "avoidance" tendency, consistent with a desire to avoid recalling threatening material, among the students who had been exposed to the fear appeals. Apparently, even some of those who resisted the counterpropaganda were inclined to avoid recalling the content of the fear-arousing lecture (by failing to make refutations based on material that had been presented during the lecture).

2.3.3 Defensive avoidance and persuasion

In interpreting their results, Janis and Feshbach argued that there was little evidence that a strong fear appeal produces inattentiveness during the communication or rejection of the communication motivated by aggression. They asserted that subsequent *defensive avoidance* arising from residual anxiety appeared to be the most probable explanation for the lower adherence to recommended practices and less resistance to counterpropaganda (assumed to reflect a desire to minimise or deny the danger of the depicted health threat) produced by the strong fear appeal. "Unreduced" emotional tension was reported immediately after the communication predominantly in the strong group. The findings on subsequent adherence/attitudes provided some suggestive evidence concerning the consequences of such residual anxiety and seem consistent with the hypothesis that "When fear is strongly aroused but is not fully relieved by the assurances contained in a mass communication, the audience will become motivated to ignore or to minimise the importance of the threat" (p.90).

In other words, if rehearsal of the reassuring statements incorporated in threatening information fails to alleviate anxiety generated by the threat, a person

will be motivated to continue trying other responses, mental or overt, until one occurs which succeeds in reducing the fear to a tolerable level. Thus, a strong fear appeal designed to motivate adaptive (protective) action in the face of realistic danger could have the maladaptive effect of motivating the individual to ignore the threat or to adopt "magical", "wishful" or other types of reassuring cognitions that are contrary to recommended protective behaviour. Similarly, when a threat evokes a high level of fear, the person will be motivated to engage in overt escape behaviours, some of which may not be compatible with precautions recommended by the communicator. Janis and Feshbach argued that unintended effects of this kind can be regarded as spontaneous "defensive" reactions which are motivated by residual anxiety.

Janis and Feshbach (1953) noted that the most direct evidence in support of the defensive avoidance hypothesis came from the spontaneous write-in answers given by the subjects when they were asked to explain their evaluation of the counterpropaganda. Amongst those subjects who rejected the counterpropaganda, those who had been exposed to the minimal appeal were the ones most likely to refer to the illustrated talk as an authoritative source, and to make use of its arguments. The relative absence of such references in the spontaneous answers given by those exposed to the moderate and strong appeals suggest that there was some tendency among these subjects to avoid recalling the content of the fear-arousing communication.

Despite its notoriety, reviews of the literature on the effects of threatening communications found only limited evidence of "defensive" coping (see Sutton, 1982, 1992b; Eagly & Chaiken, 1993). However, reviewers have typically warned that most of the fear appeal experiments have only managed to induce low to moderate levels of threat/fear, so that the effect of extreme fear is largely unknown.

Stronger evidence for fear-induced defensive behaviour was provided by Janis and Terwilliger (1962) with a sample of smokers and nonsmokers.

During an interview, each subject was administered a pamphlet asserting that smoking causes cancer and recommending that everyone should avoid or cut down smoking. The information was made up mainly of authentic quotations from medical experts. For half the subjects, a strong fear appeal was inserted into the communication (e.g., vivid descriptions of the poor prognosis for cancer victims) while for the other half, a mild appeal was inserted (e.g., did not elaborate on the most threatening aspects of the disease). Content analysis of the verbal associations given by subjects during exposure to the pamphlet showed that smokers displayed a defensive reaction; they made more statements than nonsmokers to the effect that they were unconcerned about the possibility of developing cancer or of suffering from the disease. Smokers also showed less agreement with the points made in the anti-smoking communication.

A more recent and widely cited investigation by Rippetoe and Rogers (1987; also see Fruin *et al*, 1991) also confirmed Janis and Feshbach's defensive avoidance hypothesis. The authors began by noting that despite their high levels of risk awareness, many people continue with their risky behaviours and that defensive rationalisations as well as other maladaptive coping responses may support people's risk behaviour. In a factorial experiment, they assessed the impact of threat (severity, vulnerability), response-efficacy and self-efficacy on seven different coping styles. These coping modes consisted of two adaptive (intentions to perform regular breast self-examination and rational problem solving) and five maladaptive (hopelessness, fatalism, avoidance, religious faith and wishful thinking) patterns. High threat had an energising effect on all coping styles, both adaptive and maladaptive. The specific coping mode adopted was entirely dependent on the self-efficacy and response-efficacy information provided to subjects. Higher levels

of response-efficacy and self-efficacy produced greater use of adaptive coping strategies, whereas lower levels of both appraisal processes created higher levels of maladaptive coping (hopelessness, fatalism, religous faith).

2.3.4 The family-of-curves model

The notion that fear may motivate defensive reactions that inhibit persuasion was further elaborated by Janis (1967) in his *Family-of-Curves model* (also see McGuire (1968). This theoretical analysis assumes that increases in the anxiety evoked by a threat may have multiple effects. Some effects may facilitate persuasion consistent with reducing the threat while other effects may serve to interfere with such persuasion. It is assumed that persuasion is facilitated when fear increases from a zero level, but at some point, persuasion starts to be interfered with. The resultant relationship between fear and acceptance of a threatening communication resembles an inverted U-shaped curve with the optimal point occuring at the level of anxiety at which persuasion stops being facilitated. Janis used the term "interfering responses" to refer to a variety of fear-motivated cognitive defenses: minimising the seriousness of a threat or one's susceptibility to it, being hypercritical in evaluating message content, selectively attending to message content, derogating the source of the message and defensive avoidance (as originally conceptualised by Hovland *et al*, 1953; Janis & Feshbach, 1953).

2.3.5 The parallel-response model

Although challenging the causal significance ascribed to fear by the Fear-Drive Model and Family-of-Curves Model, Leventhal (1970; also see Leventhal, Safer & Panagis, 1983) proposed a theoretic framework that also recognised that threat may induce defensive coping reactions that are incompatible with adaptive, protective action. His *Parallel-Response Model* identifies two separate processes - danger

control and fear control - that are evoked by fear appeals. Danger control is a cognitive "problem solving" response motivated, not by fear arousal, but by a desire to "avert danger". This response involves appraising both the nature of the threat (e.g., its seriousness) and potential coping behaviours (e.g., their effectiveness) and leads to adaptive action. For example, a teenager who becomes aware of the risk of AIDS will be motivated to avert this risk, and will consider the seriousness of AIDS ("It's life-threatening") and the effectiveness of contraception in reducing the risk ("Condoms will enable me protect myself"), and consequently be motivated to avoid unsafe sex. By contrast, fear control is motivated by fear arousal and involves the selection and performance of responses that alleviate anxiety; examples include avoiding threat cues, minimising the threat and engaging in behaviours that reduce awareness of the threat (e.g., eating and drinking). Fear control is compatible with Hovland *et al*'s (1953) "defensive avoidance".

2.3.6 Protection-motivation theory

Rogers (1975) proposed an expectancy-value formulation of the effects of threat on attitude and behaviour change. Largely inspired by Hovland *et al*'s (1953) work, Rogers *Protection-Motivation Theory* (PMT) was essentially an elaboration of Leventhal's (1970) danger control construct in expectancy-value terms (for complete expositions of this model, see Rogers (1975, 1983), Prentice-Dunn & Rogers (1986) and Boer & Seydel (1996)). PMT (Rogers, 1983) proposes that the effect of a threat on persuasion is mediated by several cognitions: severity of and vulnerability to the threat, efficacy of preventive behaviour in reducing the threat and, one's ability to perform the preventive behaviour. These cognitions in turn determine health-protective motivation.

More recently, Rippetoe and Rogers (1987) emphasised that people may cope with threat in ways other than taking health-protective action. They introduced a

modified version of PMT incorporating several 'maladaptive' coping patterns: religious faith (use of one's spiritual cognitions and faith in God's will to cope), avoidance (attempts to evade or deny threat), wishful thinking (use of panaceas or unrealistic solutions), fatalism (acceptance of threat as uncontrollable, with complacency) and hopelessness (absence of belief in possible solutions to threat). Two 'adaptive' coping responses were also included: intentions to take preventive action and rational problem solving (seeking out more information about the threat, analysing the problem, and making an effective plan to remedy it).

Van der Velde and Van der Pligt (1991) also proposed a modified version of PMT, incorporating adaptive and maladaptive coping responses adapted from Janis and Mann's (1976) Conflict-Theory Model. These were vigilance (objective search for and appraisal of cost-benefit information), defensive avoidance (reduction of anxiety through procrastination, denial or responsibility, bolstering) and hypervigilance (panic-like responding with impulsive choice and vacillation).

2.3.7 Cognitive consistency perspectives

The Yale researchers' notion of defensive reactions to threat was also recognised by cognitive consistency theorists. Theories of cognitive dissonance commonly propose that awareness of a threat produces inconsistency/conflict among attitudinal elements which creates "tension", and that this unpleasant affect constitutes a motivational force for attitude change (for a review, see Eiser & Van der Pligt, 1988; Eagly & Chaiken, 1993; also see Festinger, 1957; Abelson, 1968; Janis & Mann, 1976). For example, dissonance is generated when an adolescent who enjoys smoking or plans to smoke becomes aware that smoking causes lung cancer. Similarly, a teenager who is unwilling to exercise regularly will experience conflict when (s)he learns that lack of exercise is a risk factor for cardiovascular disease, and an adolescent who has unprotected sex will experience dissonance if

(s)he knows that failure to use contraception increases the likelihood of contracting the AIDS virus. The presence of dissonance/conflict produces pressures to eliminate or at least reduce it, pressure which Festinger (1957) has likened to extreme hunger for food. Just as hunger is stressful and leads to activity aimed at reducing it, so too does dissonance.

Cognitive consistency theories suggest that reducing dissonance requires the individual to change one or more cognitive elements (i.e., attitudes/cognitions). Thus, for example, the teenager who plans to smoke cigarettes and is also aware that smoking causes lung cancer, may change his/her attitude to smoking (i.e., decide not to smoke), the adolescent who is unwilling to exercise regularly but also knows that lack of exercise may lead to heart disease, may change his/her attitude towards regular exercise (i.e., plan to exercise regularly), while the person who does not plan to use contraception during sex but is also aware of the risk of AIDS may modify his/her attitude toward use of contraception (i.e., decide to use condoms regularly during sexual intercourse). Although theories of cognitive consistency emphasise attitude/belief change as the main means by which dissonance is reduced, they also recognise that people may resolve inconsistency/conflict in other ways.

Robert Abelson (1968) introduced the term *denial* as a perceiver's "direct attack" on threatening information which, if accepted, would produce inconsistency. He defined denial as incorporating not only mere rejection of threat information (e.g., "there is little or no evidence that smoking causes lung cancer") but also reflecting the perceiver's deliberate efforts to counterargue inconsistency-provoking information (e.g., "there is little or no evidence that smoking causes lung cancer, on the contrary, smoking actually improves your health by keeping your weight down"). Abelson also introduced the notion of *bolstering* as a form of inconsistency reduction. Bolstering entails adding consistent elements to an existing inconsistent

structure (for example, a smoker who cannot deny the health risks of smoking and who still plans to smoke can reduce dissonance by adding such favourable elements as "smoking keeps my weight down", "smoking calms the nerves"). Although, according to Abelson, bolstering does not entirely eliminate inconsistency, it does dilute its magnitude. Finally, people may engage in *cognitive differentiation*, a dissonance-reducing response that involves redefining inconsistent elements so that, in redefined form, they are more consistent with other elements of the attitude structure. For example, the teenager who is aware that smoking causes lung cancer may accept this risk, but argue that the danger is only applicable in cases of "excessive" smoking, and since (s)he smokes "in moderation" lung cancer is an unlikely threat.

Abelson's concepts are compatible with similar dissonance-reducing processes proposed by other cognitive consistency theorists (e.g., Festinger, 1957; Heider, 1958). Denial and bolstering were further developed by Janis and Mann (1976, 1977a, 1977b) as defective means of resolving decisional conflict generated by threat. For example, Janis and Mann (1977a) defined bolstering as "...an umbrella term that includes a number of different psychological tactics that contribute to creating and maintaining the decision makers image of a successful outcome with high gains and tolerable losses" (p.91). Abelson's analysis indicates that people try to defend their attitudes when faced with dissonance, through bolstering, denial and cognitive differentiation, and that this may reduce the likelihood of attitude change. Thus a teenager who plans to consume high fat foods and also knows that dietary fat/cholesterol can lead to heart disease, may effectively deny the heath threat ("fatty foods do not cause heart illness", "my grand parents ate pork/red meat all their lives and never developed heart disease") thereby reducing dissonance and maintaining his/her commitment to eat fatty foods.

2.3.8 Janis and Mann's conflict analysis

Based on an analysis of the literature on the role of threatening communications in attitude/behaviour change, Janis and Mann (1976) proposed that intense decisional conflicts usually arise whenever a person has to make a choice from among risky alternatives. They defined decisional conflict as "...simultaneous opposing tendencies within an individual to accept and reject a given course of action" (Janis & Mann, 1977a, p.46). Psychological stress is purportedly the main outcome of conflict. In general, the greater the conflict, the greater the stress.

Janis and Mann describe several different patterns of coping with realistic threats. These constructs constitute the essential components of their Conflict-Theory model (Janis & Mann, 1976, 1977a, 1977b, 1982; Janis, 1982, 1983, 1986). Recently, several widely cited studies have adopted Conflict-Theory as the basis for investigating the role of threat coping patterns in different health decisions, including contraceptive use (Van der Velde & Van der Pligt, 1991; Van der Velde, Hooykaas & Van der Pligt, 1992), use of sunscreen (Eiser, Eiser, Sani, Sell & Casas, 1995) and screening for cervical cancer (White, Wearing & Hill, 1994). A comprehensive exposition of the essential features of Conflict-Theory and its contrasts with rival theories (e.g., Fear-Drive Model, Protection Motivation Theory) is given in *Section* 2.4. A critical review of the relevant research is reported in *Chapter* 3.

2.3.9 Summary

In summary, a number of models posit that threat generates emotional tension that may elicit a variety of cognitive, emotional and behavioural coping responses, with implications for health-related decisions. For example, the Fear-Drive Model proposes that threat may evoke defensive avoidance, a coping response that may impede adoption of recommended protective action. The Family-of-Curves Model

refers to a variety of coping responses that either facilitate or interfere with adoption of preventive behaviour. The Parallel-Response Model proposes danger- and fear-control processes that lead, respectively, to adaptive and maladaptive action. Cognitive consistency theorists recognise different modes of resolving dissonance, with implications for attitude change. Janis and Mann (1977a) propose a conflict model which incorporates several threat coping patterns and has recently generated some relevant research.

2.4 THE CONFLICT-THEORY MODEL OF DECISION MAKING

Conflict-Theory incorporates five basic patterns of coping with threat or decisional conflict. These are: (1) unconflicted adherence, (2) unconflicted change, (3) defensive avoidance, (4) hypervigilance and (5) vigilance.

2.4.1 Unconflicted adherence

In unconflicted adherence, the decision maker complacently decides to continue whatever (s)he has been doing, failing to take any protective action despite the presence of a realistic threat (Janis & Mann, 1977a). Janis and Mann (1977a) posit that this coping mode is based on unintended misjudgements about risks, resulting from insufficient and/or inaccurate information about the probability that the threat will actually materialise and/or about the seriousness of the danger should it manifest. Such misjudgements can readily be corrected by provision of complete and accurate risk information.

2.4.2 Unconflicted change

Here, the decision maker complacently adopts whichever protective course of action that is most salient and/or strongly recommended (Janis & Mann, 1977a). Janis and Mann propose that this coping mode manifests when people promptly

agree to adopt a recommended behaviour with little or no awareness of the risks or difficulties involved. They posit that the pattern is based on misjudgements about the risks from taking protective action, and is defective in the sense that the individual is not psychologically prepared to deal with whatever losses are entailed in implementing the new action.

2.4.3 Defensive avoidance

The defensive avoidant decision maker "...evades the conflict by procrastinating, shifting responsibility to someone else, or constructing wishful rationalisations and remaining selectively inattentive to corrective information" (Janis & Mann, 1976, p.658). Janis and Mann propose that this coping mode is characterised by a low level of emotional stress which is however superficial in the sense that the person's latent decisional conflict will be reactivated whenever (s)he encounters strong threat cues that are too salient to ignore or discount (Janis & Mann, 1977a). Janis and Mann (1977a, p.81) suggest that defensive avoidance is probably used by a large percentage of those individuals who fail to adopt preventive behaviour and/or avoid risky ones, despite being aware of, and acknowledging, the risks.

According to Conflict-Theory (Janis & Mann, 1977a), information or cues that suggest to the decision maker that there are no serious penalties for postponing the decision will encourage the tendency to procrastinate. (S)he will purportedly stop thinking about the issue, avoid discussing it with anyone who may disapprove of such postponement and stay away from social or other encounters where (s)he may be put under pressure to make a decision soon. If the decision maker anticipates severe losses for postponement, it is posited that (s)he will consider turning responsibility for the decision over to someone else. The individual may rationalise that others are in a better position to make an informed choice (e.g., "My doctor/boyfriend/parents will decide") and hence should take the blame if things

turn out badly. If responsibility cannot be shifted because of pressure of a firm deadline and the insistence of significant others that (s)he assume responsibility, Conflict-Theory proposes that the person will be motivated to adopt one of the alternatives (usually the original one) as a satisfactory choice, developing rationalisations that magnify the potential benefits and argue against the possible costs (Janis & Mann, 1976, 1977a, 1977b).

Janis and Mann (1977a) describe six forms of rationalising or bolstering (the examples given below are adapted from Janis & Mann, 1977a, pp.91-95):

(1) It is proposed that the most obvious tactic is playing up the potential gains so as to convince oneself that the chosen action is well worth the risks (e.g., "I need cigarettes to relax. I will become edgy, or irritable, without them");

(2) In addition to magnifying possible gains, Janis and Mann (1977a) posit that the individual may play down the potential losses, for example by denying personal vulnerability to the threat ("It hasn't really been proven that cigarette smoking is a cause of lung cancer", "If I prefer to smoke, I am only hurting myself and nobody else", "No one in my family had cancer, so it is unlikely that lung cancer will materialise in my own particular case"). Biased discounting is also said to be aimed at playing down the benefits of a reject alternative and/or magnifying its costs (e.g., "If I stop smoking, I will gain too much weight");

(3) Janis and Mann (1977a) propose that conflict may be minimised by denying the aversive features of possible negative consequences by viewing them as acceptable and even desirable (e.g., "I don't mind developing heart disease later on in life if it would prevent me from being dependent on anyone in old age");

(4) It is posited that the person may discount potential costs of his/her choice by assuming that no action will be required in the foreseeable future so that all calculations about long-range consequences may become irrelevant due to unanticipated events (e.g., the development of a new effective drug for lung

cancer). This realisation helps to keep the person's mind off the disturbing risks. Many young cigarette smokers who know they might develop cardiovascular disease feel relieved when they realise that the danger is unlikely to materialise in less than 20 years time. By relegating the danger to the dim, remote future, they avoid the stress of undergoing a here-and-now decisional conflict;

(5) Janis and Mann (1977a) propose that a person may minimise social surveillance by convincing him/herself that it would not matter to anyone whether (s)he adopts a chosen action (e.g., "No one really cares whether I smoke", "My smoking habits are not really anyones business");

(6) Finally, it is purported that personal responsibility may be minimised whereby the individual attributes his/her choice to internal or external pressures or constraints, and denies that (s)he is personally in favour of the decision (e.g., 'smoking just seems to be an unbreakable habit for me"). This form of bolstering is posited to border on shifting responsibility, a separate form of defensive avoidance. In shifting responsibility, the person is said to deliberately arrange for others to take responsibility for a decision (e.g., by asking a friend and/or relative to make the decision). In minimising personal responsibility, however, the person purportedly realises that (s)he is the one who has made, or is going to make, the decision, but disclaims full responsibility by maintaining to him/herself that the decision can't be helped due to uncontrollable internal/external factors (e.g., habit, peer pressure).

2.4.4 Hypervigilance

According to Conflict-Theory, the hypervigilant individual "...searches frantically for a way out of the dilemma and impulsively seizes upon a hastily contrived solution that seems to promise immediate relief, overlooking the full range of consequences of his choice because of emotional excitement, repetitive thinking and cognitive constriction (manifested by reduction in immediate memory span and

simplistic thinking)" (Janis & Mann, 1977a, p.59). In its most extreme form, hypervigilance is referred to as "panic" (Janis & Mann, 1976, p.658). Janis (1986) proposes that, in such a state, the person becomes obsessed with thoughts about all the horrible things that may happen. The individual tends to show extreme vacillation as first one option and then another seems to be the most appropriate. Errors in judgement occur and the person gravitates towards simple "rules-of-thumb" in making a choice (Janis & Mann, 1977a; Janis, 1986).

Hypervigilant behaviour is also observed in emotional role-playing experiments (see review by Janis & Mann, 1977a) in which smokers are exposed to dramatic fear-arousing experiences that make them feel extremely susceptible to threat, thinking "It can happen to me". The panic and disorganised thought characteristic of hypervigilance is captured in a soliloquy improvised by a 20-year old female smoker required in a role-playing experiment (Janis & Mann, 1965) to enact the role of a patient who has just been told by her doctor that, on the basis of X-ray and sputum tests, a small malignant mass has been discovered in the patient's lung and a lung operation is recommended, to be carried out as soon as possible: "Cancer... Oh, God! I can't believe this.... This can't be happening to me. Maybe it's nothing... Maybe... Why did I ever pick up that stupid habit? I know that it causes cancer... I might not ever be able to breathe again. I might be dead. Why did I ever come to him? Why couldn't I die slowly without having to go through this? That cough was not so bad..." (Janis & Mann, 1977a, p.351).

2.4.5 Vigilance

In this coping mode, "The decision-maker searches painstakingly for relevant information, assimilates it in an unbiased manner, and appraises alternatives carefully before making a choice" (Janis & Mann, 1976, p.658). Janis and Mann (1977a) propose that the person experiences a "moderate" degree of stress which is

not too low to motivate a reaction to threat, and not too high to produce maladaptive behaviour. Janis (1983, 1984) conceptualises vigilance as consistent with the assumptions of current expectancy-value models of health behaviour, entailing judgements of the severity of the depicted threat, one's vulnerability to the threat, the effectiveness of available preventive options, and one's optimism or confidence about being able to do what has to be done to avert the danger. Janis (1986) proposes that vigilance "...generally leads to effective problem-solving behaviour that reduces or minimises the threat" (p.468).

2.4.6 Mediating cognitive appraisals

Conflict-Theory specifies cognitions that mediate each of the five coping styles. When people become aware of a threat, they purportedly ask themselves a number of vital questions, the answers to which determine their coping response. *Figure* 2.1 shows the five coping patterns and the answers to the basic questions which constitute the cognitions that mediate each coping mode (also see *Table* 2.1). Janis and Mann (1977a) assume that in the face of threat, these questions are not the subject of detailed deliberation, but are usually posed and answered in split-second perceptions of what is happening. Thus, when a person becomes aware of a threat, Conflict-Theory assumes that his/her cognitive appraisals can be broken down into a rapid series of responses that constitute answers to the four basic questions (the examples given below are adapted from Janis & Mann, 1977a, pp. 54-64).

(1) On becoming aware of a threat, the first basic question a person is said to ask is: "Are the risks serious if I don't take protective action?". In answering this question, the person is said to consider the credibility of the communication, the probability of the threat ("It won't happen to me") and also the severity of the danger ("lung cancer is not a very serious condition"). If the individual judges the probability and seriousness of the danger to be low, his/her answer to the first basic

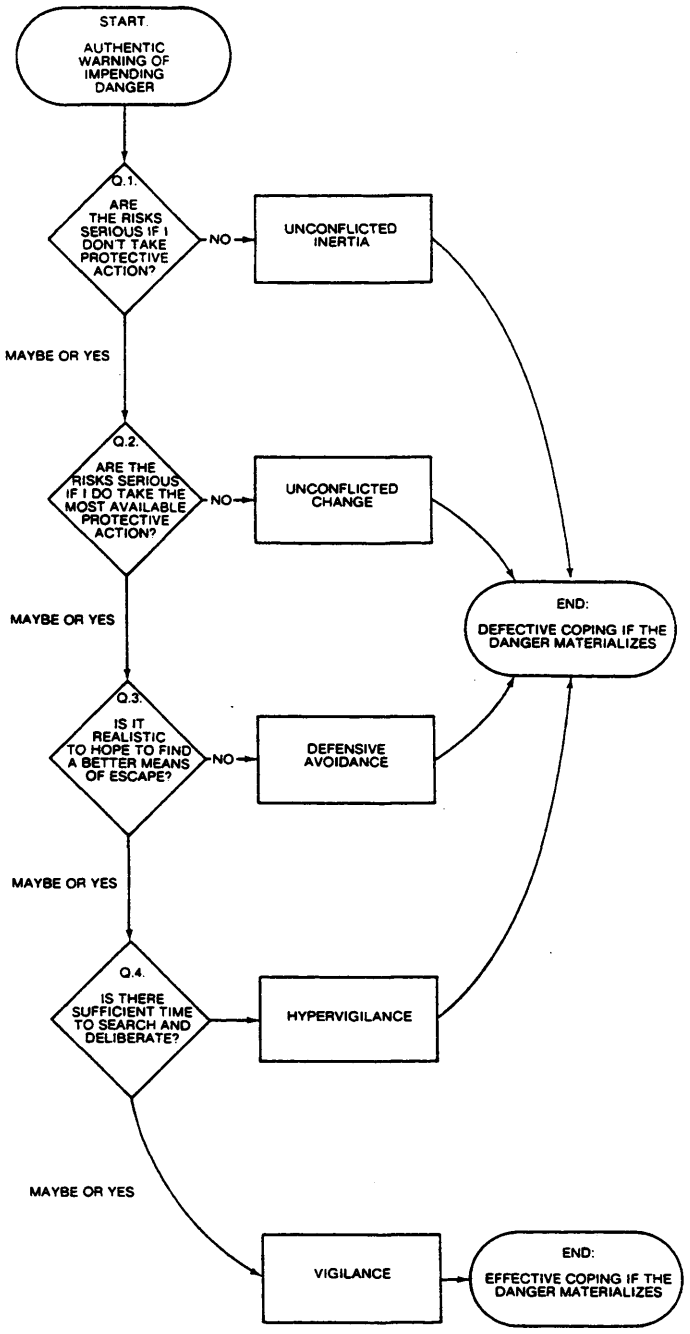

Figure 2.1 A conflict-theory model showing basic patterns of emergency decision making evoked by warnings of impending danger (Based on Janis & Mann, 1977a).

Table 2.1 Mediating beliefs and stress levels for each of the five coping styles (adapted from Janis, 1986, p.470)

Coping pattern	*Beliefs*	*Level of stress*
Unconflicted adherence	No serious risk from current course of action	Low: persistently calm
Unconflicted change	Serious risk from current action No serious risk from new action	Low: persistently calm
Defensive avoidance	Serious risk from current action Serious risk from new action No better solution can be found	Variable from low to high (mainly pseudo-calm, with high anxiety when threat is salient)
Hypervigilance	Serious risk from current action Serious risk from new action A better solution might be found Insufficient time to search for and evaluate a better solution	High: persistently strong anxiety
Vigilance	Serious risk from current action Serious risk from new action A better solution might be found Sufficient time to search for and evaluate a better solution	Moderate: variations within intermediate range with level depending upon salience of threat and presence of reassuring communications

(2) Janis and Mann (1977a) propose that a positive response to the first basic question will lead to emotional arousal and vigilant search for a self-protective response. At least one viable preventive course of action is purportedly salient and/or strongly recommended (e.g., giving up smoking) by the communication. If the threat is of a familiar nature, the individual will tend to search his/her memory in an effort to recall what has been done in the past to avert the danger. As soon as the individual begins to think about taking preventive action, (s)he asks the second basic question: "Are the risks serious if I take this particular protective action?" In answering this question, the individual will consider the expected effectiveness of the preventive action ("Will quitting smoking effectively reduce my chances of developing heart disease?") and the costs entailed by adopting the protective action ("Would I still feel self-confident if I stop smoking?"). If (s)he gives a negative response to the second basic question, his/her fear would subside and the person will promptly adopt the preventive behaviour without decisional conflict.

(3) Confict-theory posits that if the person gives a positive response to the second basic question, (s)he will continue to experience fear which may become more intense. The individual will then pose a third basic question: "Is it realistic to hope to find a better means of escape?". In answering this question, the individual is said to consider available external social resources (e.g., "Will my friends support me if I quit smoking?") and also internal resources (e.g., "Am I capable of quitting smoking if I chose to?"). If the answer to the third basic question is negative, the person will pessimistically give up searching for an effective threat-reducing alternative, despite being dissatisfied with the available options. (S)he will experience a strong degree of anxiety and promptly resort to defensive avoidance tactics to reduce the fear.

(4) If the person gives a positive response to the third basic question, vigilance tendencies will purportedly remain dominant over avoidant propensities. (S)he will

pose a fourth basic question: "Is there sufficient time to make a careful search for an acceptable, effective threat-reducing option?". If the threat is perceived as imminent (e.g., early symptoms of lung cancer diagnosed in hospital) and/or if a deadline has been given for taking protective action before it is too late (e.g., doctor has asked for immediate abstinence from smoking), the individual's response will be "no". Confronted with a highly probable threat, the individual will experience a high level of anxiety and become hypervigilant.

(5) Janis and Mann (1977a) suggest that if the person gives a positive response to the fourth basic question, (s)he will be disposed to vigilance, a disposition which would endure provided the person remains hopeful of finding a viable protective option and is not faced with an imminent threat and/or deadline pressure for making a decision.

As can be seen in *Figure* 2.1, Conflict-Theory specifies four basic conditions which facilitate vigilance: (a) perception of risks in not taking protective action; (b) perception of risks in taking recommended protective action; (c) optimism that a viable protective response is available; and (d) sufficient time to search for and consider viable alternatives. According to the model, the first two conditions make for arousal of decisional conflict - the person wants to avoid the risks associated with not acting protectively, but at the same time wants to avoid the risks entailed in adopting a salient protective action. Decisional conflict purportedly stimulates search for a better alternative, through information seeking, memory scanning, and appraisal of personal abilities. The model proposes that when conflict is aroused, lack of hope of finding a viable protective option facilitates defensive avoidance while insufficient time to search for such an option (due to imminent threat and/or deadline pressure) engenders hypervigilance.

<u>The relevance of unconflicted coping modes</u>. Unconflicted adherence results from lack of knowledge about the risks entailed in persisting in a current behaviour.

Unconflicted change results from ignorance of risks associated with changing to an alternative behaviour. Janis and Mann (1977a) suggest that these "unconflicted" states are rare, since most of the real life decisions that people make generate some degree of negative feedback that produces decisional conflict; "Many decisions go through a honeymoon period in which the decision maker is quite happy about his choice and implements it without any qualms. All too often, however, this idyllic postdecisional state is rudely interrupted, sooner or later, by new threats or opportunities" (p.177).

In Western countries, where there is intense publicity about major health risks like HIV/AIDS, cancer, and cardiovascular disease, and their behavioural risk factors (Amler & Dull, 1987), most adolescents are aware of major health threats associated with performing health-damaging behaviours, such as smoking (e.g., Sutton, 1994) and not performing health-protective behaviours, such as use of contraception (e.g., Modeste *et al*, 1994; Morrison, Baker & Gillmore, 1994). Most teenagers are also aware of various benefits from engaging in such behaviours. For example, many teenagers associate smoking with weight control (e.g., Charlton, 1984), and not using contraception with reduced embarrasment and greater sexual pleasure (e.g., Bury, 1991). From a Conflict-Theory perspective, therefore, it can be argued that most teenagers experience some degree of decisional conflict about (not) engaging in a particular health behaviour, so that unconflicted change or adherence are probably very rare responses in their health decision making (Janis, 1986).

Most health behaviour researchers examining Conflict-Theory coping modes have not assessed these unconflicted coping modes (see Van der Velde & Van der Pligt, 1991). In line with this tradition, the remainder of this thesis will focus only on the conflict-related coping styles of vigilance, defensive avoidance and hypervigilance.

2.4.7 Coping styles and information preferences

Conflict-Theory proposes that each coping style has implications for the degree to which an individual is objective or biased in his/her preference for both threatening and nonthreatening information. The model points to a number of distinct tendencies which, depending on the preferred coping style, become dominant. They include indifference, active evasion of threatening information, openmindedness and failure to assimilate new information (see *Table* 2.2).

For vigilance, Janis and Mann (1977a) propose that the characteristic mode of information processing is a discriminating and openminded interest in information, with active search for both supportive and nonsupportive information, and careful evaluation for relevance and trustworthiness. They posit that if the threats are ambigous and vague, for example as to the seriousness and probability of the danger, the vigilant individual will go out of his/her way to obtain specific information, and other relevant information, no matter how threatening, in order to satisfy a need for detailed and accurate information about risks.

For defensive avoidance, Janis and Mann (1977a) purport that the typical information processing mode is closed-mindedness and selectivity. In procrastination, they propose a slight degree of interest in supportive information together with active avoidance of all threatening information. The person is more interested in putting off the decision so that any information that provokes him/her to think about relevant risks is neither sought nor welcomed. In shifting responsibility, information search is purportedly limited to seeking out others who can take responsibility for making a choice. With bolstering, Janis and Mann (1977a) posit that the classic pattern of selective exposure is dominant, marked by active search and preference for supportive information and active avoidance of threatening information.

Table 2.2 Characteristic information preferences for each coping style (adapted from Janis & Mann, 1977a, p.206)

Coping pattern	*Typical information preference*
Unconflicted adherence	Nonselective exposure
Unconflicted change	Nonselective exposure
Defensive avoidance	
Procrastination	Passive interest in supportive information; avoidance of all challenging information
Shifting responsibility	Delegation of search and appraisal to others
Bolstering	Selective exposure; search for supportive information and avoidance of discrepant information. Facilitated if threats are vague or ambigous
Hypervigilance	Active search for both supportive and non-supportive information, with failure to discriminate between relevant and irrelevant, trustworthy and untrustworthy. Characterised by information overload as the individual attempts to absorb the deluge of incoming warnings, biased rumors advice, and unsubstantiated claims, in addition to objective evidence.
Vigilance	Active search for supportive and nonsupportive information, with careful evaluation for relevance and trustworthiness; preference for trustworthy nonsupportive information if threats are vague or ambigous.

For hypervigilance, Janis and Mann (1977a) propose that the characteristic information processing mode is indiscriminate interest in information, with active search for both supportive and nonsupportive information and failure to discriminate between relevant and irrelevant, trustworthy and untrustworthy. Thus, they posit that the individual may be overwhelmed by informational overload in an attempt to take account of the deluge of warnings, advice, and rumours to which (s)he indiscriminately pays attention and takes seriously.

2.4.8 Conflict-theory predictions

Conflict-Theory generally associates the quality of decision making with the coping style adopted (Janis & Mann, 1976, 1977a, 1977b, 1982). More specifically, the model makes testable predictions about the role of vigilance, defensive avoidance and hypervigilance in decision making.

Coping styles and relations between health beliefs and decisions. In the early 1980s, Janis (1983, 1984, 1986) postulated additional predictions of Conflict-Theory to explain people's failure to adhere to medical and public health recommendations. Janis (1983) cited review articles indicating noncompliance rates as high as 93%. He also presented evidence showing that specific cognitions incorporated in the early versions of Conflict-Theory and in existing health behaviour models are generally found to covary with different types of adherence behaviours. Such behaviours include carrying out a prescribed medical regimen, staying in medical treatment, and taking recommended preventive measures. More specifically, he noted that the positive associations of perceptions of threat to health (i.e., vulnerability, severity) and perceptions of the efficacy of recommended practices (i.e., response-efficacy) to people's adherence support the notion that individuals need to be informed as to why it is important for them to carry out the recommended preventive action and assured that the preventive behaviour will be

effective in helping them to improve and maintain their health. But this view assumes that the decision to adhere is the result of rationalistic cost-benefit appraisals, such as is performed by a vigilant decision maker.

Janis asserted that "...people will weigh the benefits of a recommended course of action against the perceived costs or barriers to taking that action, as is assumed by rational models, only when their dominant coping pattern is vigilance" (p.146). By contrast, "When defensive avoidance or any of the other nonvigilant coping patterns is dominant, the decision maker will fail to engage in adequate information search and appraisal of consequences, overlooking or ignoring crucial information about relevant costs and benefits. Under those conditions, the outcome will not be correctly predicted by the health belief model or by any other rationalistic model of decision making" (Janis, 1983, p.146).

Hence, because defensive avoidance essentially involves evasion and/or distortion of threatening information (e.g., through selective inattention, selective forgetting, construction of wishful rationalisations), Conflict-Theory predicts that when people use this coping mode, they will plan to behave in ways not consistent with their health beliefs. Janis (1983, p.147) argued that, when people use defensive avoidance in response to health threats (e.g., early cancer, heart disease), "...they tend to minimise or deny the seriousness of their clear-cut symptoms (which would reduce the correlation between adherence and symptoms...)". The essential feature here seems to be that defensive avoidance leads to uniformly low risk (severity, vulnerability) estimates, causing floor effects. Uniformly low threat appraisals are unlikely to effectively discriminate between people who do, and those who do not, adhere to recommendations. Janis is not explicit as to why the impact of response-efficacy would also be weakened when defensive avoidance is dominant. Presumably, people who do not acknowledge threat have no cause to contemplate the efficacy of alternative actions - the present (risky) action is OK!

Since hypervigilance entails impulsive and frantic 'knee-jerk' decision making, so that decisions tend to be ill-considered (i.e., choices are made with superficial consideration of threat and efficacy information), Conflict-Theory predicts that people who use hypervigilance are unlikely to make choices that accurately reflect their health beliefs. Janis (1983, p.147) proposes that when people respond with hypervigilance, "...they would be extremely worried not only about the risks of the disease but also about the risks of pain and side effects from the prescribed treatment, even though they believed it to be efficacious... which would reduce the correlation between adherence and beliefs about efficacy of the treatment or preventive action recommended by the health experts...". One interpretation of Janis's assertions is that strong concerns about risks mean uniformly high threat appraisals, so that perceived threat may not effectively distinguish between different levels of adherence. It is less clear why relations between response-efficacy and adherence would be attenuated. However, Janis and Mann (1977a) associate hypervigilance with impaired mental efficiency and simplistic thinking, so that efficacy (or threat) appraisals may be severely limited when making a decision.

Janis (1983) explains that, in any given study, any significant relations between health beliefs and decisions would be attributable mainly to just a fraction of the sample whose behaviour was assessed. Those findings would reflect the determinants of behaviour primarily for the subset of persons whose coping pattern was predominantly vigilance at the time when they decided to perform or not to perform the behaviour. Many of the relations between health beliefs and decisions would tend to be attenuated by the inclusion in the sample of persons who displayed nonvigilant coping patterns at the time they made their decision. For example, when the dominant coping response to a major health risk (e.g., AIDS) is defensive avoidance, an individual will tend to ignore information about the

seriousness and probability of the threat, which would reduce the correlations between decisions and severity/vulnerability beliefs. When their dominant coping response is hypervigilance, the person would be extremely worried about the risks and in a near-panic state, would frantically seek help/advice from unreliable sources (e.g., friends or relatives with no expert knowledge) and make a snap ill-considered decision that, given the perfunctory cost-benefit appraisals and extreme vacillation, will not be predicted accurately by the individual's health beliefs.

It follows from this Conflict-Theory interpretation of health decisions that, for any sample of individuals, the larger the percentage whose dominant coping mode is vigilance, the higher the correlations will be between health beliefs and decisions. Conversely, the greater the proportion of those who tend to use defensive avoidance or hypervigilance, the lower the likelihood that health beliefs will be significantly related to decisions.

In summary, Conflict-Theory postulates that:

(a) health beliefs better predict decisions when people are disposed to vigilance.

(b) health beliefs poorly predict decisions when people are disposed to defensive avoidance.

(c) health beliefs poorly predict decisions when people disposed to hypervigilance.

Coping styles and health risk-taking. In its original version (Janis & Mann, 1976, 1977a, 1977b), Conflict-Theory was offered as a model of emergency decision making which explains people's reactions to authentic public health warnings about natural disasters such as hurricanes, floods, and earthquakes. The model proposed that when a warning is genuine (that is, comes from trustworthy public health authorities), the behaviour resulting from defensive avoidance, hypervigilance, and the unconflicted coping patterns can be characterised as 'defective' or 'maladaptive' in that "...the person exposes himself to unnecessary damage or does not survive because he fails to discover the best means for escaping

the danger, whereas he might have a good chance of surviving unharmed if he had engaged in more careful search and appraisal" (Janis & Mann, 1977b, p.43).

Conflict-Theory recognises that the nonvigilant coping patterns may occasionally be adaptive. For example, defensive avoidance may be effective in helping individuals, who have chronic incurable medical conditions (e.g., AIDS), to reduce severe anxiety and depression. However, where self-protective action is plausible and effective (e.g., giving up smoking) and the stakes are high (e.g., threat of lung cancer), defensive avoidance generally reduces the chances of averting the danger. Similarly, while hypervigilance can be adaptive when threat is imminent and time is insufficient for careful threat and appraisal (e.g., when a person experiences early symptoms of a heart attack and must seek medical aid immediately if (s)he is to have any chance of survival), it often leads to maladaptive actions, or adaptive action that is short-lived and easily reversed. The pattern of vigilance can be maladaptive when, for example, immediate action is required, but is generally adaptive where there is sufficient time (as is the case with most health behaviour decisions) to make an informed choice. Sustained vigilance does however entail costs in time, energy and other resources.

Thus, in summary, Conflict-Theory postulates that:

(a) High levels of vigilance relate to low levels of health-risk taking.

(b) High levels of defensive avoidance relate to high levels of health risk-taking.

(c) High levels of hypervigilance relate to high levels of health risk-taking.

2.4.9 Contrasts with rival theories

Conflict-Theory supposedly builds on the early work of the Yale and cognitive consistency traditions. While there are numerous differences between Conflict-Theory and the other threat-coping models, only three of the most salient ones will be considered here: (a) offering testable predictions about the implications of

different coping patterns for decision making; (b) accounting for both "rational" and "irrational" coping patterns; and (c) specifying psychological processes which mediate different coping modes.

Testable predictions. The Fear-Drive Model and Family-of-Curves model both generated a great deal of research on fear and persuasion during the late 50's, through to the 70's. However, Leventhal's (1970) critique that these models accorded fear too much causal significance, and the failure of the vast majority of studies to confirm the curvilinear relation between fear and persuasion (Sutton, 1982), contributed to a marked reduction in the level of interest in these formulations by the late 1970s. Although Leventhal's notions of danger and fear control exerted a pronounced influence on subsequent theorising and research in social (health) psychology, these constructs are considered too broad to constitute a testable theory of threat and persuasion (Sutton, 1982; Eagly & Chaiken, 1993). By contrast, Conflict-Theory offers specific, testable hypotheses about relations between coping patterns and decision making. For example, the hypotheses that vigilance and defensive avoidance, respectively, reduce and increase risk-taking has been successfully evaluated (and confirmed) in several studies (e.g., White *et al*, 1994; Van der Velde *et al*, 1992).

Adaptive and maladaptive coping patterns. Despite the popularity of Janis and Feshbach's (1953) defensive avoidance hypothesis, and subsequent research confirming the "boomerang" effect (i.e., the reduced motivation to take protective action when threat is perceived but efficacy appraisals are low) (e.g., Rogers & Mewborn, 1976; Rippetoe & Rogers, 1987; Sturges & Rogers, 1996), existing social cognition (expectancy-value) models, which are essentially elaborations of Leventhal's danger control construct, and have guided most of the health behaviour research in the past two decades or so, fail to account for maladaptive (i.e., fear

control) coping responses to threat (Rippetoe & Rogers, 1987; Van der Velde & Van der Pligt, 1991; Janis, 1983, 1984, 1986).

According to Weinstein (1993), "The health belief model and subjective expected utility theory say nothing about factors that might intervene between the perceived attractiveness of a precaution and precaution adoption" (p.328). Janis (1984) has argued that "Many important aspects of patients' decisions fall between the cracks. For example, the [Health Belief] model does not provide an adequate explanation for the widespread tendency of patients who have painful heart attacks to delay obtaining medical aid... Typically, when the afflicted person thinks of the possibility that it might be a heart attack, he or she assumes that "it couldn't be happening to me". The patients' delay of treatment is not attributable to unavailability of medical aid or transportation delays; approximately 75% of the delay time elapses before a patient decides to contact a physician..." (pp.331-332).

Although Rippetoe and Roger's (1987) modified Protection Motivation Theory (Rogers, 1975, 1983) incorporates a number of maladaptive threat coping patterns (e.g., wishful thinking, avoidance, fatalism), and generated some research (e.g., Fruin *et al*, 1991), the model does not explain why specific coping patterns are expected to have particular implications for decision making, or what mediating psychological processes explain these effects (see below).

Mediating processes. According to Janis and Mann (1976, 1982), Conflict-Theory is unique because, unlike other models, it describes the psychological processes (relating to risks, hope, time, stress) which mediate each coping pattern. This is indeed a significant advantage since any relations observed between coping and decision measures in empirical tests can be more easily explained by reference to these factors. None of the other models considered thus far are explicit about the conditions that underlie specific coping reactions to threat. For example, in a critical review of Leventhal's (1970) paper on the Parallel-Response Model, Rogers

(1975) noted "The model does not indicate those antecedent conditions (especially the components of a fear appeal) that regulate its intervening variables, the danger and fear control [coping] processes..." (p.108). Although Roger's Protection-Motivation Theory does specify cognitive mediating processes, the model relates these to adaptive coping (i.e., protection motivation), but not to maladaptive reactions (e.g., defensive avoidance).

2.4.10 Summary

In summary, Conflict-Theory identifies five patterns of coping with threat or decisional conflict: unconflicted adherence refers to complacent persistence in an original risky action; unconflicted change entails complacent adoption of a new action; defensive avoidance is a strategy focusing on reducing anxiety through procrastination, denial of responsibility and bolstering; hypervigilance refers to panic-like search for appropriate responses, without reaching well-balanced decisions; vigilance involves accurate search for and appraisal of relevant cost-benefit information. Each coping pattern is mediated by a unique set of cognitions, relating to risks, hope and time, and characterised by a particular mode of information preference. Conflict-Theory makes testable predictions about the role of these coping patterns as *moderators* of belief-decision relations, and correlates of health risk-taking. The model also has several principal advantages over rival formulations such as the parallel response model and protection motivation theory.

CHAPTER THREE

APPLICATIONS OF CONFLICT-THEORY COPING STYLES TO HEALTH DECISIONS

3.1 INTRODUCTION

This literature review critically considers empirical studies which directly tested, in relation to health-related decisions, at least one of the Conflict-Theory predictions outlined in the previous Chapter (*Section* 2.4.8). Five studies were found which tested Conflict-Theory postulates concerning the role of coping styles in health risk-taking (Van der Velde *et al*, 1992; Van der Velde & Van der Pligt, 1991; Eiser, Hannover, Mann, Morin, Van der Pligt & Webley, 1990; Eiser, Eiser, Sani, Sell & Casas, 1995; White, Wearing & Hill, 1994). Although health behaviour researchers have made reference to Conflict-Theory predictions about coping styles as moderators of belief-decision relations (e.g., Niven, 1989, p.201), no studies were found which tested these hypotheses.

Firmly rooted in the Yale researchers work on communication/persuasion (see Hovland *et al*, 1953; Janis & Feshbach, 1953, 1954; Janis, 1967; Leventhal, 1970), Conflict-Theory is not a model of coping per se, but of decision making. To this end, Mann and his colleagues (Mann, 1982; Radford, Mann & Kalucy, 1986; Mann, Harmoni, Power, Beswick & Ormond, 1988; Burnett, Mann & Beswick, 1989; Beswick, 1988) have developed an instrument (the Flinders Decision Making Questionnaire[2]) which measures people's propensity to use three of the conflict model's coping styles (vigilance, defensive avoidance, hypervigilance) when making decisions. Of the studies found which tested Conflict-Theory predictions in relation to health decision making, only two (White *et al*, 1994; Eiser *et al*, 1990) employed the Flinders Questionnaire. The other investigations adapted their coping measures from other sources, mostly from the general stress-coping literature (see Krohne, 1993; Suls & Fletcher, 1985; McCrae, 1984).

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[2]More recently validated and published as the 'Melbourne Decision Making Questionnaire' (see Mann, Burnett, Radford & Ford, 1997).

Given the conflict model's emphasis on decision making, a caveat is in order concerning health behaviour studies that did *not* employ the Flinders instrument, but yet claimed to test Conflict-Theory. Strictly speaking, the extent to which these studies constitute adequate tests of Conflict-Theory postulations may be seriously questioned. However, given the paucity of health-related research employing the Flinders Questionnaire, these studies are reviewed here. To further broaden the scope of the review, one frequently cited study which, although not based on Conflict-Theory, examined coping styles compatible with Conflict-Theory constructs in relation to health-protective motivation, is also reviewed (Rippetoe & Rogers, 1987). The findings from this investigation may be of some relevance to Conflict-Theory predictions.

The studies to be reviewed have been grouped under three headings, consistent with the health/safety risk that they focus on: (1) HIV/AIDS-related behaviour (Van der Velde & Van der Pligt, 1991; Van der Velde *et al*, 1992); (2) Cancer-related behaviour (Eiser *et al*, 1995; White *et al*, 1994; Rippetoe & Rogers, 1987); (3) Technological risk-related behaviour (Eiser *et al*, 1990). In reviewing these studies, most of which examined a number of other explanatory variables apart from coping patterns, the focus is only on the findings concerning Conflict-Theory. Finally, in separate sections, the main limitations with existing research are described, the rationale for further research is outlined, and research questions and hypotheses are specified.

3.2 COPING STYLES AND HIV/AIDS-RELATED DECISIONS

Van der Velde and Van der Pligt (1991) examined the role of adaptive (vigilance) and maladaptive (defensive avoidance, hypervigilance) coping patterns, together with additional variables, on intentions to use condoms in future sexual encounters. The authors began by noting that although many health education campaigns have

attempted to persuade people to protect themselves against major health risks, many people often fail to adopt measures to reduce these risks, thereby increasing the likelihood of negative health outcomes that could be averted. The recommendations made by health education campaigns are unambigous: abstaining from specific high risk sexual behaviours markedly reduces the chances of becoming infected with HIV. Yet AIDS-related behaviour is noted for low adherence to recommendations. Since people do not always respond to threat information by adopting the communicator's recommended response, a central question concerns how people cope with threat when they do not intend to adopt an adaptive, protective response. The authors argued that maladaptive as well as adaptive coping responses are relevant to the study of persuasion and adopted Conflict-Theory as the basis for conceptualising coping. One aim of their study was to assess the role of coping styles in relation to cognitions and intentions concerning the use of contraception.

A total of 231 people took part in the study, comprising 147 homosexual and 84 heterosexual adults. All participants had had multiple sex partners in the 6 months preceding the study, were aged between 18 and 30, and none was tested HIV positive. Participants were administered a questionnaire assessing, among other variables, behavioural intentions (to use condoms in future sexual encounters) and cognitions (severity of vulnerability to AIDS, self-efficacy for preventing HIV infection, and condom-use efficacy). Coping styles assessed were vigilance ("You have thought about how to raise the subject of safe sex with your sexual partner"), hypervigilance (e.g., "You still have doubts about how to adapt your sex life precisely") and defensive avoidance (e.g., "You leave the choice whether to practice safe sex or not to your sexual partner"). Factor analysis confirmed the existence of the three distinct coping styles. Alpha's were .82 (vigilance), .73 (hypervigilance) and .71 (defensive avoidance).

All analyses were performed separately for homosexuals and heterosexuals. This was because seroprevalence within the homosexual population is many times higher than within the heterosexual population, presenting homosexuals with a more severe and realistic threat. In addition, homosexuals were confronted with the threat of AIDS at least several years earlier than heterosexuals. These differences suggest more pronounced coping behaviour amongst homosexuals. Consistent with Conflict-Theory, in the heterosexual sample, vigilance was significantly and positively related to intentions to use condoms ($p<.01$) and defensive avoidance significantly and negatively related to intentions ($p<.01$). However, hypervigilance was not related to intention at all. In the homosexual group, the findings were similar: vigilance was positively related to intentions to use condoms ($p<.001$) and defensive avoidance was negatively related ($p<.01$).

In predictive analyses, coping styles could be interpreted as either adaptive or maladaptive in terms of their effects on cognitions and on intentions. Amongst the heterosexual group, vigilance proved to be adaptive not only by strengthening intentions to use condoms ($p<.01$), but also by increasing feelings of vulnerability to HIV ($p<.05$) which in turn increased intentions. Defensive avoidance was clearly maladaptive: this coping mode decreased the feeling of being able to perform the recommended behaviour ($p<.05$), which in turn reduced intentions. However, although higher scores on fear were related to higher scores on hypervigilance ($p<.01$), hypervigilance appeared to have neither an adaptive nor maladaptive effect, by failing to influence cognitions/intentions in return. In the homosexual group, no coping style predicted any of the cognitions measured. However, vigilance and defensive avoidance did influence intentions: as expected, avoidance decreased ($p<.05$) whereas vigilance increased ($p<.01$) intentions to behave adaptively. Although hypervigilance was negatively related to feelings of being

able to perform the recommended behaviour and positively related to fear, this coping mode did not affect intentions.

In discussing these findings, Van der Velde and Van der Pligt asserted that, contrary to Conflict-Theory predictions, hypervigilance has neither a maladaptive nor adaptive influence on precaution motivation. Surprisingly though, this was cited as *support* for Janis and Mann's (1977a) theoretical definition of hypervigilance as a process of panic-like search for appropriate responses without reaching well balanced decisions. But panic-like decision making entails superficial cost-benefit appraisals, and hence, is unlikely to facilitate adaptive health behaviour. Janis and Mann echo this view when they describe hypervigilant individuals as exercising poor judgement and acting in an inefficient manner thereby increasing their chances of becoming casualties (p.60). "Hypervigilance facilitates taking drastic action that a person might refuse to consider in a less aroused state, *but it rarely facilitates successful escape*" (p.64).

Van der Velde *et al* (1992) also examined the role of coping styles in AIDS-related behaviour. They began by noting that people tend to underestimate their personal vulnerability to many health and safety risks of which they are aware. If people feel invulnerable, it follows that they will be less likely to change their behaviour to reduce risks. The effectiveness of health education campaigns depends to a large degree on getting people to acknowledge the link between their behaviour and risks. If this condition is not met (and it usually isn't), unrealistic perceptions of invulnerability may lower risk reduction motivation and/or activities. Research suggests that defensive coping (amongst other factors) may lead to unrealistic optimism. One aim of the study was to investigate the role of Conflict-Theory coping strategies in both absolute and comparative risk judgements.

Subjects were 535 visitors to a Sexually Transmitted Disease clinic, aged over 17 years and who had had at least five sexual partners during the previous six

months. Most engaged in prostitution contacts. All subjects were asked to return three weeks after the first visit, and afterwards, every four months for follow-up. Participants were administered a questionnaire assessing sexual behaviour in the four months preceding the study and in the four months after the first follow-up, intentions to use condoms during the next four months, perceived risk and coping styles. To assess perceived risk, subjects estimated the chance of personally being infected with HIV in the future (own risk). The same probability estimation was asked for an average other of one's own age and sex (other's risk). A comparative risk score was derived by subtracting the own risk score from the risk score for others. Those who judged their own risk to be higher than the risk of others were referred to as "pessimists", subjects who did not differentiate between their own and others' risk were referred to as "realists", while those who judged their own risk to be lower than the risk of others were called "optimists".

Coping styles assessed were vigilance (e.g., "You have thought about how to raise the subject of safe sex with your sexual partner"), defensive avoidance (e.g., "You leave the choice whether to practice safe sex or not with your sexual partner") and hypervigilance (e.g., "You still have doubts about how to adapt your sex-life precisely"). Factor analysis confirmed the existence of the three distinct coping styles. Cronbach alpha's were .77 (vigilance), .61 (hypervigilance) and .70 (defensive avoidance).

Higher scores on hypervigilance were significantly related to higher levels of perceived own risk ($p<.01$). Higher scores on vigilance and hypervigilance were related to higher levels of perceived others risk ($p<.05$, $p<.001$, respectively). Higher scores on vigilance were associated with greater optimism (higher risk scores for others than for themselves). In multiple regression, higher levels of vigilance predicted both higher own risk scores and risk scores for others. In further analyses, the authors split up the sample into "pessimists", "realists" and

"optimists" (see above). In discriminant analyses to predict group membership, it was found that realists had lower scores on vigilance while optimists scored higher on this coping style. Among pessimists, higher others' risk scores were predicted by higher levels of defensive avoidance, while higher absolute risk judgements of realists were predicted by higher levels of vigilance. Finally, for optimists, higher own risk scores were predicted by higher levels of hypervigilance, higher others' risk-scores were positively related to hypervigilance, while greater optimism was predicted by higher scores on defensive avoidance. In assessing correlates of intentions to use condoms, those who had *high* intention scores scored lower on defensive avoidance, compared to those with *low* scores. Higher levels of defensive avoidance predicted greater levels of subsequent risk behaviour (i.e., at four months).

By and large, these findings are consistent with Janis and Mann's (1977a) description of vigilance as adaptive and defensive avoidance and hypervigilance as maladaptive. Van der Velde *et al* however thought it puzzling that subjects classified as "realists" (i.e., who perceived their risk to be equal to others' risk) had lower scores on vigilance. If anything, realists are being objective about risks and so should score *higher* on vigilance. The authors suggest that vigilance refers to accurate and complete information search, followed by analysis of the problem and planning behaviour to reduce the threat. Based on their information search, low vigilant subjects may have judged that they are as vulnerable as others, and that the same factors blocking their intentions to behave adaptively may block adaptive behaviour for others. Indeed, one can expect that high vigilant subjects would tend to engage in adaptive behaviour, and hence should tend to perceive their risk to be lower than others risk. The fact that optimists scored higher on vigilance seems to substantiate this point. If being vigilant facilitates adaptive behaviour which in turn leads to optimistic risk estimates, such appraisals cannot be considered "unrealistic"

since they are based on accurate assessments of adaptive health behaviour (see Weinstein & Nicolich, 1993). The authors acknowledge this by noting that optimists had lower levels of risky behaviour so that "we cannot conclude that optimists were unrealistically optimistic" (p.36).

3.3 COPING STYLES AND CANCER-RELATED DECISIONS

Eiser *et al* (1995) examined the relevance of coping styles to the decision to sunbathe. The incidence of skin cancer in many countries is now a major public health concern and as with other behavioural risk factors, mere provision of information has been insufficient to change people's behaviour in a safer direction. A central question, thus, is not just whether health warnings are acknowledged, but whether they are acted upon. Janis and Mann's (1977a) coping styles are relevant within this context. The decision to sunbathe can be seen to involve conflict. Many people who continue to sunbathe because they find it pleasurable are also aware that this behaviour could prove fatal. The main focus of the study was the relevance of coping styles to people's attitudes towards skin cancer. Attitudes towards skin cancer and protection are likely to be influenced by sociocultural factors. In some countries, the population may be at especially high risk from excessive exposure to the sun, while in others, the risk may be very low. Chronic exposure to an environmental hazard can sensitise populations to the risks involved and lead to denial of the need for protective action. Such cultural differences necessitate the exploration of possible differences in attitudes and cognitions about risks between a northern and a southern European sample.

Two groups of holiday makers were administered a questionnaire during the summer holiday period. Both the British sample (n=132) and Italian sample (n=142) consisted of visitors to separate beaches. The questionnaire consisted of items relating to perceived risk of skin cancer, ease with which one sunburnt,

enjoyment of sunbathing and protective behaviours such as sunscreen use, as well as statements expressing concern about the environment in general and global change, such as the greenhouse effect and depletion of the ozone layer.

Factor analyses of these items distinguished three interpretable subgroups. The first group comprised items reflecting a lack of concern over broader enviromental issues (e.g., "I avoid thinking about environmental issues", "I find talk about the environment boring", "I prefer to leave decisions about the enviroment to other people") and was labelled "avoidance" (alpha, .73). The second group comprised items involving a tendency to play down the risk of skin cancer (e.g., "The risk of skin cancer is so small that it's silly to worry about it", "skin cancer is the least dangerous of all cancers", "skin cancer is easy to treat") and to emphasise benefits of sunbathing (e.g., "A suntan gives protection against sunburn", "Everyone looks more attractive with a suntan") and was labelled "bolstering" (alpha, .62). The final subset included items reflecting greater knowledge of specific risk factors (e.g., "Bad sunburns as a child increase your risk of skin cancer later in life", "Too much sun makes your skin look old"), protective behaviour (e.g., "I always use a sunscreen if I sunbathe") and self-ratings of oneself as well informed about environmental issues and about the risks of skin cancer. This factor was labelled "vigilance" (alpha, .54).

Consistent with Conflict-Theory, avoidance was positively correlated with bolstering ($p<.001$), and negatively with vigilance ($p<.001$). Bolstering and vigilance were also negatively correlated ($p<.05$). The British, who reported a greater tendency to sunburn (in other words, higher perceived risk), scored higher than the Italians on vigilance ($p<.001$). Vigilance was also positively related to the tendency to sunburn ($p<.05$).

The fact that the British reported a greater tendency to sunburn and also described themselves as better informed about skin cancer and environmental

issues, and agreed more with items concerning appropriate protective behaviours, including self-reported use of sunscreens, appears to support the adaptive quality Conflict-Theory ascribes to vigilance. Although correlational data are open to different interpretations, the positive association between vigilance and reported tendency to sunburn suggests that high levels of vigilance led to greater (i.e., more objective) perceptions of vulnerability to sunburn. In general, this study showed that coping styles are relevant to our understanding of attitudes in response to the threat of skin cancer. Factor analysis showed that vigilance and defensive avoidance were the underlying constructs or "factors" that explained the correlations among a set of variables measuring attitudes toward skin cancer and protective behaviours such as sunscreen use. Bolstering and avoidance were clearly maladaptive, by being associated with less knowledge about skin cancer and environmental issues and less endorsement of protective behaviours.

One limitation of this study is that the authors did not include a measure of hypervigilance. In selecting questionnaire items, the authors did not appear to consider questions/statements relating to panic-like behaviour (e.g., "I am scared to death about the possibility of developing skin cancer"), vacillation (e.g., "I cannot make up my mind whether or not to sunbathe/use sunscreen"), impulsive choice (e.g., "I usually decide on the spur of the moment whether or not to use suncreen"), information overload (e.g., "There is so much confusing information about skin cancer") and cognitive impairment (e.g., "I can't think clearly about how to protect myself from skin cancer because the whole issue is too frightening"), factors which characterise hypervigilant behaviour. Hypervigilance is likely to be reported by people who, for example, come "face-to-face" with the threat of skin cancer, either by developing sunburn or early physical symptoms of skin melanomas and carcinomas, and/or learning about a significant other who has recently developed

these symptoms. Such a powerful challenge will create the perception of imminent danger and hence make for poor judgement and inefficient action.

White *et al* (1994) examined the role of coping styles in attendance for a screening test for cervical cancer, a cancer which affects one out of every 100 women in the Australian state of Victoria. Cervical cancer is one of a few cancers for which a treatable precursor stage can be identified through an uncomplicated procedure called the Pap smear test. The test entails internal examination of the pelvis, by a doctor, during which a sample of cells are taken from the cervix. The cell sample is sent to a laboratory to determine the presence of pre-cancerous or cancerous cells. If abnormalities are found, treatment or further investigation may begin. Several investigations have demonstrated the effectiveness of the Pap test in reducing a woman's risk of cervical cancer. To protect against cervical cancer, women are advised to have a Pap test at least every two years. Women who have not had a Pap test within this time period increase their risk of cervical cancer and are considered overdue for the test. Although screening has been available in Australia for over two decades, it has been estimated that only 40% of cervical cancers are being prevented. This is partly due to failure to have a Pap-test, with only 50% of women having an adequate screening history.

As the decision to have a Pap test involves the possibility of discovering cancer, while the decision not to have a test involves the possibility of letting a cancer develop, the decision to have a test involves considerable conflict. According to Conflict-Theory, the decision to test is a function of the coping strategy a woman adopts. White *et al* identified four groups of women; those who initiated having the test themselves, those who were recruited (by their doctor) for the test, those who were overdue and those who had never been screened. As current behaviour is a consequence of both past and present decisions, present screening status was taken as an indicator of the decision to have the Pap test. One aim of the study was to

determine if the use of defensive avoidance differed between groups and also to establish whether a generalised tendency to use each of vigilance, hypervigilance and defensive avoidance was related to screening status.

Participants comprised 302 women aged between 20 and 66 years, with 26% being under 30 years and 54% aged between 30 and 39 years. Use of defensive avoidance was assessed by statements like "If a woman feels healthy in every way, there is no need to have a Pap smear test". Factor analysis yielded a rationalisation (bolstering) scale (e.g., "No need to have a test if healthy", alpha, .77) and a procrastination scale (e.g., "Extra year or two between tests is OK", alpha, .70). Scores on these scales were combined to form an avoidance index. The Flinders Questionnaire was used to measure generalised coping styles.

Analysis revealed a significant difference between the four groups on the use of defensive avoidance: consistent with Conflict-Theory, women who were overdue for their Pap test showed greater avoidance than women who either initiated their last Pap test or were recruited to have the test. Furthermore, women who initiated the test themselves were less defensive than women who were recruited to have the test. Cronbach alpha's for the Flinders Questionnaire scales were .74 (vigilance), .59 (hypervigilance), .68 (defensive avoidance), .72 (buckpassing), .73 (procrastination) and .50 (rationalisation). The only significant difference found in general coping styles was between the overdue group and the recruited group; those in the latter group scored higher on hypervigilance ($p<.05$).

White *et al* offer no explanation for the failure to find relations between most of the Flinders scales and screening status. In their introduction, they suggest that acceptance of a doctor's advice to test may reflect unconflicted change (i.e., little or no threat is associated with testing) with the woman accepting medical advice as to whether to have a test, or buck-passing, with the woman turning the decision over to the doctor. However, it seems unlikely that testing will be perceived as

nonthreatening (testing carries the risk of discovering that one has cancer), and while buck-passing may be employed, the findings suggest that those who accepted the doctors advice were generally more likely than others to accept any advice, reliable or not, and hastily adopt any recommended solution that promises to offer immediate relief (i.e., were more hypervigilant).

The authors surmised that generalised coping styles were not related to screening status, that the negative findings may have been due to measurement error, theory failure, or both. They suggested that the constructs measured in the Flinders Questionnaire may be better suited to situations in which the decision is currently being made and pros and cons are being weighed for the first time. Indeed most of the women in the study made the decision whether to have a Pap test some time prior to completing the survey. This explanation however is not substantiated by results from previous research, where general coping patterns (assessed with the Flinders Questionnaire) were found to be related to on-going decisions (e.g., Burnett *et al*, 1989). Perhaps, generalised coping styles play a more indirect role, for example, by moderating the effects of situational factors (e.g., attitudes/beliefs) on the decision, as proposed by Conflict-Theory (*Section* 2.4.8). In any case, the low internal reliabilities (alpha <.65) of some of the scales (hypervigilance and rationalisation) in White *et al*'s study may have attenuated relations between general coping modes and screening status. Factor analyses of the scales before administration to subjects would have helped (dis)confirm the existing factor structure and allow the modification of items to enhance the reliability of the scales.

White *et al*'s research is further limited by their failure to incorporate measures of vigilance and hypervigilance in relation to having a Pap test. No reason is given for not measuring vigilance even though the authors acknowledge that alternative solutions to the conflict generated by the decision whether to test may be found and that a woman who is aware of acceptable alternatives (one condition for vigilance)

can be expected to display vigilance (p.60). In relation to hypervigilance, the authors argue that in the decision to have a Pap test, although time may be important when a woman has to make an immediate decision, for example, if she is confronted with having to make a decision in a doctor's consulting room, it is unlikely that time limitations would influence the decision. There appear to be no grounds for such an assertion. In addition to hypervigilant behaviour being induced by a doctor's ultimatum, this coping mode may be evoked by other powerful challenges that elicit strong perceptions of personal vulnerability, such as having a friend who recently received a positive test result or developing ominous symptoms such as vaginal discharge. Hypervigilance may lead to an ill-considered and hence easily reversed decision to have the test, as one option and then another seems to be the most appropriate action to take.

Rippetoe and Rogers (1987) examined the role of adaptive and maladaptive coping styles in women's intentions to perform breast self-examination (BSE) in response to the threat of breast cancer. They noted that despite being presented with threatening information that requires attitude/behaviour change, many people continue with their risky habits. Rationalisations and other maladaptive responses to threat may support people's risky behaviour. The adoption of BSE as a regular habit is of great importance to women who wish to avert the potentially disfiguring, emotionally devastating, and often fatal consequences of breast cancer. Yet, surveys indicate that only a minority of American women practise BSE.

Two adaptive coping styles (intention to perform regular BSE's, rational problem solving) and five maladaptive coping patterns (religious faith, avoidance, wishful thinking, fatalism, hopelessness) were assessed. Rational problem solving referred to seeking out more information about BSE, analysing the problem and making an effective plan to remedy it (e.g., "I am motivated to learn more about the connection between self-examination of the breasts and surviving breast cancer").

This pattern is compatible with vigilance. Religious faith referred to the use of one's spiritual cognitions and faith in God's will to cope with the possibility of breast cancer (e.g., "When it comes to the possibility of developing breast cancer, I think it best to pray and put the problem in God's hands") and is compatible with shifting responsibility, a form of defensive avoidance.

Avoidance was defined as an attempt to evade actively or deny the threat (e.g., "I try not to think about the possibility of developing breast cancer") and is consistent with defensive avoidance (procrastination/ bolstering). Wishful thinking was described as a tactic that prompts the use of panaceas or unrealistic solutions to a problem (e.g., "I believe a miracle cure for cancer in the near future is the answer to my fears about breast cancer") and is compatible with defensive avoidance (bolstering). Fatalism was defined as the acceptance of a stressful situation as unchangeable and complacency in the face of danger because nothing can be done anyway (e.g., "If you are destined to die from breast cancer, you will; there is really very little you can do about it") while hopelessness referred to absence of belief in possible solutions to a threat such as cancer without acceptance (e.g., "Given what I know about breast cancer, I sometimes feel it's almost useless to try to stay healthy"). Hopelessness and, to a lesser extent, fatalism, are consistent with defensive avoidance since they both entail low optimism about finding a solution. Cronbach alpha's for all seven coping modes ranged from .60 (religious faith) to .91 (intentions).

Subjects were 163 female students who had not performed a correct BSE every month for the past 3 months, and did not have breast cancer or a history of previous breast cancer. In path analysis, several maladaptive coping styles had dysfunctional effects (all p's $<.05$) on health beliefs (severity of breast cancer, self-efficacy for performing BSE), fear (concerning breast cancer) and intentions to perform BSE. Avoidance decreased fear and also decreased intentions to perform BSE.

Hopelessness, while having the adaptive effect of increasing severity cognitions which in turn increased intentions to perform BSE, increased fear which in turn increased avoidance (which reduced intentions). Wishful thinking was completely maladaptive. This coping mode reduced perceived severity (which lowered BSE intentions), increased fear (which strengthened avoidance, hence lowering BSE intentions) and reduced self-efficacy which in turn reduced intentions to perform BSE.

Rippetoe and Rogers suggest that these findings confirm the argument of the Yale researchers (i.e., Janis & Feshbach, 1953) that defensive reactions could occur which produce undesirable effects from the perspective of the communicator and prevent a person from accepting the communicator's recommendation. Indeed these findings confirm the maladaptive quality Conflict-Theory ascribes to defensive avoidance. The authors offer no explanation for the failure of rational problem solving to emerge as a significant predictor. It is possible that vigilant-style coping does not play an important role in relation to breast cancer for which BSE may be the only viable preventive option and threat-relevant information may be ambigous and hence open to defensive distortion and/or evasion. Furthermore, because the authors adapted their measures of coping from the general stress-coping literature (see McCrae, 1984), rather than Conflict-Theory, hypervigilant coping was not assessed.

3.4 COPING STYLES AND TECHNOLOGICAL RISK DECISIONS

Eiser *et al* (1990) examined the role of coping styles in people's attitudes towards the Chernobyl disaster. They began by noting that people may resist changes in their attitudes when they become aware of a threat and that making ideological or political decisions can give rise to conflict (and hence stress). The nuclear accident at Chernobyl in April 1986 provided a good opportunity to examine the relevance

of Conflict-Theory coping patterns to understanding reactions to this event of great national importance. The news of the accident was threatening and uncertain in its implications both immediately and long after the disaster. The Chernobyl accident could be regarded as involving decisional conflict in that it was incompatible with the favourable estimations of the safety of nuclear power stations held by many ordinary people, and also it raised the question of whether ordinary people could do anything to reduce their personal susceptibility to the ill effects of not just the Chernobyl catastrophe, but also of nuclear accidents which might occur in the future. This study examined the relationship between people's attitudes towards news of Chernobyl and their preferred style of coping with decisional conflict within a political context. Coping styles were expected to be related to how personally threatening or important the accident was seen to be.

Participants comprised 840 individuals (mean age 23.6 years) recruited from several large European and Australian cities. Coping styles were measured using the Flinders Questionnaire (Mann, 1982). Items were reworded to specify political decision making as the main focus. Attitudes towards Chernobyl were assessed with items such as "What happened at Chernobyl could easily happen at any nuclear power station" and "I feel sure that there are going to be many more nuclear disasters before very long". Factor analysis of the coping items yielded several factors which seemed to reflect distinct coping styles; defensive avoidance (e.g., "I put off taking a stand on political issues"), self-esteem/vigilance (e.g., "I feel confident about my ability to make decisions on political issues", "I like to consider all of the alternatives before making a political choice") and hypervigilance (e.g., "I get very worked up when I have to make a political choice").

Factor analyses of the attitude measures yielded three factors including a 'pronuclear' factor associated with less fear concerning Chernobyl and nuclear safety generally and an 'involvement' factor reflecting greater attention to

Chernobyl and more interest in and knowledge about nuclear power. In multiple regression, high levels of defensive avoidance predicted high levels of pronuclear attitudes ($p<.001$). Low levels of defensive avoidance ($p<.001$) and high levels of self-esteem/vigilance ($p<.001$) predicted high degrees of involvement. Thus, those people who paid more attention to and were more fearful of the accident, were less likely to use avoidant tactics and had greater self-esteem/vigilance. The authors concluded that coping styles were related to the degree of anxiety and attention evoked by the Chernobyl accident and that, consistent with Conflict-Theory, defensive avoidance and vigilance are contrasting means of coping with threat.

Eiser *et al* do not discuss what seems to be lack of support for hypervigilance as an important determinant of reactions to Chernobyl. Only one item ("I get very worked up when I have to make a political choice") loaded heavily (i.e., >.50) on the hypervigilance factor which predicted neither involvement nor pronuclear attitudes. Assuming the single-item measure was reliable, the results suggest that hypervigilance is a redundant conflict-resolution measure in reactions to nuclear accidents. This may be related to the length of time between the Chernobyl accident and the study. Hypervigilance is normally evoked in situations where severe danger is perceived to be fast approaching and imminent (Janis, 1986). Data were collected from subjects at least 3 months after the accident, by which time any hypervigilant reactions (e.g., panic, vacillation, impulsive choice, confusion) would have dissipated and/or been replaced by vigilant or avoidant coping. The authors also fail to provide data on the internal reliability of each coping scale[3]. Low alpha's would have attenuated relations between coping and attitudes (Hypervigilance was assessed with a single-item measure and this may partly explain the failure of this

[3]Although it should be noted that scores for each scale did not reflect total factor scores (see Eiser *et al*, 1990).

coping mode to impact on attitudes. Single item measures generally tend to be unreliable).

3.5 LIMITATIONS OF EXISTING RESEARCH

In general, the studies reviewed in the preceding section support Conflict-Theory postulates about the role of vigilance, defensive avoidance, and hypervigilance in health decisions. For example, Van der Velde and Van der Pligt (1991) found that high levels of vigilance, and low levels of defensive avoidance, respectively, predicted (directly or indirectly) higher intentions to use condoms. Van der Velde *et al* (1992) also found that high levels of defensive avoidance predicted greater sexual risky behaviour. Eiser *et al* (1995) observed that vigilance and defensive avoidance were the underlying factors that explained the correlations amongst measures of attitudes towards skin cancer and protective behaviours such as sunscreen use. In this study, vigilance was positively correlated with self-reported vulnerability to sunburn. White *et al* (1994) found that failure to present for cancer screening was associated with higher levels of defensive avoidance.

These findings are consistent with Conflict-Theory predictions that high levels of vigilance relate to low levels of health risk-taking, whereas high levels of defensive avoidance and hypervigilance relate to high levels of health risk-taking (*Chapter* 2, *Section* 2.4.8).

Several methodological issues were raised. For example, some studies did not incorporate a measure of hypervigilance (e.g., Eiser *et al*, 1995; White *et al*, 1994). Other studies (e.g., Van der Velde *et al*, 1991; Van der Velde & Van der Pligt, 1991) failed to employ the Flinders instrument developed by Mann and his colleagues (Mann, 1982; Radford *et al*, 1986; Mann *et al* 1988; Brown & Mann, 1990) to assess vigilance, defensive avoidance, and hypervigilance. However, two *main* limitations can be identified from the literature review. These are:

(1) The focus on *adult* participants.

(2) The focus on coping styles as *mediators* of relations between health beliefs and decisions.

3.5.1 The focus on adults

None of the studies reviewed set out to apply Conflict-Theory postulates to an adolescent and/or pre-adolescent population. Hence, most studies used persons aged 20 years or more. Age ranges reported were 18-30 years (Van der Velde & Van der Pligt, 1991) and 20-66 years (White *et al*, 1994). In White *et al*'s study, the majority of subjects (54%) were aged between 30 and 39 years. Eiser *et al* (1995) reported average ages (for British and Italian men and women) ranging from 29.39 years to 36.05 years. Van der Velde *et al* (1992) recruited people aged at least 17 years, while Eiser *et al* (1990) reported an mean age of 23.6 years. Rippetoe and Rogers (1987) did not provide age-related information. However, subjects were university undergraduates and it seems safe to assume that most were aged at least 18 years (i.e., in late adolescence/early adulthood).

If adolescence is defined as an age period from 10 to 19 years (Nutbeam & Booth, 1994), it becomes clear that the research findings reviewed above may not generalise to this age group, particularly adolescents aged below 17 years. This gap in the literature is important given the growing need to understand the role of threat coping patterns in adolescents' health decisions (Gladis *et al*, 1992).

As stated in *Chapter* 2, most teenagers in the Western world are aware of the major health risks and appear to have the 'right' health beliefs, for example, about the seriousness of major health risks and the lifestyle factors with which they are associated (e.g., Sutton, 1992; Steptoe & Wardle, 1992). Yet, many teenagers fail to take steps to protect their health (Nutbeam & Booth, 1994). For example, research has shown that adolescents are more likely than adults to expose themselves to

solar ultraviolet radiation (see Fritschi, Green & Solomon, 1992; Borland, 1990). Coping styles are purported to play an important role within this context (Fruin *et al*, 1991; Gladis *et al*, 1992). For example, adolescents' risk behaviour has been attributed partly to their *denial* of personal vulnerability to threat (e.g., Abraham *et al*, 1994). Major health threats like heart disease, cancer, and stroke may seem very ambigous and remote to teenagers and hence be more easily denied and/or ignored (Van der Pligt, 1994).

3.5.2 The focus on coping styles as mediators of belief-decision relations

As outlined in *Section* 2.4.8, Conflict-Theory associates coping styles with the adoption of risky or protective behaviour in response to threat. In effect, coping styles account for the relationship between people's health beliefs and decisions. In this regard, two widely cited studies (Van der Velde & Van der Pligt, 1991; Rippetoe & Rogers, 1987) examined coping patterns as *mediators* of relations between health beliefs (from Protection Motivation Theory; see Rogers, 1983) and behavioural intentions. A mediator represents a mechanism that specifies how or why a relationship between two variables occurs (Lindley & Walker, 1993). Van der Velde and Van der Pligt (1991, *Section* 3.2) tested a model in which risk perceptions and efficacy beliefs influenced intentions to use condoms through vigilance, defensive avoidance, and hypervigilance. Health beliefs emerged as mediators of relations between coping styles and intentions (in heterosexual subjects), but no evidence for coping styles as mediators was found. Rippetoe and Rogers (1987, *Section* 3.3) also found limited evidence for coping styles as mediator variables. These findings have led to the view that coping styles contribute little to our understanding of health decisions (Abraham *et al*, 1994), hence the common practice of excluding coping measures from health behaviour research (see reviews by Van der Pligt, 1994; Boer & Seydel, 1996).

However, mediation is only one of two ways by which coping styles may be implicated in belief-decision relations. As Conflict-Theory suggests (*Section* 2.4.8), vigilance, defensive avoidance, and hypervigilance may *moderate* relations between health beliefs and decisions. A moderator variable influences the strength and/or direction of relations between two variables. The moderator effect can be described as an *interaction* between a predictor and a moderator (Lindley & Walker, 1993). More importantly, absence of a mediator effect does not necessarily imply absence of a moderator effect, or vice versa (Baron & Kenny, 1986, p.1178).

The relevance of coping patterns as moderators of belief-decision relations is currently a highly important issue in health psychology. Widely used health decision models such as the Health Belief Model (HBM; Janz & Becker, 1984), and Protection Motivation Theory (PMT; Rogers, 1983) propose that beliefs about the seriousness of a threat, one's vulnerability to the threat, and the benefits or efficacy of recommended preventive action, affect a person's motivation to adopt health-protective behaviours. Previous studies have related beliefs specified by the HBM and PMT to health decisions in adolescents (Nutbeam *et al*, 1989; Fruin *et al*, 1991; Holund, 1991; Arnold & Quine, 1994; Nutbeam & Booth, 1994; Abraham *et al*, 1994, 1996; Sheeran & Abraham, 1996; Sturges & Rogers, 1996). Results have been mixed, many studies reporting insignificant relations between health belief and decision measures (e.g., Fruin *et al*, 1991; Abraham *et al*, 1992; Abraham *et al*, 1994, 1996; Maddux & Rogers, 1983; Sheeran & Abraham, 1996). For example, studies have found no relations between beliefs about the efficacy of regular exercise and intentions to exercise regularly (Wurtele & Maddux, 1987; Fruin *et al*, 1991), between beliefs about the seriousness of, and vulnerability to, ill health and sugar consumption (Rise & Holund, 1990), and between vulnerability beliefs regarding HIV/AIDS and condom-related intentions (Abraham *et al*, 1994, 1996).

Research on the role of Conflict-Theory coping styles as moderators of relations between health beliefs and decisions could have major implications for the applicability of the HBM and PMT to health decisions in teenagers. Indeed, these models have been criticised for proposing relations between health beliefs and decisions without accounting for coping differentials (Janis, 1984, 1986; Van der Velde & Van der Pligt, 1991). For example, Janis (1984) maintains that "...the health belief model, like other models of rational choice, fails to specify under what conditions people will give priority to avoiding subjective discomfort at the cost of endangering their lives, and under what conditions they will make a more rational decision." (pp.331-332). Research in this area may shed much light on instances in the literature where studies report insignificant associations between health beliefs and decisions in adolescents (e.g., Rise & Holund, 1990; Abraham *et al*, 1994, 1996).

3.6 EXTENDING CONFLICT-THEORY TO ADOLESCENTS

It has been argued that previous applications of Conflict-Theory to health decisions are limited by their focus on adults, that coping styles may play an important role in adolescents, particularly as moderators of belief-decision relations. However, on what empirical grounds should one expect Conflict-Theory to be applicable to adolescents? Some studies have successfully applied coping constructs compatible with Conflict-Theory coping patterns to health-related choices in teenagers (Abraham, Sheeran, Abrams & Spears, 1994; Gladis *et al*, 1992).

Coping constructs. Abraham *et al* (1994) examined the role of coping styles in adolescents' motivation to have safe sex. They noted that substantial proportions of young people engage in risky sexual practices (e.g., multiple sex partners, unprotected anal intercourse, inconsistent condom use) despite the fact that preventive sexual practices have been strongly recommended as precautions by

public health experts. Perception of threat and self/response efficacy cognitions may result in maladaptive coping patterns which protect the individual from the threat without generating protection motivation. Indeed, coping modes such as denial may undermine adaptive cognitions. Hence, one aim of the study was to explore the role of maladaptive coping styles in adolescents' motivation to use condoms in response to AIDS/HIV. The research was based in Dundee, an area of high risk for HIV infection, especially among people in the 15-24 age group. 507 adolescents with a mean age of 16.8 years took part.

Five maladaptive coping responses which might result from the threat of HIV/AIDS were considered; homophobia, irrational fear, denial, fatalism and wishful thinking. Factor analysis generated four factors. However, only the irrational fear items (e.g., "If someone I liked got the AIDS virus, I would not mind kissing them") formed a reliable measure and the other three factors (each with two items) were treated as separate single-item measures; denial (general) ("I try not to think about the possibility of catching the AIDS virus"), denial (in relation to sex) ("I try not to think about AIDS when I think about sex"), fatalism (general) ("No matter what precautions you take you might still get the AIDS virus"), fatalism (some people) ("Getting the AIDS virus just happens to some people regardless of whether they take precautions"), wishful thinking (God) ("I feel that God will protect me from the AIDS virus") and wishful thinking (science) ("If I caught the AIDS virus it would not be long before a cure was found"). These measures of coping are compatible with the procrastinating (denial) and bolstering (wishful thinking, fatalism) forms of defensive avoidance specified by Conflict-Theory.

In regression analysis, only denial (general) emerged as a significant predictor of anticipated condom use: as denial increased motivation to use condoms decreased, in line with Conflict-Theory propositions. Abraham *et al* surmised that maladaptive coping styles contribute little to the predictive impact of health beliefs, that in

general, maladaptive coping modes do not undermine readiness to take preventive action. They did however suggest that denial/avoidance may be more likely than other maladaptive coping styles to undermine protection motivation.

In a widely cited study, Gladis *et al* (1992) examined the role of maladaptive coping in adolescents' perceptions of risk for AIDS. They began by noting that despite the genuine threat of AIDS, people in general, and adolescents in particular, may not perceive the risk as real or immediate. Many studies have shown that most adolescents do not feel vulnerable to AIDS even when they engage in high risk sexual behaviours such as unprotected anal intercourse. They noted that inaccurate cognitions about risks may undermine precaution motivation, leading to a markedly increased risk of contracting HIV/AIDS. Biased risk perceptions may reflect a desire to allay feelings of fear and anxiety and there has been speculation about the role of defensive denial.

The main aim of the study was to establish the contribution of defensive coping to distorted risk judgements by demonstrating an association between unrealistic risk judgements about a genuine threat and a measure of defensive denial. The study employed a trait measure of coping with threat - repression and sensitisation (R-S; Bryne, 1964) - in relation to AIDS risk perceptions at various levels of behavioural risk. Repression is compatible with defensive avoidance; repressors are theorised to be dispositionally prone to dealing with threat through the use of several avoidance strategies, including repression, denial, and rationalisation. Sensitisation is similar to vigilance; sensitisers are thought to be exceptionally vigilant about threat and seek out more risk information. Using an R-S scale as a measure of a predisposition to avoid threat, Gladis *et al* expected that repressors would deny that they were at risk for AIDS and that this denial would be more pronounced when there was greater actual threat.

Subjects were 296 adolescents with a mean age of 15.3 years (range=13 to 19 years). Data analysis revealed that sensitisers and neutrals (i.e., intermediates between sensitisers and repressors) used their behaviours as a basis for assessing personal risk, in the sense that they generally perceived higher risk when their behaviour was in fact riskier. On the other hand, repressors engaging in risky behaviours actually reported that their risk was lower. Gladis *et al* considered these findings to reflect the essence of motivated denial, with misperception of risk occurring under the condition of greatest threat (and, presumably, greatest fear; see Janis & Feshbach, 1953). When the results of other analyses were considered, they suggested a pathway by which denial affects AIDS-risk behaviours. In addition to the evidence that R-S had a direct impact on risk judgements, another finding was that these risk judgements increased intentions to change behaviour due to AIDS (among those engaging in behaviours that might put them at risk). Thus, the results point to an indirect (maladaptive) effect of defensive avoidance on future preventive behaviour through its negative effect on risk perceptions.

The Flinders Questionnaire. On what empirical grounds should one expect the Flinders Questionnaire, the instrument designed by Mann and his colleagues (Mann *et al*, 1982; Mann *et al*, 1988) for measuring Conflict-Theory coping styles, to be applicable to decisions amongst adolescents? Two studies have been found which demonstrated relations between coping styles, as measured with the Flinders instrument, and adolescents' attitudes/behaviour concerning academic and career decisions (Beswick, 1988; Burnett *et al*, 1989). Like health decisions, academic/career choices usually involve serious consequences for the individual which can generate considerable decisional conflict (see Janis & Mann, 1977a).

Burnett *et al* (1989) investigated the relationship between coping styles (vigilance, defensive avoidance, hypervigilance) and student competence and satisfaction in course and career choices. They noted that of the many consequential

decisions that people make in their lives, decisions about career choice are among the most relevant. For many young people, the decision to attend university and enrol and pursue a particular course of study is the beginning of their career. Participants were 40 university students aged 17-31 years with a mean age of 19.5 years. Participants were administered the Flinders Instrument together with measures of competence in course and career decision making. Three measures were used as indicators of competence in course decision making - independence in choice of course; satisfaction with course; and planning (i.e., a clear idea of subjects to be studied during the course). Two measures were used as indicators of competence in career decision making - work planning (a clear idea of future career) and recognition of options for future employment. The authors expected positive correlations between scores on vigilance and measures of competent decision behaviour and negative relations between defensive avoidance/hypervigilance and decision behaviours. Internal reliabilities for the coping scales were .77 (defensive avoidance) and .74 (hypervigilance)[4].

As expected, vigilance was significantly positively related with satisfaction with course, defensive avoidance was negatively related to course planning ($p<.05$), career planning and career options, while hypervigilance was negatively related to independence of course choice and career options (all p's$<.05$). Burnett *et al* concluded that these findings were evidence of the validity of the Flinders Questionnaire scales as modest predictors of decision behaviour. To establish whether the coping scales could predict future decision behaviour, a second study was conducted in which a sample of students who were administered the Flinders Questionnaire during their first year at university were administered the decision behaviour measures in their second year, approximately 18 months later. Subjects

[4] No alpha coefficient is given for the vigilance scale.

in this second investigation were 42 students with an average age of 23 years. Participants filled in the decision behaviour items in their tutorial classes as part of a survey on student satisfaction with university and course of study. No mention was made of a link between the Flinders Questionnaire data collected in the previous year. Each student's coping scores were obtained from data archives and matched with data obtained from the course and career decision items. As predicted, vigilance correlated positively with decision behaviours, although only two reached statistical significance. They were course planning ($p<.01$) and career planning ($p<.05$). As in the first study, the two maladaptive coping styles - defensive avoidance and hypervigilance - were negatively correlated, albeit not significantly, with the decision behaviours. The exception was the near-zero positive correlation ($r=.04$) between hypervigilance and independence of choice of course.

The authors surmised that, while the correlations were weak, they were consistent with Conflict-Theory predictions, and, given the 18 months interval separating administration of the Flinders Questionnaire and the decision behaviour items, were encouraging. If students use vigilance in choosing a course of study, they are more likely to have evaluated the subjects they are going to study and the potential costs and benefits of such a course. The significant correlations between vigilance and course and career planfulness in both studies suggests this is the case. The reverse was found for those with high scores on defensive avoidance. These individuals were low in course and career planning and tended to be less satisfied with their course. Furthermore, these findings are consistent with Janis and Mann's (1977a) description of the hypervigilant decision maker as someone who latches onto the first available alternative that is salient or recommended by others.

In another investigation involving adolescents, Beswick (1988) examined the role of procrastination (a form of defensive avoidance), as measured by the Flinders

Questionnaire, in students' delay in making important academic decisions. They began by noting that procrastination on academic tasks is a common problem amongst students which often has serious consequences. Many students defer preparation for tests and examinations until the last minute and submit assignments after the deadline. Such procrastination may reflect severe decisional conflict, coupled with lack of hope of finding a solution to the problem (the conditions that make for defensive avoidance; see *Section* 2.4.6). For example, a student who postpones starting work on an assignment may be conflicted about which topic to choose or may be undecided about what is required. Items in the Flinders Questionnaire that relate to procrastination include "Even after I have made a decision, I delay acting upon it", "I put off making decisions", "I delay making decisions until it is too late", "When I have to make a decision, I wait a long time before starting to think about it" (alpha, .80).

The decision measures in this study were the time taken to submit a 1000 word term paper (grades on the paper counted toward the final course grade and late submission drew a penalty) and self-reported tendency to procrastinate on various academic tasks. A specific deadline for submission of the term paper was set and announced. Subjects comprised 245 students with a mean age of 23 years. Although ages ranged from 16 to 58 years, the majority of participants (n=139, or 56.7%) were aged less than 21 years. Consistent with Conflict-Theory, there was a significant correlation between the Flinders measure of procrastination and delay in submitting the term paper ($p<.05$), and also between the Flinders measure and self-reported procrastination ($p<.001$). As procrastination increased, so did the delay in submitting the term paper and the tendency to delay in resolving academic tasks. In regression analysis, procrastination emerged as a significant predictor of both time taken to hand in the term paper and self-reported procrastination. Burnett

et al interpreted this finding as modest support for the role of procrastination in the decision to hand in a term paper and self-reported procrastination.

In summary, the research findings reviewed above show significant associations between adolescents' decision making and their use of vigilance, defensive avoidance, and hypervigilance. In one study (Gladis *et al*, 1992), measures compatible with vigilance and defensive avoidance were indirectly related, respectively, to higher and lower intentions to adopt health-protective behaviour (i.e., to avoid the HIV virus). Furthermore, coping styles, as measured by Flinders Questionnaire, showed associations with teenagers' academic and career decisions, with more informed 'rational' decision making being associated with greater use of vigilance, and less reliance on defensive avoidance and hypervigilance (e.g., Burnett *et al*, 1988). Overall, these findings provide empirical justification for expecting Conflict-Theory coping constructs, based on the Flinders Instrument, to be applicable to adolescents.

3.7 RESEARCH QUESTIONS AND HYPOTHESES

This chapter began by reviewing empirical tests of Conflict-Theory predictions within a health-related context. Research on Conflict-Theory is limited. Existing research has focused on health decisions relating to HIV/AIDS, cancer screening and reactions to technological risks. The main limitations of existing research is the focus on adults, and on the role of coping styles as mediators of belief-decision relations. Thus, little is known about the applicability of Conflict-Theory postulates to *adolescents*, especially with regard to coping patterns as *moderators* of relations between health beliefs and decisions.

The primary aim of the project reported here was to extend the existing literature by testing, in a population of *adolescents* rather than adults, the validity of Conflict-Theory hypotheses about the role of threat coping patterns (vigilance, defensive

avoidance and hypervigilance) as *moderators* rather than mediators of relations between health beliefs and decisions. A secondary objective was to test Conflict-Theory propositions that vigilance is related to lower health risk-taking, whereas defensive avoidance and hypervigilance are related to greater health risk-taking.

The following questions were asked and hypotheses tested:

(a) Does a dispositional tendency to use vigilance strengthen relations between health beliefs and decisions, and a propensity to use defensive avoidance or hypervigilance attenuate relations between health beliefs and decisions? It was hypothesised that:

- *Health beliefs better predict decisions in adolescents who are high on vigilance;*
- *Health beliefs better predict decisions in adolescents who are low on defensive avoidance;*
- *Health beliefs better predict decisions in adolescents who are low on hypervigilance.*

Chapter 4 reports the large-scale study in which these hypotheses were tested.

(b) Is vigilance related to lower health risk-taking, and defensive avoidance and hypervigilance related to greater health risk-taking? It was hypothesised that:

- *Higher levels of vigilance relate to lower levels of health risk-taking;*
- *Higher levels of defensive avoidance relate to higher levels of health risk-taking;*
- *Higher levels of hypervigilance relate to higher levels of health risk-taking.*

Chapter 5 reports an investigation in which these hypotheses were tested.

CHAPTER FOUR

CONFLICT-THEORY COPING STYLES AS MODERATORS OF RELATIONS BETWEEN HEALTH BELIEFS AND DECISIONS

(Umeh, in press)

4.1 INTRODUCTION

This chapter reports a study testing in adolescents Conflict-Theory hypotheses about the role of coping styles in belief-decision relations[1]. Before presenting the study, it is necessary to briefly reconsider the background empirical and theoretical literature reported in *Chapter*s 2 and 3.

In *Chapter* 2, it was argued that although most teenagers are aware of health risks and believe that their lifestyle affects their health, many continue to engage in health-threatening behaviour (Nutbeam & Booth, 1994). How adolescents cope with threat has been implicated in their health decisions (Fruin *et al*, 1991; Abraham *et al*, 1994). For example, adolescents' failure to take measures to protect their health has been partly attributed to their denial of personal risk (e.g., Gladis *et al*, 1992).

A number of models posit that threat can elicit a variety of cognitive, emotional and behavioural coping responses, with implications for decision making (e.g., Hovland *et al*, 1953; Leventhal, 1970; Abelson, 1968). Janis and Mann's (1977a) Conflict-Theory model offers explicit postulates about how different coping patterns - vigilance (accurate and complete information search and appraisal), defensive avoidance (evasion of anxiety via procrastination, denial of responsibility, and bolstering), and hypervigilance (panic-like and impulsive search for an appropriate response) - interact with response-efficacy (beliefs about the effectiveness of a recommended preventive action in reducing threat) and threat perceptions (beliefs about the seriousness of a threat, and ones vulnerability to the threat) to enhance or diminish the strength of associations between beliefs and decisions (Janis, 1983, 1984).

Janis (1983) posits that "...people will weigh the benefits of a recommended course of action against the perceived costs or barriers to taking that action, as is

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[1]The research publication titled *Coping styles as moderators of cognition-decision relations amongst adolescents* (Umeh, in press) is based on this chapter.

assumed by the rational models, only when their dominant coping pattern is vigilance" (p.146). He further proposes that "...When defensive avoidance or any of the other nonvigilant coping patterns is dominant, the decision maker will fail to engage in adequate information search and appraisal of consequences, overlooking relevant costs and benefits. Under those conditions, the outcome will not be correctly predicted by the health belief model or by any other rationalistic model of decision making" (p.146).

Vigilance is characterised by optimism about finding a solution, and the belief that there is sufficient time in which to do so. Since costs and benefits are carefully appraised in formulating a response to threat, Janis (1983, 1984) posits that health beliefs will more accurately predict decisions when people are high on vigilance. Defensive avoidance is mediated by pessimism about finding a solution. Since the focus is on reducing anxiety rather than evaluation of relevant costs and benefits, Conflict-Theory predicts weaker relations between health beliefs and decisions in persons high on defensive avoidance. Hypervigilance is mediated by the belief that danger is imminent. Given the extreme vacillation and superficial (if any) cost-benefit appraisals characteristic of this coping style, Conflict-Theory predicts attenuated relations between health beliefs and decisions in those high on hypervigilance.

In *Chapter* 3, it was noted that, hitherto, applications of coping constructs from Conflict-Theory to health-related decisions have focused mainly on adult samples (e.g., Eiser *et al*, 1995; Van der Velde *et al*, 1992), and the role of coping styles as mediators of belief-decision relations (e.g., Van der Velde & Van der Pligt, 1991). Thus, little is known about the role of Conflict-Theory coping styles in *adolescents'* health decisions, particularly as *moderators* of belief-decision relations. Limited evidence suggests that vigilance, hypervigilance and defensive avoidance can inform understanding of decision

making in adolescents (e.g., Burnett *et al*, 1989).

The present study aimed to address this gap in the literature, by extending to adolescents Conflict-Theory postulates about how threat and efficacy perceptions interact with threat coping styles in predicting health decisions. Research in this area could have major implications for the validity of social cognition models such as Protection Motivation Theory (Rogers, 1983), and the Health Belief Model (Janz & Becker, 1984). Both these models propose direct relations between threat/efficacy beliefs and intentions/behaviour, fail to account for coping differentials (Van der Velde & Van der Pligt, 1991; Van der Pligt, 1994), and are frequently employed to explain health decisions in adolescents (e.g., Sturges & Rogers, 1996; Fruin *et al*, 1991; Richard & Van der Pligt, 1991).

The following hypotheses were tested:

(a) health beliefs better predict decisions in adolescents *high* on vigilance;

(b) health beliefs better predict decisions in adolescents *low* on defensive avoidance;

(c) health beliefs better predict decisions in adolescents *low* on hypervigilance.

4.2 METHOD

4.2.1 Design

The study was based on a cross-sectional questionnaire survey, a research approach successfully employed in previous investigations on health beliefs, coping patterns, and decision making (e.g., Van der Velde & Van der Pligt, 1991; Van der Velde *et al*, 1992; Abraham *et al*, 1994; Gladis *et al*, 1992; Eiser *et al*, 1995; White *et al*, 1994)

Variables. The coping modes assessed were those specified by Janis (1983): vigilance, defensive avoidance and hypervigilance. Mann and his colleagues

(Mann, 1982; Radford *et al*, 1986; Mann *et al*, 1988) have developed scales for assessing people's tendency to use any, or all, of these coping patterns. These measures focus on how individuals usually approach decisions, and thus can be seen to assess *dispositional* coping styles. Results from several studies indicate that Mann *et al*'s dispositional measures of vigilance, defensive avoidance, and hypervigilance have some validity within the context of real-life decisions (e.g., Burnett *et al*, 1989; Beswick *et al*, 1988; Radford *et al*, 1986).

The health beliefs of interest were those addressed by Janis (1983): beliefs concerning the likelihood of a threat (vulnerability), the seriousness of the threat (severity), and the effectiveness of recommended protective behaviour in reducing the threat (response-efficacy).

Decisions were indexed by behavioural intentions. According to Rogers and colleagues (Rogers, 1975, 1983; Rogers & Mewborn, 1976; Maddux & Rogers, 1983; Rippetoe & Rogers, 1987), severity, vulnerability, and response-efficacy beliefs arouse "protection motivation", the primary measure of which has been behavioural intentions (see review by Boer & Seydel, 1996).

The health behaviours assessed were cigarette smoking, alcohol consumption, dietary fat avoidance, drug use, exercise and use of contraception. These behaviours have been identified as areas of public health priority, where research would have significant benefits for health promotion (Jacobsen *et al*, 1991).

Research has shown that health decisions in adolescence are significantly affected by demographic factors (Cohen *et al*, 1990), previous behaviour (Sheeran & Pascal, 1996), fear, and self-efficacy beliefs (Richard & Van der Pligt, 1991), in addition to health beliefs which Conflict-Theory postulates address. These extra factors were therefore included in the present study as *additional variables* which may account for some of the variance in behavioural

intentions.

4.2.2 Participants

Participants comprised 885 secondary school students including 430 males and 453 females. Three secondary schools within the metropolitan area of Northampton were approached, one agreed to participate. All students in grades 9, 10 and 11 were available to participate. One hundred and thirty-seven (15.5%) subjects were aged 13, 320 (36.3%) were aged 14, 294 (33.3%) were 15 years of age, 130 (14.7%) were 16 years of age and 1(.1%) was aged 17. The mean age was 14.47 years. Two hundred and ninety-four (33.22%) were in grade 9 (mean age, 13.54 years), 319 (36.05%) in grade 10 (mean age, 14.48 years), and 270 (30.51%) in grade 11 (mean age 15.49 years). Risk-taking in adolescence becomes more frequent and peaks roughly between the ages of 13 and 17 (Heaven, 1996). This age-range is therefore of special interest in health behaviour research. Eight hundred and thirty (94%) were White, 34 (3.9%) were Black, 17 (1.9%) were of Asian origin and 2 (0.2%) were classified as "other". Using the *Office of Population Censuses and Surveys* (1990) social class list, participants were classified into social class groups on the basis of the fathers[2] employment; 'professional' (N=71), 'intermediate occupations' (N=139), 'skilled nonmanual' (N=145), 'skilled manual' (N=425), 'partly skilled' (N=40), 'unskilled' (N=3) and 'armed forces' and 'inadequately described' (N=49)[3][4].

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[2]Mothers employment was used as an index of social class in cases where information about fathers employment was not available.
[3]'Armed forces' and 'inadequately described' were both treated as missing data. Members of the armed forces are not assigned any clear social class category in the OPCS (1990) manual.
[4]Figures may not add up due to missing data.

4.2.3 Measures

A comprehensive 77-item questionnaire was developed to assess health beliefs, coping styles, health behaviour, demographic variables, and behavioural intentions. Most research on the role of health beliefs and coping styles in health decisions has been based on questionnaire surveys (see reviews by Abraham & Sheeran, 1993; Conner & Waterman, 1996). To this end, there has been a proliferation of questionnaire scales designed to assess belief constructs based on the Health Belief Model (see review by Sheeran & Abraham, 1996), Protection Motivation Theory (see review by Boer & Seydel, 1996) and other health cognition models (see reviews by Norman & Bennett, 1996; Conner & Sparks, 1996; Schwarzer & Fuchs, 1996). The main means of assessing Conflict-Theory coping constructs has been the Flinders Decision Making Questionnaire (Mann, 1982; see review by White et al, 1994), more recently dubbed the Melbourne Decision Making Questionnaire (Mann et al, 1997).

Questionnaire surveys rely heavily on the assumption that people are uniquely placed to observe and report their own beliefs and coping behaviours (Conner & Waterman, 1996). This view is especially true for health beliefs. Although questions have been raised about the accuracy of people's self-reports of their cognitions (Abraham & Sheeran, 1993; Ingham, 1993), psychologists also recognise that health beliefs, unlike behaviours, are abstract constructs which cannot be directly observed (and hence measured) by others (Eagly & Chaiken, 1993). Although coping behaviours can be objectively measured through observational techniques, this approach can become impractical when dealing with large groups of participants (Conner & Waterman, 1996). These arguments have justified the use of questionnaire methods in previous research on the role of health beliefs and behavioural (coping) factors in health decisions (Conner & Waterman, 1996). The same arguments warrant the use of a

questionnaire design in the present project.

Measures of health beliefs, intentions, and additional variables were drawn from previous health behaviour research in which adequate reliability coefficients were reported (e.g., Van der Velde *et al*, 1992; Norman & Conner, 1993). Measures of perceptions of efficacy (response-efficacy, self-efficacy), fear, and threat perceptions (vulnerability, severity) were taken from Norman and Conners' (1993) *Health Questionnaire*. Intention scales were drawn from Ajzen and Fishbein's (1980) *Sample Questionnaire*. Measures of past behaviour were drawn from several sources; scales assessing substance use were taken from the *Office of Population Censuses and Surveys* (1992) research, fat avoidance from Steptoe and Wardle (1992), and physical exercise from Blaxter (1990). Measures of past sexual behaviour were adapted from Van der Velde and Van der Pligt (1991).

To detect ambiguous items, the questionnaire was pilot-tested on 20 boys and 12 girls aged from 14 to 16 years. These individuals were asked to complete the questionnaire and, in the process, highlight any item(s) that proved too difficult and/or confusing to answer. Difficult and/or ambiguous items were subsequently modified or deleted. At the request of the school authorities, items pertaining to sex were excluded from questionnaires administered to respondents in grades 9 and 10. A copy of the questionnaire is presented in *Appendix* A (grade 11) and *Appendix* B (grades 9 and 10).

Health behaviour. The questionnaire assessed respondents' substance-use/abuse (cigarette smoking, alcohol consumption and drug-use), dietary fat avoidance, physical exercise and sexual intercourse/condom-use (see *Appendix* A, *Section* C).

Substance use. Smoking was assessed with five options (*Question* 2): Never smoked ("I have never smoked") (1), Tried smoking once ("I have only ever

tried smoking once") (2), Used to smoke ("I used to smoke sometimes but I never smoke a cigarette now") (3), Occasional smoker ("I sometimes smoke cigarettes now, but I don't smoke as many as one a week") (4) and Regular smoker ("I usually smoke between one and six cigarettes a week", or "I usually smoke more than six cigarettes a week") (5).

Consumption of alcohol (e.g., beer, lager, cider, shandy, wine, martini, sherry, spirits, liqueurs) was assessed with seven response options (*Question's* 4 to 7): Never drunk alcohol (*Question* 4, "No" to "Have you ever had a proper alcoholic drink...?") (1), Used to drink (*Question* 4, "Yes"; *Question* 5, "I never drink alcohol now") (2), Very occasional drinker (*Question* 4, "Yes"; *Question* 5, "I drink alcohol only on very special occasions") (3), Occasional/regular drinker but none last week (*Question* 4, "Yes"; *Question* 5, "I occasionally drink alcohol" or "I drink alcohol regularly"; *Question* 6, "No" to "Have you had any alcoholic drinks during the past 7 days?") (4), Light drinker (*Question* 4, "Yes"; *Question* 5, "I occasionally drink alcohol" or "I drink alcohol regularly"; *Question* 6, "Yes"; *Question* 7, "1 to 5 drinks") (5), Moderate drinker (*Question* 4, "Yes"; *Question* 5, "I occasionally drink alcohol" or "I drink alcohol regularly"; *Question* 6, "Yes"; *Question* 7, "6 to 10 drinks") (6) and Heavy drinker (*Question* 4, "Yes"; *Question* 5, "I occasionally drink alcohol" or "I drink alcohol regularly"; *Question* 6, "Yes"; *Question* 7, "More than 10 drinks") (7).

Use of drugs (e.g., glue sniffing, solvent abuse, use of marijuana, cocaine, heroine) to get high was assessed with three items (see *Question's* 8 and 9): Never used drugs (*Question* 8, "No" to "Have you ever used drugs...?") (1), Previous user (*Question* 8, "Yes"; *Question* 9 "No" to "Do you ever use drugs to get high nowadays?") (2), and Current user (*Question* 8, "Yes"; *Question* 9, "Yes") (3).

Smoking, alcohol-use and drug-use measures, added together, formed a reliable 'substance use' scale with a Cronbach alpha of .67.

Dietary fat avoidance. Conscious efforts to avoid fatty foods (e.g., eggs, butter, sausages, bacon, chips) were assessed with four options; "never" (1), "not often" (2), "often" (3) and "very often" (4).

Physical exercise. Physical activity was measured by asking participants to indicate on a list of 23 exercise/sports events those activities which they had performed in the previous week, the number of times each activity had been performed and the average amount of time (in minutes) spent on each occasion. An estimated weekly energy-output score was then computed for each respondent. For each activity performed, calories output per minute (see activity calorie figures in Sharkey, 1975) was multiplied by the number of times the exercise was performed and the average amount of time spent on each occasion. Scores obtained were then summed to yield a total energy-output score for each respondent (Sharkey, 1975; Blaxter, 1990). For example, a participant who played volley ball (3.5 calories per minute) three times and went swimming (6 calories per minute) four times in the past week both for an average of 60 minutes each time received a weekly energy output score of (3.5 x 3 x 60) + (6 x 4 x 60)=2070 (because of skewed distributions these scores were subsequently log-transformed)[5].

Sexual behaviour. Previous experience of sexual intercourse was assessed on a "yes' (2)/"no" (1) format. Among respondents with experience of sexual intercourse, use of reliable contraception (e.g., condoms) was measured with

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[5]Scores obtained can only be viewed as rough estimates at best since factors like efficiency and body size which significantly affect energy expenditure were not taken into account (Sharkey, 1975). Also, many respondents may have been unable to recall accurately details of the respective exercises they engaged in during the past week. Nonetheless, the patterns of energy expenditure which emerged appeared to have good face validity and this form of assessment was thought to be preferable to more general and less quantifiable descriptions of physical activity (Blaxter, 1990).

three response choices: "non user" (1), "occasional user" (2), "regular user" (3).

Health beliefs. Beliefs assessed were perceptions of response-efficacy, threat (i.e., vulnerability and severity), and self-efficacy. Fear, purportedly a direct consequence and/or precursor of threat appraisals (see Rippetoe & Rogers, 1987), was also assessed. Response-efficacy, self-efficacy, and fear were measured in relation to each health behaviour while threat perceptions were measured with respect to several well known diseases medically associated with the health behaviours being investigated in the present study (see Amler & Dull, 1987). These illnesses were cancer, high blood pressure, heart disease, stroke and AIDS. Although respondents were not instructed on medically accepted associations between specific illnesses and health behaviours, previous research suggests that young people are aware of the causal links between the diseases enumerated above and the particular risk behaviours assessed (Steptoe & Wardle, 1992; Bury, 1991)[6]. Details of the number of items used, the Cronbach's alpha coefficient of reliability, and the mean and standard deviation for health belief measures are provided in *Table* 4.1.

Response-efficacy. Perceptions of response-efficacy were assessed by asking participants whether they believed performing a healthful behaviour or not performing an unhealthful behaviour reduces their chances of developing health problems; responses were made on a 10-point scale from "no, not at all" to "yes, very much".

Threat perceptions. To assess *vulnerability* and *severity* beliefs, participants were asked to rate the severity to their own health of each of the five medical conditions on a 10-point scale ranging from "not at all serious" to "very serious" (severity) and to estimate the likelihood that they would develop each

[6]In any case, measures of vulnerability and severity for each of cancer, stroke, heart disease and high blood pressure, formed reliable scales (see Table 4.1), suggesting that adolescents do not differentiate between these health problems in their appraisal of threat.

Table 4.1 Health belief, coping style, additional variable, and intention measures: Cronbach's alphas, means and standard deviations.

Measure	*No of Items*	*C, Alpha*	*Min-Max*	*Mean*	*SD*
Health beliefs					
Response-efficacy for:					
avoiding substance use (i.e., cigarette use, alcohol use, drug use)	3	.72	3-30	22.28	5.50
exercising regularly	1	-	1-10	7.53	2.19
avoiding dietary fat	1	-	1-10	6.44	2.12
having protected sex	1	-	1-10	7.94	2.40
Vulnerability to disease (heart disease, cancer, stroke, high blood pressure)	4	.83	4-40	14.66	6.72
Vulnerability to AIDS	1	-	1-10	2.27	1.93
Severity of disease (heart disease, cancer, stroke, high blood pressure)	4	.92	4-40	26.97	9.25
Severity of AIDS	1	-	1-10	7.62	3.32
Additional variables					
Self-efficacy for:					
avoiding substance use (i.e., cigarettes, alcohol, drugs)	3	.73	3-30	25.98	5.59
exercising regularly	1	-	1-10	8.88	1.56
avoiding dietary fat	1	-	1-10	6.64	2.70
having protected sex	1	-	1-10	9.38	1.63
Fear of:					
using substances (i.e., cigarettes, alcohol, drugs)	3	.74	3-30	18.74	6.49
not exercising regularly	1	-	1-10	5.79	2.52
consuming dietary fat	1	-	1-10	4.34	2.24
having unprotected sex	1	-	1-10	7.62	2.61
Intention to:					
use substances (i.e., cigarettes, alcohol) drugs)	3	.66	3-30	11.58	7.19
exercise regularly	1	-	1-10	7.65	2.68
consume dietary fat	1	-	1-10	8.15	2.19
have unprotected sex	1	-	1-10	1.94	2.11

condition by the age of 40 (vulnerability); responses for vulnerability were indicated on a 10-point scale from "not at all likely" to "very likely". Severity and vulnerability measures for the first four illnesses (i.e., excluding AIDS) formed two reliable "disease" scales.

Fear. This affect was measured by respondents rating the degree to which they felt worried about the risks of performing a health-compromising behaviour or not performing a health-enhancing behaviour; responses were made on a 10-point scale ranging from "not at all worried" to "very worried".

Self-efficacy. Scores for self-efficacy were obtained by asking respondents to indicate whether they thought they could perform a health-enhancing behaviour or avoid performing a health-compromising behaviour if they wanted to; answers were shown on a 10-point scale from "no, I can't" to "yes, I can".

Behavioural intentions. This was gauged by asking if respondents intended to perform a health behaviour during the next two months; responses were made on a 10-point scale ranging from "no, I don't" to "yes, I do".

Coping styles. Measures of dispositional coping styles were based on the Flinders Questionnaire, a measure derived from Conflict-Theory (Mann, 1982; Mann *et al*, 1988; Beswick *et al*, 1988; Burnett *et al*, 1989; Brown & Mann, 1990; White *et al*, 1994; Mann *et al*, 1997). This instrument incorporates 24 items assessing vigilance, hypervigilance, defensive avoidance, unconflicted change, and unconflicted adherence. Respondents are required to rate the extent to which each item best applies to themselves on a scale ranging from "not at all true for me" (0) to "almost always true" (3).

Factor analysis was computed to determine the existence of these distinct coping styles in the present sample[7]. A principal components analysis with varimax (orthogonal) rotation generated five factors with an eigen value greater

[7]Factor analysis was necessary given the low alpha coefficients on some of the existing scales.

than 1. Varimax rotation attempts to minimise the number of items that have high loadings on a factor, thereby enhancing the interpretation of factors, and producing factors that are uncorrelated (Norusis, 1988). Conflict-Theory does not propose any enduring relationships between vigilance, defensive avoidance, and hypervigilance (even though intuitively, they may appear to be related). Instead each coping style is purportedly mediated by a *unique* set of conditions (relating to conflict, hope and time, see *Section* 2.4.6) so that when any one coping style is 'dominant', the other two are not salient. Thus each coping mode is considered 'distinctive' (Janis & Mann, 1976, p.659) and best conceptualised as unique dimensions or scales. Varimax rotation has been used in previous factor analyses of Conflict-Theory coping styles (see Eiser *et al*, 1995).

The output from SPSS Windows (*Appendix* C, *Table* C1) showed the list of (24) items analysed, their corresponding loadings (correlations with each factor) and other data including, for each factor, the *eigenvalue* (the amount of the total variance accounted for by the factor). The variance accounted for by the first factor was 5.80 or 24.2% of the total variance. Eigen values for the second, third, fourth and fifth factors were respectively, 2.10 (8.6%), 1.57 (6.6%), 1.30 (5.2%) and 1.04 (4.3%). Factors with eigen values less than 1 were excluded at this stage. Generally, the meaning of a factor is determined by the items which correlate most highly with it. Factor loadings equal to or greater than .50 were used to interpret factors (Norusis, 1988, p.145).

Three factors corresponded almost perfectly to the original Flinders item design (see *Table* 4.2). The first of these factors comprised 4 items reflecting firmness in decision making (e.g., "Once I have made a decision then I don't change my mind"), making informed decisions (e.g., "When I make a decision, I feel that I've made the best one possible") and acting on decisions made (e.g., "When I decide to do something, I get right on with it"). This factor was

Table 4.2 Factor analysis of coping items (loadings >.50 only)

Item/measure	*Vigilance*	*Defensive avoidance*	*Hypervigilance*
(13) Once I have made a decision then I don't change my mind.	.66		
(20) When I make a decision, I feel that I've made the best one possible.	.62		
(23) I like to make decisions myself.	.52		
(27) When I decide to do something, I get right on with it.	.69		
(7) I avoid making decisions.		.73	
(9) I put off making decisions.		.70	
(12) I'd rather let someone else make a decision decision for me so that it won't be my problem.		.62	
(14) I prefer to leave decisions to others.		.72	
(28) I don't like to take responsibility for making decisions.		.53	
(11) I panic if I have to make decisions quickly.			.63
(18) I feel as if I'm under tremendous time pressure when making decisions.			.71
(19) I can't think straight if I have to make a decision in a hurry.			.77
Cronbach alpha	.61	.79	.67
Range	12	15	9
Mean	6.30	3.76	3.42
Standard deviation	2.23	2.79	1.93

labelled *vigilance*. The second factor included items reflecting procrastination (e.g., "I avoid making decisions") and denial of responsibility (e.g., "I prefer to leave decisions to others"). This group of items was labelled *defensive avoidance*. The third factor comprised 3 items reflecting panic-like coping (e.g., "I panic if I have to make decisions quickly") and cognitive impairment induced by deadline pressure (e.g., "I can't think straight if I have to make a decision in a hurry"). This factor was labelled *hypervigilance*. The two other factors did not correspond to the original Flinders item design (each factor contained items from two or more previously separate scales) and, given their low internal reliabilities (alphas of .59 and .15), were subsequently discarded. For each of the three reliable factors, item scores were summed to yield an index of that coping style.

Demographic characteristics. Variables measured were *age* (13-17 years), *gender* (1=male, 2=female), *social class* (1=lower; unskilled/ partly-skilled/ skilled-manual, 2=upper; skilled-nonmanual/ intermediate/ professional)[8] and *race* (1=white, 2=nonwhite).

4.2.4 Procedure

The questionnaire was administered to participants over a ten-day period. The survey was conducted in a large classroom with successive groups of pupils, each group comprising between 60 and 100 pupils from the same grade, using school time normally allocated for more general education classes. Each group of respondents was informed that the survey concerned adolescents' health behaviours and was part of on-going research at the nearby college. The confidentiality of the questionnaire was emphasised both verbally by the administrator and in a written statement in the questionnaire which read "Please

[8]It was decided to transform social class into a binary variable because of the very low frequencies in some categories.

read this questionnaire carefully and answer each question. It is completely PRIVATE and will not be used by anyone except researchers at Nene College. Write your name clearly below and then read the instructions that follow" (see *Appendix* A & B).

Previous research has demonstrated that strong assurances of confidentiality engender valid responses to questions that elicit socially desirable answers, even amongst teenagers providing self-report information on drug use, cigarette smoking and alcohol consumption (Murray & Perry, 1987). In Murray and Perry's study, anonymity was induced by not requiring respondents to provide their names on the questionnaire. Although names were required in the present study, it was repeatedly emphasised to the students that their names were only needed for the purpose of selecting people to attend a subsequent interview (see *Chapter* 5) and would not be seen by anyone (especially their teachers) except the researcher.

Respondents were also advised to read the instructions carefully and encouraged to work independently. With regard to independent work, the students were told to write down their own responses, and not to confer with students seated next to them. Administration of the survey in classes allowed direct supervision of respondents. Questions were raised by respondents concerning the need to write their names and the apparent redundancy of some questionnaire items; these were addressed immediately. It must be noted that at no point did any respondent report difficulty in understanding an item, indicating that the piloting of the questionnaire was successful. Students were allowed 20 minutes to complete the questionnaire[9]. The vast majority of respondents finished in the time available after which all questionnaires were gathered together.

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[9]Those who did not complete within 20 minutes were allowed extra time.

4.2.5 Data analyses

Approximately 75% of the questionnaires contained complete data. Most of the remaining questionnaires contained missing data on only one or two items. Although failures of completion may reflect difficulty in understanding questionnaire items, this possibility seems unlikely since the questionnaire was pilot-tested and respondents, when questionned after the survey, reported no difficulty in comprehending items[10] There did not seem to be any discernable trends in the pattern of missing data. Since missing data on a particular variable did not necessarily affect analysis of other variables, all questionnaires were employed in data analysis.

Hierarchical multiple regression was used to test the hypothesised moderator effects. Health beliefs (response-efficacy, severity, vulnerability) and coping styles (vigilance, defensive avoidance, hypervigilance) were included in each regression equation, both as separate variables, and as interactive terms, because it was expected that a given belief would differentially predict intentions across levels of a given coping style.

Belief x coping interaction terms were created by first subtracting the sample mean of each variable from the variable, thereby creating *centred* variables in deviation score form with a mean of zero. A procedure advised by Lindley and Walker (1993), centring greatly reduces the high multicollinearity that often results between first order variables and interaction terms (Cohen & Cohen, 1983)[11]. Next, the centered variables were multiplied to form interaction terms (Baron & Kenny, 1986).

In hierarchical regression, a belief (e.g., severity) and coping style (e.g., vigilance) were entered at *Step 1*, and then their interactive term (i.e., severity x

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[10]Nonetheless, unless asked individually and/or privately, teenagers may be unwilling to acknowledge difficulties in responding to the questionnaire!

[11]All correlations between the centred variables were below .30 (see Appendix C, C41).

vigilance) at *Step 2*. Interaction effects can only be established when first order influences are partialled out (Cohen & Cohen, 1983, p.115). If there is an interaction between a belief and coping style, this will be reflected in a significant increase in the proportion of variance accounted for between step 1 and step 2 (Tabachnick & Fidell, 1996).

Figure 4.1 illustrates the essential properties of a moderator effect. Three paths feed into the criterion variable of intention: the impact of a health belief as a predictor (path *a*), the impact of a coping style as a moderator (path *b*), and the interaction of these two (path *c*). A moderator effect is substantiated if the interaction (path *c*) is significant (Baron & Kenny, 1986).

4.3 RESULTS

This section begins by considering data on the prevalence of health behaviours and trends in health beliefs, intentions, and additional variables, amongst participants. Then the results pertaining to the main study hypotheses are detailed.

Table 4.3 summarises the prevalence of the six health behaviours (cigarette use, drug use, alcohol consumption, physical exercise, dietary fat avoidance, and sexual intercourse/condom use).

Overall, only a minority of respondents smoked regularly. Over one-third had never smoked, although nearly one-half had previously experimented with smoking or currently smoked occasionally. Most participants had consumed some form of alcohol at least once in the past. Over 80% currently consumed alcohol, although less than one-third had done so in the past 7 days. About 1 in 20 respondents fell into the "heavy drinker" category. Current and previous drug use were generally uncommon, with more than 75% reporting never having used drugs.

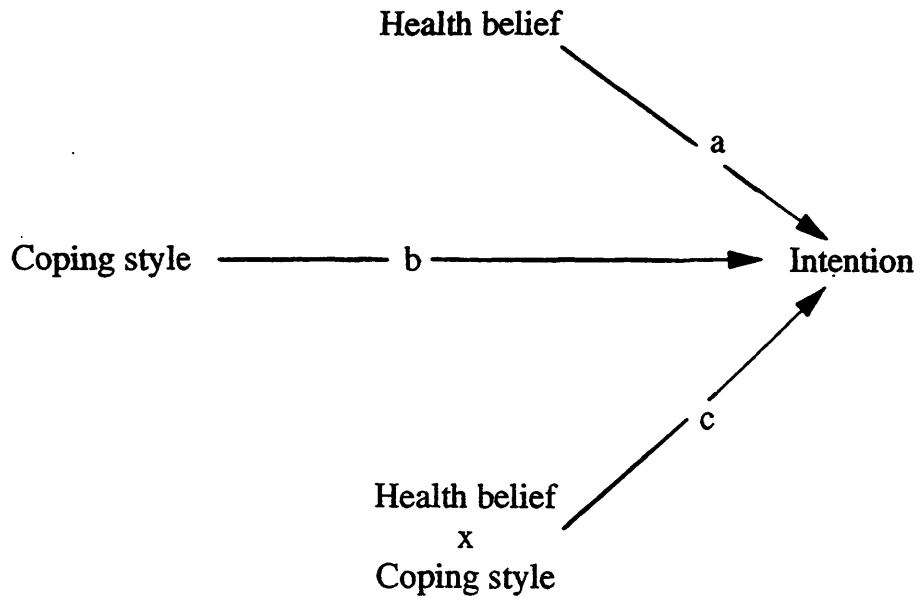

Figure 4.1 Illustration of the moderator model (see Baron & Kenny, 1986, p.1174)

Table 4.3 Prevalence of health behaviours (percentages)

Behaviour

Cigarette smoking

Never smoked	Tried smoking once	Used to smoke	Occasional smoker	Regular smoker
34.1	19.4	17.2	7.9	21.4

Alcohol consumption

Never drunk alcohol	Used to drink	V. occasional drinker	Occ/reg drinker but none last week	Light drinker (1-5 drinks last week)	Moderate drinker (6-10)	Heavy drinker (>10)
1.4	18.2	24.4	36.7	9.5	4.1	5.7

Drug use

Never used drugs	Previous user	Current user
75.1	11.7	13.1

Physical exercise

<1000 kcals /week	1000-2500 kcals/week	>2500 kcals /week
20.2	31.7	48.1

Dietary fat avoidance

Never	Not often	Often	Very often
31.9	48.0	16.3	3.9

Experience of intercourse (grade 11 only)

No	Yes
63.7	36.3

Use of contraception (in those with experience of intercourse) (grade 11 only)

Nonuser	Occasional user	Regular user
3.1	13.4	83.5

Nearly 50% expended over 2500kcalories of energy in the past week, while fewer then 1 in 4 reported energy output less than 1000kcalories. Avoidance of dietary fat was generally infrequent, while most respondents (grade 11 only) had never had sexual intercourse. Contraceptive use was regular amongst the vast majority of sexually active participants (grade 11 only).

Some of the patterns observed are roughly comparable to trends reported in other surveys of adolescents' health habits. For example, a recent *Office of Population Censuses and Surveys* (1994) study revealed that up to 28% of 15-year olds in England (average age of the present sample was 14.47 years) smoked regularly, while 31% had never smoked. These percentages are roughly comparable with, respectively, 21.4% and 34.1% in the present study.

Another *Office of Population Censuses and Surveys* (1992) study showed that about 45% of 15-year olds had drunk alcohol in the past week while 12% had never drunk alcohol. In contrast, participants in the present study seemed less likely to have consumed alcohol in the past week (19.3%) although a smaller proportion (1.4%) had never drunk alcohol. Eighty-eight percent had never used solvents while 2% were current users, compared with 75.1% and 13.1% in the present study, suggesting that participants were more likely than the average teenager to be current drug users.

Jacobsen *et al* (1991) report data indicating that most UK adolescents are physically active, especially before they leave school. Persons who expend more than 2000 kcalories of energy per week - mostly in sports, play and walking, are considered 'active', while those who expend less than 500 kcalories are classed as 'inactive' (Jacobsen *et al*, 1991). Most of the present participants (79.8%) expended at least 1000kcalories weekly with about one-half (48.1%) expending over 2500 kcalories.

Other UK surveys report high proportions of sexually active adolescents

(53.8% in males, and 54.8% in females), and low rates of 'last occasion' condom use (30-60%) (Graham, 1994). These figures contrast sharply with the present sample in which a minority (36.3%) had experience of sexual intercourse with 83.5% of these individuals reporting regular use of contraception.

Descriptive data on health beliefs, intentions, and additional variables are summarised in *Table* 4.1 (page 99)[12].

Respondents generally reported strong response-efficacy beliefs. This was particularly evident in relation to having protected sex (mean=7.94, min-max=1-10) and not using substances (mean=22.28, min-max=3-30). Response efficacy beliefs for regular exercise and dietary fat avoidance were also quite strong (means=7.53, and 6.44, respectively, min-max=1-10). In other words, respondents considered that exercising regularly and avoiding dietary fat could effectively reduce the likelihood of developing health problems. Previous research has shown that most adolescents perceive a link between these behaviours and health maintenance (Sutton, 1992; Steptoe & Wardle, 1992; Abraham et al, 1994).

Vulnerability beliefs were generally low. Respondents did not view themselves as being very likely to develop the diseases listed (i.e., heart disease, stroke, cancer, high blood pressure, and AIDS). This was particularly the case with regards to developing AIDS (mean=2.27, min-max=1-10). This pattern is consistent with past research (Abraham et al, 1996; Sheeran & Abraham, 1996). Sheeran and Abraham argue that limited transmission routes and delayed effects produce a general failure amongst teenagers to acknowledge personal AIDS risk. Perceptions of invulnerability in adolescents have also been reported in relation to cardiovascular disease and cancer (Moore & Rosenthal, 1992;

[12]Overall, the standard deviation scores do not show any particularly striking variability in the scores obtained. This suggests that respondents had roughly similar health beliefs and motivations.

Whalen et al, 1994). It has been argued that long term threats such as heart disease and cancer are simply too remote to most teenagers to be perceived as personally relevant (Van der Pligt, 1994).

Severity beliefs were quite strong with respondents recognising the seriousness of the diseases listed. This was especially so with respect to AIDS (mean=7.62, min-max=1-10). The salience and fatal nature of AIDS may lead to a rapid consensus about the seriousness of the disease (Sheeran & Abraham, 1996).

Strongest self-efficacy beliefs were indicated in relation to avoiding substance use (mean=25.98, min-max=3-30), and having protected sex (mean=9.38, min-max=1-10). Surveys indicate that most adolescents are confident about their abilities to use contraception (Bury, 1991). Self-efficacy beliefs for avoiding dietary fat were weakest (mean=6.64, min-max=1-10). Some research indicates that adolescence is a period when parents have greater control over their childrens' food habits (Cohen et al, 1990). Nonetheless, the mean score shown above suggests that respondents were generally confident of their ability to avoid eating fatty foods.

Feelings of fear about the risks of performing an unhealthful behaviour (e.g, substance use) or not adopting a healthful behaviour (e.g., exercising regularly) were highest for having unprotected sex (mean=7.62, min-max=1-10), possibly reflecting the concern many teenagers may have about pregnancy, a risk far more salient to this age group than HIV/AIDS (Bury, 1991).

Finally, the pattern of intention scores, with the exception of dietary fat, suggests that respondents were generally motivated to protect their health! On average, respondents were strongly motivated to exercise regularly (mean=7.65, min-max=1-10) and disinclined to use substances (mean=11.58, min-max=3-30) and have unprotected sex (mean=1.94, min-max=1-10). These figures

substantiate the view that "More than 80 percent of 14-17 year olds think they are responsible for their own health and accept that their lifestyle affects their health" (Macfarlane & McPherson, 1993, p.19). Intentions to consume dietary fat were generally high (mean=8.15, min-max=1-10), perhaps reflecting the frequent 'snacking' that is characteristic of adolescents (Cohen, *et al*, 1990).

4.3.1 Main data analyses

The results of multiple regression analyses testing for belief x coping moderator effects are shown in *Tables* 4.4 to 4.13. In each analysis presented, the *Beta's* and their associated significance levels are from the last step (i.e., Step 2), which includes all listed variables. As stated earlier (see *Section* 4.2.5), in each analysis a belief and coping style were entered at Step 1, to predict a measure of behavioural intention. At Step 2, the belief x coping interactive term was added (Cohen & Cohen, 1983; Tabachnick & Fidell, 1996). Cumulative R's, changes in R^2, and the significance of change in R^2, are reported in the tables. To ascertain if observed interactions remained significant after controlling for additional variables (i.e., self-efficacy, fear, past behaviour, demographic factors), emerging moderator effects were retested with these factors included in the equation.

In assessing the effects of threat perceptions on behavioural intentions, intention regarding unprotected sex was regressed on severity and vulnerability beliefs for AIDS, while intentions relating to other behaviours were regressed on severity and vulnerability beliefs for disease (i.e., heart disease, stroke, cancer, high blood pressure).

All analyses regarding unsafe sex were limited to the 270 grade 11 respondents whose questionnaires incorporated sex-related items.

Given the large number of measures specified, only results significant at the

p<.01 level are reported. Except where indicated, the statements of results below are based on the last step (i.e., Step 2), when both first order items and their interactive term were in the equation.

4.3.2 Vigilance as a moderator

It was hypothesised that health beliefs better predict health behaviour intentions in those who are *high* on vigilance. No support was found for this hypothesis.

Testing for vigilance x perceived efficacy interactions. The results are shown in *Table* 4.4.

Response-efficacy (for avoiding substance use) predicted *intentions to use substances* (beta=.19, t=-5.59, p<.0001), accounting for 4% of the variance, F(3,849)=12.62, p<.0001.

Both response-efficacy (for exercising regularly) (beta=.21, t=6.17, p<.0001) and vigilance (beta=.14, t=4.09, p<.0001) predicted *intentions to exercise regularly*, explaining 7% of the variance, F(3,849)=21.36, p<.0001.

Response-efficacy (for avoiding dietary fat) predicted *intentions to consume fatty foods* (beta=-.11, t=-3.29, p<.001), contributing 1% of the variance, F(3,850)=3.88, p<.01.

Both response-efficacy (for having protected sex) (beta=-.35, t=-5.85, p<.0001) and the efficacy x vigilance term (beta=.22, t=3.69, p<.001) predicted *intentions to have unprotected sex*, accounting for 15% of the variance, F(3,257)=15.15, p<.0001. Addition of the interaction term (at Step 2) significantly increased the R^2 by 5%, to 15%, indicating that the relation between beliefs about the efficacy of using protection during sexual encounters and intention varied across levels of vigilance.

Table 4.4 Prediction of intentions from response-efficacy beliefs, vigilance, and response-efficacy x vigilance terms

Predictors	*Beta*	*Cumulative R^2*	*R^2 Change*	*Significance of change*
Predictors of intentions to use substances *(n=853)*				
Step 1				
Response-efficacy	-.19***			
Vigilance	.07			
		.04	.04	.00
Step 2				
Response-efficacy	-.19***			
Vigilance	.07			
Response-efficacy X Vigilance	-.07			
		.04	.00	.05
Predictors of intentions to exercise *(n=853)*				
Step 1				
Response-efficacy	.21***			
Vigilance	.14***			
		.07	.07	.00
Step 2				
Response-efficacy	.21***			
Vigilance	.14***			
Response-efficacy X Vigilance	-.03			
		.07	.00	.31
Predictors of intentions to eat fatty foods *(n=854)*				
Step 1				
Response-efficacy	-.11**			
Vigilance	.01			
		.01	.01	.00
Step 2				
Response-efficacy	-.11**			
Vigilance	.01			
Response-efficacy X Vigilance	-.03			
		.01	.00	.40
Predictors of intentions to have unsafe sex *(n=261)*				
Step 1				
Response-efficacy	-.29***			
Vigilance	-.12			
		.11	.11	.00
Step 2				
Response-efficacy	-.35***			
Vigilance	-.12			
Response-efficacy X Vigilance	.22**			
		.15	.05	.00

* p<.01, **p<.001, ***p<.0001

Figure 4.2 illustrates the nature of the interaction[13]. For the purpose of this illustration, the sample was split into *high* and *low* levels on the predictor and moderator variables (please note that sample splitting was *entirely* for the purpose of visually and statistically illustrating the differential effects of the predictor variable at different levels of the moderator). Intention scores were then plotted as a function of the predictor and moderator (Coolican, 1994).

Results of *t*-Tests for independent samples showed that, in the *low* vigilance group, those high on the perceived efficacy of using protection reported significantly lower mean intention scores (n=56, mean=1.46) than those low on efficacy beliefs (n=64, mean=2.91), $t(96.97^{14}) = 3.55$, p=.001. By contrast, in the *high* vigilance group, mean intention scores did not differ significantly for high (n=84, mean=1.61) and low (n=66, mean=1.79) efficacy respondents, $t(148) = .62$, p=.534. These findings suggest that beliefs about the efficacy of using protection only had a significant influence on intentions to have unsafe sex in respondents low on vigilance[15].

This interpretation was further illustrated when the perceived efficacy of using protection was used as a predictor of intentions, separately for high and low vigilance groups. Response-efficacy emerged as a significant predictor in

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[13]To obtain *high* and *low* levels of variable, the sample was split around the median (Coolican, 1994). Scores *equal* to the median were grouped as low *or* high depending on which classification produced a more equitable split. Factorial charts of this kind are misleading because the *continous* values of the predictor and moderator variables have been combined into high/low *discrete* variables. However, this is the conventional way of graphically representing the direction of interaction effects (Coolican, 1994; Baron & Kenny, 1986; Cohen & Cohen, 1983). Nonetheless, the lines should not be read as representing values between discrete (as opposed to continous) values of the predictor and moderator variables (Coolican, 1994, p.348).

[14]Where the Levene's Test for equality of variances was significant ($p<.05$), *t* statistics for *unequal* variances (which may include degrees of freedom with fractions) are reported.

[15]The figure also shows that the relation between vigilance and intention was moderated by response-efficacy: vigilance more strongly affected (reduced) intentions to have unsafe sex in respondents *low* on response-efficacy! Those *high* on response-efficacy were generally disinclined to have unsafe sex, and so being disposed to vigilance did not make much difference.

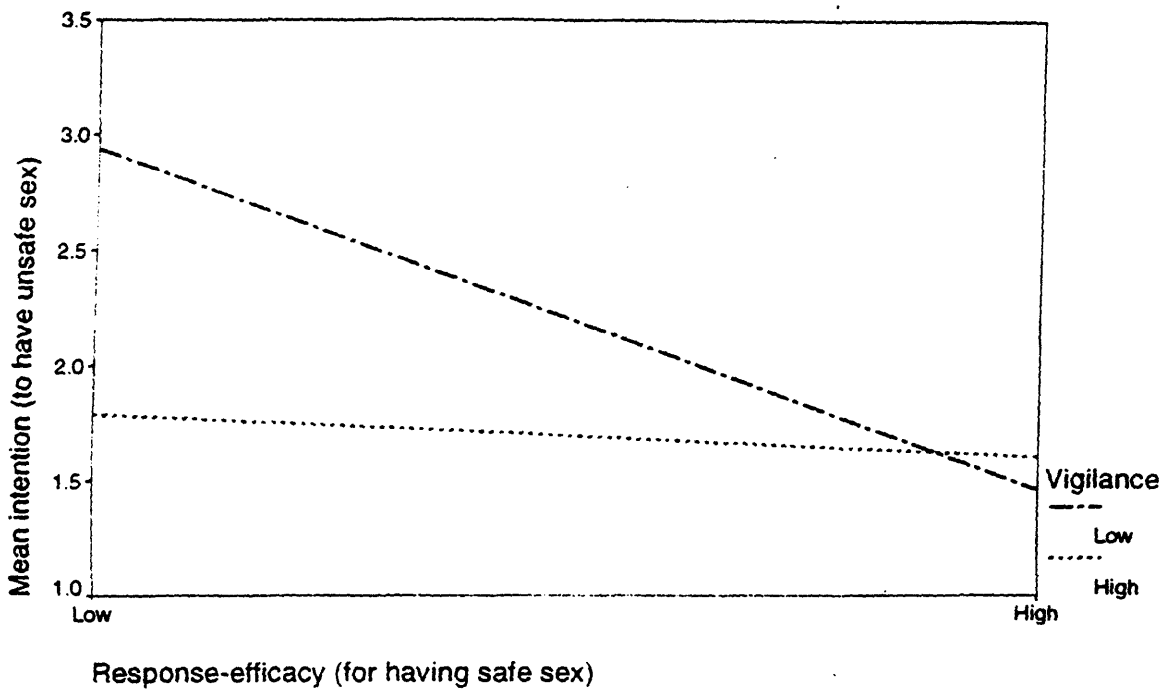

Figure 4.2 Intention to have unsafe sex as a function of response-efficacy (for having safe sex) and vigilance.

the former group (*B*=-.47, t=-5.54, p=.000), contributing 21% of the variance, F(1,115)=30.73, p=.000. Respondents with stronger beliefs about the effectiveness of using protection reported lower intentions to have unprotected sex. Perceived efficacy was, however, not a significant predictor (*B*=-.07, t=-1.145, p=.254) in the high vigilance group, F(1,146)=1.31, p=.254.

Table 4.5 shows the results of analyses testing the significance of the efficacy x vigilance interaction *after* controlling for additional variables. The interactive term remained significant (beta=.16, t=2.77, p<.01) notwithstanding the influence of previous sexual experience (beta=.19, t=3.27, p<.01), gender (beta=-.21, t=-3.63, p<.001), and response-efficacy (beta=-.31, t=-5.14, p<.0001). Remarkably, entering the interactive term (at Step 3) produced a significant 2% increase in the R^2 (from 22% to 24%). The F for the significance of R^2 change was F(1,242)=7.69, p<.01. This suggests that relations between respondents beliefs about the effectiveness of using protection and their intentions to have unprotected intercourse were affected by their level of vigilance, *regardless* of their perceived ability to use protection, previous experience of sexual intercourse, and gender.

Testing for vigilance x perceived vulnerability interactions. *Table* 4.6 shows the results.

Vulnerability predicted *intentions to use substances* (beta=.18, t=5.32, p<.0001), accounting for 4% of the variance, F(3,833)=11.43, p<.0001.

Both vulnerability (beta=-.10, t=-2.96, p<.01) and vigilance (beta=.16, t=4.69, p<.0001) predicted *intentions to exercise*, explaining 4% of the variance, F(3,835)=11.39, p<.0001.

No variables significantly predicted *dietary fat intentions*, F(3,833)=1.10, p=.35.

Vigilance (beta=-.17, t=-2.73, p<.01) predicted *intentions to have*

Table 4.5 Prediction of intentions (to have unsafe sex) from response-efficacy (for having safe sex), vigilance, efficacy x vigilance terms, and additional variables.

Predictors	*Beta*	*Cumulative R^2*	*R^2 Change*	*Significance of change*
Step 1				
Self-efficacy	-.17*			
Fear	-.06			
Previous behaviour	.19*			
Age	-.11			
Gender	-.23**			
Social class	.06			
		.13	.13	.00
Step 2				
Self-efficacy	-.11			
Fear	-.02			
Previous behaviour	.21**			
Age	-.07			
Gender	-.22**			
Social class	.09			
Response-efficacy	-.27***			
Vigilance	-.10			
		.22	.08	< .001
Step 3				
Self-efficacy	-.09			
Fear	-.01			
Previous behaviour	.19*			
Age	-.06			
Gender	-.21**			
Social class	.08			
Response-efficacy	-.31***			
Vigilance	-.11			
Response-efficacy X Vigilance	.16*			
		.24	.02	< .01
(n=252)				

* p<.01, **p<.001, ***p<.0001

Table 4.6 Prediction of intentions from vulnerability beliefs, vigilance, and vulnerability x vigilance terms

Predictors	*Beta*	*Cumulative R^2*	*R^2 Change*	*Significance of change*
Predictors of intentions to use substances *(n=837)*				
Step 1				
Vulnerability	.18***			
Vigilance	.07			
		.04	.04	.00
Step 2				
Vulnerability	.18***			
Vigilance	.07			
Vulnerability X Vigilance	.05			
		.04	.00	.14
Predictors of intentions to exercise *(n=839)*				
Step 1				
Vulnerability	-.10*			
Vigilance	.16***			
		.04	.04	.00
Step 2				
Vulnerability	-.10*			
Vigilance	.16***			
Vulnerability X Vigilance	-.02			
		.04	.00	.54
Predictors of intentions to eat fatty foods *(n=837)*				
Step 1				
Vulnerability	.04			
Vigilance	-.00			
		.00	.00	.50
Step 2				
Vulnerability	.04			
Vigilance	-.00			
Vulnerability X Vigilance	.05			
		.00	.00	.17
Predictors of intentions to have unsafe sex *(n=266)*				
Step 1				
Vulnerability	.09			
Vigilance	-.15			
		.03	.03	.02
Step 2				
Vulnerability	.14			
Vigilance	-.17*			
Vulnerability X Vigilance	-.11			
		.04	.01	.10

* p<.01, **p<.001, ***p<.0001

unprotected sex, contributing 4% of the variance, F(3,262)=3.59, p=.014.

Testing for vigilance x perceived severity interactions. The results are shown in *Table* 4.7.

Severity (beta=.12, t=3.52, p<.001 predicted *intentions to use substances*, accounting for 2% of the variance, F(3,838)=5.08, p<.01.

Vigilance predicted *intentions to exercise* (beta=.16, t=4.77, p<.0001), explaining 3% of the variance.

Severity (beta=.11, t=3.13, p<.01) predicted *intentions to consume fat*, contributing 1% of the variance, F(3,838)=4.21, p<.01.

No factors predicted *intentions to have unprotected sex*, F(3,259)=1.99, p=.12.

Summary. The results above show little evidence of interdependence between vigilance and health beliefs. The one interaction observed - involving perceived response-efficacy for having protected sex - directly contradicted Conflict-Theory postulates. However, this interaction endured when additional factors were considered, highlighting the importance of vigilance as a moderator variable. It must be noted that the observed moderator effect only applies to the 270 respondents in grade 11, and not to the entire sample. Several main effects for vigilance and health beliefs were also noted. Vigilance may play a more direct role in decisions relating to physical exercise and unsafe sex. Overall, vigilance, beliefs and their interactive terms explained only a small proportion of the variance in intentions (no more than 15%).

4.3.3 Defensive avoidance as a moderator

It was hypothesised that health beliefs better predict decisions in those who are *low* on defensive avoidance. There was no evidence of interaction between health beliefs and defensive avoidance.

Table 4.7 Prediction of intentions from severity beliefs, vigilance, and severity x vigilance terms

Predictors	*Beta*	*Cumulative R^2*	*R^2 Change*	*Significance of change*
Predictors of intentions to use substances *(n=842)*				
Step 1				
Severity	.12**			
Vigilance	.04			
		.02	.02	.00
Step 2				
Severity	.12**			
Vigilance	.04			
Severity X Vigilance	-.02			
		.02	.00	.51
Predictors of intentions to exercise *(n=844)*				
Step 1				
Severity	.01			
Vigilance	.16***			
		.03	.03	.00
Step 2				
Severity	.01			
Vigilance	.16***			
Severity X Vigilance	-.05			
		.03	.00	.13
Predictors of intentions to eat fatty foods *(n=842)*				
Step 1				
Severity	.11*			
Vigilance	-.01			
		.01	.01	.01
Step 2				
Severity	.11*			
Vigilance	-.01			
Severity X Vigilance	-.06			
		.01	.00	.10
Predictors of intentions to have unsafe sex *(n=263)*				
Step 1				
Severity	-.04			
Vigilance	-.14			
		.02	.02	.06
Step 2				
Severity	-.03			
Vigilance	-.14			
Severity X Vigilance	-.03			
		.02	.00	.60

* p<.01, **p<.001, ***p<.0001

Testing for defensive avoidance x perceived efficacy interactions. The results are shown in *Table* 4.8.

Response-efficacy (for avoiding substance use) (beta=-.18, t=-5.33, p<.0001) predicted *intentions to use substances*, accounting for 4% of the variance, F(3,855)=11.16, p<.0001.

Both response-efficacy (for exercising regularly) (beta=.22, t=6.59, p<.0001) and defensive avoidance (beta=-.10, t=-3.03, p<.01) predicted *intentions to exercise,* explaining 6% of the variance, F(3,855)=19.20, p<.0001.

Response-efficacy (for avoiding dietary fat) significantly predicted *intentions to eat fat* (beta=-.11, t=-3.27, p<.01), contributing 1% of the variance, F(3,854)=4.06, p<.01.

Response-efficacy (for having protected sex) predicted *intentions to have unprotected sex* (beta=-.31, t=-4.90, p<.0001), accounting for 11% of the variance, F(3,261)=10.58, p<.0001.

Testing for defensive avoidance x perceived vulnerability interactions. *Table* 4.9 shows the results.

Vulnerability predicted *intentions to use substances* (beta=.19, t=5.44, p<.0001), explaining 4% of the variance, F(3,839)=10.86, p<.0001.

Both defensive avoidance (beta=-.11, t=-3.23, p<.01) and vulnerability (beta=-.10, t=-3.02, p<.01) predicted *intentions to exercise*, contributing 3% of the variance, F(3,841)=7.34, p<.0001.

No variables significantly predicted *intentions to eat fat*, F(3,837)=1.62, p=.18, and *intentions to have unprotected sex*, F(3,266)=3.08, p=.03.

Testing for defensive avoidance x perceived severity interactions. The results are shown in *Table* 4.10.

Severity (beta=.12, t=3.51, p<.001) predicted *intentions to use substances,* accounting for 2% of the variance, F(3,844)=4.55, p<.01.

Table 4.8 Prediction of intentions from response-efficacy beliefs, defensive avoidance, and response-efficacy x defensive avoidance terms

Predictors	*Beta*	*Cumulative R^2*	*R^2 Change*	*Significance of change*
Predictors of intentions to use substances *(n=859)*				
Step 1				
Response-efficacy	-.18***			
Defensive avoidance	-.04			
		.03	.03	.00
Step 2				
Response-efficacy	-.18***			
Defensive avoidance	-.04			
Response-efficacy X Defensive avoidance	.06			
		.04	.00	.07
Predictors of intentions to exercise *(n=859)*				
Step 1				
Response-efficacy	.22***			
Defensive avoidance	-.10*			
		.06	.06	.00
Step 2				
Response-efficacy	.22***			
Defensive avoidance	-.10*			
Response-efficacy X Defensive avoidance	.04			
		.06	.00	.24
Predictors of intentions to eat fatty foods *(n=858)*				
Step 1				
Response-efficacy	-.11*			
Defensive avoidance	.04			
		.01	.01	.00
Step 2				
Response-efficacy	-.11*			
Defensive avoidance	.04			
Response-efficacy X Defensive avoidance	.02			
		.01	.00	.57
Predictors of intentions to have unsafe sex *(n=265)*				
Step 1				
Response-efficacy	-.29***			
Defensive avoidance	.15			
		.11	.11	.00
Step 2				
Response-efficacy	-.30***			
Defensive avoidance	.14			
Response-efficacy X Defensive avoidance	-.05			
		.11	.00	.42

* p<.01, **p<.001, ***p<.0001

Table 4.9 Prediction of intentions from vulnerability beliefs, defensive avoidance, and vulnerability x defensive avoidance terms

Predictors	*Beta*	*Cumulative R^2*	*R^2 Change*	*Significance of change*
Predictors of intentions to use substances *(n=843)*				
Step 1				
Vulnerability	.19***			
Defensive avoidance	-.05			
		.04	.04	.00
Step 2				
Vulnerability	.19***			
Defensive avoidance	-.05			
Vulnerability X Defensive avoidance	-.05			
		.04	.00	.18
Predictors of intentions to exercise *(n=845)*				
Step 1				
Vulnerability	-.10*			
Defensive avoidance	-.11*			
		.02	.02	.00
Step 2				
Vulnerability	-.10*			
Defensive avoidance	-.11*			
Vulnerability X Defensive avoidance	.03			
		.03	.00	.40
Predictors of intentions to eat fatty foods *(n=841)*				
Step 1				
Vulnerability	.05			
Defensive avoidance	.03			
		.00	.00	.21
Step 2				
Vulnerability	.05			
Defensive avoidance	.04			
Vulnerability X Defensive avoidance	-.05			
		.01	.00	.20
Predictors of intentions to have unsafe sex *(n=270)*				
Step 1				
Vulnerability	.10			
Defensive avoidance	.14			
		.03	.03	.01
Step 2				
Vulnerability	.10			
Defensive avoidance	.14			
Vulnerability X Defensive avoidance	-.02			
		.03	.00	.77

* p<.01, **p<.001, ***p<.0001

Table 4.10 Prediction of intentions from severity beliefs, defensive avoidance, and severity x defensive avoidance terms

Predictors	*Beta*	*Cumulative R^2*	*R^2 Change*	*Significance of change*
Predictors of intentions to use substances *(n=848)*				
Step 1				
Severity	.12**			
Defensive avoidance	-.03			
		.02	.02	.00
Step 2				
Severity	.12**			
Defensive avoidance	-.03			
Severity X Defensive avoidance	.00			
		.02	.00	.99
Predictors of intentions to exercise *(n=850)*				
Step 1				
Severity	.03			
Defensive avoidance	-.12**			
		.02	.02	.00
Step 2				
Severity	.03			
Defensive avoidance	-.12**			
Severity X Defensive avoidance	.06			
		.02	.00	.07
Predictors of intentions to eat fatty foods *(n=846)*				
Step 1				
Severity	.11*			
Defensive avoidance	.04			
		.01	.01	.00
Step 2				
Severity	.11*			
Defensive avoidance	.04			
Severity X Defensive avoidance	.02			
		.01	.00	.49
Predictors of intentions to have unsafe sex *(n=267)*				
Step 1				
Severity	-.02			
Defensive avoidance	.15			
		.02	.02	.05
Step 2				
Severity	-.02			
Defensive avoidance	.15			
Severity X Defensive avoidance	-.03			
		.02	.00	.63

* p<.01, **p<.001, ***p<.0001

Defensive avoidance predicted *intentions to exercise* (beta=-.12, t=-3.48, p<.001), explaining 2% of the variance, F(3,846)=5.38, p<.01.

Severity (beta=.11, t=3.28, p<.01) predicted *intentions to eat fatty foods*, contributing 1% of the variance, F(3,842)=4.04, p<.01.

No variables predicted *intentions to have unprotected sex*, F(3,263)=2.15, p=.09.

Summary. Overall the results indicate no evidence of interactions between defensive avoidance and health beliefs. This implies that, unlike vigilance, defensive avoidance does not affect the strength of relations between health beliefs and decisions. However, like vigilance, defensive avoidance does appear to play a more direct role in decisions relating to physical exercise, irrespective of health beliefs.

4.3.4 Hypervigilance as a moderator

It was hypothesised that health beliefs better predict intentions in those who are *low* on hypervigilance. No evidence of interaction between health beliefs and hypervigilance was found.

Testing for hypervigilance x perceived efficacy interactions. The results are shown in *Table* 4.11.

Response-efficacy (for avoiding substance use) predicted *intentions to use substances* (beta=-.18, t=-5.27, p<.0001), accounting for 4% of the variance, F(3,857)=10.74, p<.0001.

Both response-efficacy (for exercising regularly) (beta=.22, t=6.76, p<.0001) and hypervigilance (beta=-.09, t=-2.66, p<.01) predicted *intentions to exercise*, contributing 6% of the variance, F(3,857)=19.19, p<.0001.

Response-efficacy (for avoiding fat) predicted *intentions to eat fat* (beta=-.11, t=-3.19, p<.01), explaining 2% of the variance, F(3,856)=4.54, p<.01.

Table 4.11 Prediction of intentions from response-efficacy beliefs, hypervigilance, and response-efficacy x hypervigilance terms

Predictors	*Beta*	*Cumulative R^2*	*R^2 Change*	*Significance of change*
Predictors of intentions to use substances *(n=861)*				
Step 1				
Response-efficacy	-.18***			
Hypervigilance	-.05			
		.04	.04	.00
Step 2				
Response-efficacy	-.18***			
Hypervigilance	-.05			
Response-efficacy X Hypervigilance	.01			
		.04	.00	.79
Predictors of intentions to exercise *(n=861)*				
Step 1				
Response-efficacy	.22***			
Hypervigilance	-.09*			
		.06	.06	.00
Step 2				
Response-efficacy	.22***			
Hypervigilance	-.09*			
Response-efficacy X Hypervigilance	.06			
		.06	.00	.09
Predictors of intentions to eat fatty foods *(n=860)*				
Step 1				
Response-efficacy	-.11*			
Hypervigilance	-.01			
		.01	.01	.00
Step 2				
Response-efficacy	-.11*			
Hypervigilance	-.01			
Response-efficacy X Hypervigilance	-.06			
		.02	.00	.09
Predictors of intentions to have unsafe sex *(n=264)*				
Step 1				
Response-efficacy	-.26***			
Hypervigilance	.03			
		.07	.07	.00
Step 2				
Response-efficacy	-.26***			
Hypervigilance	.03			
Response-efficacy X Hypervigilance	.04			
		.07	.00	.56

* p<.01, **p<.001, ***p<.0001

Similarly, response-efficacy (for having protected sex) was the sole predictor of *intentions to have unprotected sex* (beta=-.26, t=-4.33, p<.0001), accounting for 7% of the variance, F(3,260)=6.59, p<.001.

Testing for hypervigilance x perceived vulnerability interactions. *Table* 4.12 shows the results.

Vulnerability predicted *intentions to use substances* (beta=.18, t=5.35, p<.0001), contributing 4% of the variance, F(3,841)=11.62, p<.0001.

Both vulnerability (beta=-.11, t=-3.12, p<.01) and hypervigilance (beta=-.09, t=-2.75, p<.01) predicted *intentions to exercise*, explaining 2% of the variance, F(3,843)=6.57, p<.001.

There were no predictors of *intentions to consume dietary fat*, F(3,839)=.90, p=.44, and *intentions to have unprotected sex*, F(3,265)=.93, p=.43.

Testing for hypervigilance x perceived severity interactions. The results are shown in *Table* 4.13.

Severity (beta=.12, t=3.45, p<.001) predicted *intentions to use substances*, accounting for 2% of the variance, F(3,846)=5.25, p<.01.

Hypervigilance (beta=-.11, t=-3.09, p<.01) predicted *intentions to exercise*, contributing 1% of the variance, F(3,848)=3.39, p=.02.

Severity (beta=.11, t=3.28, p<.01) predicted *intentions to eat fatty foods*, explaining 1% of the variance, F(3,844)=4.10, p<.01.

No variables predicted *intentions to have unprotected sex*, F(3,262)=.34, p=.79.

Summary. As with the results concerning defensive avoidance, the findings concerning hypervigilance show no evidence of belief x hypervigilance interactions. Although main effects were observed for hypervigilance and each health belief, entering the interactive term did not influence the R^2 by a significant amount. This suggests that belief-decision relations are not

Table 4.12 Prediction of intentions from vulnerability beliefs, hypervigilance, and vulnerability x hypervigilance terms

Predictors	*Beta*	*Cumulative R^2*	*R^2 Change*	*Significance of change*
Predictors of intentions to use substances *(n=845)*				
Step 1				
Vulnerability	.18***			
Hypervigilance	-.08			
		.04	.04	.00
Step 2				
Vulnerability	.18***			
Hypervigilance	-.08			
Vulnerability X Hypervigilance	-.05			
		.04	.00	.15
Predictors of intentions to exercise *(n=847)*				
Step 1				
Vulnerability	-.11*			
Hypervigilance	-.09*			
		.02	.02	.00
Step 2				
Vulnerability	-.11*			
Hypervigilance	-.09*			
Vulnerability X Hypervigilance	.03			
		.02	.00	.41
Predictors of intentions to eat fatty foods *(n=843)*				
Step 1				
Vulnerability	.05			
Hypervigilance	-.03			
		.00	.00	.26
Step 2				
Vulnerability	.05			
Hypervigilance	-.03			
Vulnerability X Hypervigilance	.00			
		.00	.00	.90
Predictors of intentions to have unsafe sex *(n=269)*				
Step 1				
Vulnerability	.09			
Hypervigilance	.02			
		.01	.01	.25
Step 2				
Vulnerability	.09			
Hypervigilance	.02			
Vulnerability X Hypervigilance	-.00			
		.01	.00	.95

* p<.01, **p<.001, ***p<.0001

Table 4.13 Prediction of intentions from severity beliefs, hypervigilance, and severity x hypervigilance terms

Predictors	*Beta*	*Cumulative R^2*	*R^2 Change*	*Significance of change*
Predictors of intentions to use substances *(n=850)*				
Step 1				
Severity	.12**			
Hypervigilance	-.07			
		.02	.02	.00
Step 2				
Severity	.12**			
Hypervigilance	-.07			
Severity X Hypervigilance	.01			
		.02	.00	.87
Predictors of intentions to exercise *(n=852)*				
Step 1				
Severity	.02			
Hypervigilance	-.11*			
		.01	.01	.01
Step 2				
Severity	.02			
Hypervigilance	-.11*			
Severity X Hypervigilance	.02			
		.01	.00	.62
Predictors of intentions to eat fatty foods *(n=848)*				
Step 1				
Severity	.11*			
Hypervigilance	-.02			
		.01	.01	.00
Step 2				
Severity	.11*			
Hypervigilance	-.02			
Severity X Hypervigilance	-.03			
		.01	.00	.35
Predictors of intentions to have unsafe sex *(n=266)*				
Step 1				
Severity	-.05			
Hypervigilance	.03			
		.00	.00	.65
Step 2				
Severity	-.04			
Hypervigilance	.03			
Severity X Hypervigilance	.03			
		.00	.00	.69

* p<.01, **p<.001, ***p<.0001

dependent on hypervigilance differentials.

4.3.5 Overall summary

The present results offer no support for the stated hypotheses. Regression of intentions on beliefs, vigilance, and belief x vigilance interactions revealed a number of independent relationships, but only one interaction effect. The pattern of this interaction contradicted the hypothesis that beliefs better predict intentions in those who are *high* on vigilance. Prediction of intentions from beliefs, defensive avoidance, and belief x avoidance interactions produced several significant direct associations, but no significant belief x avoidance interactions. A similar pattern of results was obtained with respect to hypervigilance. Overall, coping styles appeared to play a more important role as independent predictors of decisions, particularly in relation to physical exercise.

It should be noted that all the R^2 values were equal to or below 15% (except when additional variables were considered in relation to unsafe sex, in which case the R^2 was 24%). In fact, most were less than 10%, suggesting that, whether as independent predictors and/or interactive terms, coping styles and health beliefs generally account for an exceptionally low proportion of the variance in adolescents' health decisions. While this issue is not necessarily central to the present thesis, it is consistent with the general pattern of results reported in health related research.

A wide variety of factors account for individual differences in health decisions including demographic factors (e.g., gender), personality processes (e.g., extraversion), social factors (e.g., pressure from family and friends), previous behaviour, and economic circumstances (e.g., access to medical care) (see reviews by; Murphy & Bennett, 1994; Conner & Norman, 1996). Research has shown that after past health behaviour is considered, health beliefs and

coping factors only account for a marginal proportion of the variance in health beliefs (see review by Van der Pligt, 1994; Norman & Conner, 1996). Factors like past behaviour and others mentioned may account for most of the unexplained variance in the present results. In this regard, it is remarkable that the efficacy x vigilance interaction observed remained significant even after previous behaviour and demographic factors were partialled out. This suggests that while beliefs and coping patterns explain only a small proportion of the variance in decisions, they remain an essential part of the decision making process.

4.4 DISCUSSION

The primary purpose of this investigation was to test, in adolescents, Conflict-Theory hypotheses concerning how health beliefs interact with coping styles in predicting health-related decisions (intentions). Intentions were assessed in relation to each of four health behaviours (substance-use, physical exercise, fat avoidance and unprotected sex). There was some evidence of a belief x vigilance interaction. However, the pattern of this moderator effect contradicted what was hypothesised. Overall, belief-intention relations seemed independent of levels of coping. Some evidence for coping styles as independent predictors of behavioural intentions was found.

4.4.1 Vigilance as a moderator

It was hypothesised that health beliefs better predict intentions in those who are high on vigilance. One significant belief x vigilance interaction emerged: the perceived efficacy of using protection during sexual intercourse predicted intentions to have unprotected sex as a function of vigilance.

The vigilance x perceived efficacy interaction. The results suggest that the

strength of relations between respondents' intentions to have unsafe sex, and their beliefs about the efficacy of using protection, was dependent on their level of vigilance. *Figure* 4.1 shows that, while *low* vigilance subjects reported lower intentions at higher levels of perceived efficacy, those *high* on this coping style reported generally low intentions at both high and low levels of efficacy. Thus, high vigilance respondents who doubted the efficacy of contraceptive use were nonetheless inclined to avoid having unprotected intercourse. The uniformly low intention scores suggests response-efficacy scores failed to distinguish effectively between intention differentials, in high vigilance subjects. The pattern of this interaction constitutes a direct contradiction of the hypothesis that beliefs better predict decisions in those who are high on vigilance.

To understand this efficacy x vigilance interaction, it is necessary to reconsider the characteristic features of vigilance. Conflict-Theory postulates that each coping style is characterised by a typical mode of information processing which governs the type and amount of information that the decision maker will prefer: vigilance is typified by an openminded interest in risk-benefit information (*Section* 2.4.7; Janis & Mann, 1977a, p.207). The coping patterns are also distinguished by a unique set of beliefs: vigilance involves optimism about finding a solution to threat, and the expectation that time is sufficient in which to do so (see *Chapter* 2, *Sections* 2.4.6 and 2.4.7).

With regard to information preference, respondents high on vigilance can be expected to be better informed about HIV/AIDS. They may have carefully considered, without bias, warnings, cues, and other information about the relevant alternatives and their consequences. While some high vigilance persons may perceive contraceptive use as ineffective (e.g., based on accurate knowledge that condoms are not 100% effective, and can slip off or become damaged during intercourse, allowing exchange of bodily fluids), the

alternatives to using contraception (e.g., not using contraception at all, using contraception but only some of the time) may be seen as posing considerable, unacceptable health risks. Thus although using contraception may be ineffective in averting health risks, overall, this option may constitute the least risky alternative! High vigilance subjects who underrate the efficacy of contraceptive use may nonetheless be very cognisant of the pregnancy and AIDS threats entailed in having unprotected sex. By contrast, low vigilance respondents may be less informed about these risks, and those who perceive contraceptive use as ineffective may not fully appreciate the dangers inherent in not using protection[16].

Optimism about finding a solution, another distinguishing feature of vigilance (*Section* 2.4.6), may also be relevant to interpreting this interaction. Such optimism is characteristic of vigilance, and reflects high levels of self-efficacy for performing a behaviour (e.g., "I am capable of using contraception every time I have sex", "I can work out a good HIV/AIDS protection plan") (Janis & Mann, 1977a, p.57; Janis, 1986, p.464). It has been demonstrated that people will be motivated to perform a behaviour if they believe they are capable of doing so (high self-efficacy), regardless of their beliefs about the efficacy of that behaviour in reducing threat (Maddux & Rogers, 1983; Wurtele & Maddux, 1987). According to Bandura (1989), "...the effects of outcome [response-efficacy] expectancies on performance motivation are partly governed by self-beliefs of efficacy... Self-perceived inefficacy can thus nullify the motivating potential of alluring outcome expectancies..." (p.1180).

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[16]More prone to bias in their evaluation of cost-benefit information, low vigilance respondents may employ defensive avoidance tactics that allow them to ignore and/or discount the pregnancy/AIDS threats posed by having unsafe sex. Research has shown that persons who score low on vigilance tend to score high on defensive avoidance (e.g., Eiser et al, 1995) (Also, see Appendix C).

Thus, if a preventive behaviour is perceived as relatively easy to perform, response-efficacy may have a negligible impact on people's motivation to perform the act. Intentions will be primarily determined by self-efficacy. If high optimism about finding a solution reflects strong self-efficacy beliefs, it can be argued that high vigilance respondents were higher on self-efficacy than low vigilance respondents. The former group, believing they could successfully avoid having unprotected sex, were motivated to do so, even if they doubted the efficacy of contraceptive use. Indeed, secondary data analysis revealed a significant positive correlation between vigilance and self-efficacy for using protection (r=.16, p<.01, see *Appendix* C, *Table* C5).

The efficacy x vigilance interaction remained even after additional variables, including previous behaviour, self-efficacy and fear, were incorporated in the equation. There is ample evidence showing that previous behaviour, self-efficacy, fear and demographic variables exert profound effects on contraception-related intentions (e.g., Abraham *et al*, 1994; Van der Velde *et al*, 1992; Sheeran & Abraham, 1996). Often, when these factors are taken into account, belief-intention paths are attenuated (Van der Pligt, 1994). Self-efficacy in particular is thought to be a major moderator of belief-intention relations (e.g., Wurtele & Maddux, 1987). However, in the present study, a significant response-efficacy-to-intention path obtained if respondents were *low* on vigilance, regardless of their past sexual experience, self-efficacy beliefs, fear, or demographic characteristics. For example, previous research has shown that if people have low self-efficacy beliefs about performing a preventive behaviour, their perceptions of the efficacy of that behaviour will have no impact on their behavioural intentions (Maddux & Rogers, 1983; Wurtele & Maddux, 1987). The present findings suggest that if vigilance levels are low, efficacy beliefs will have a significant impact on intentions, *even if self-efficacy*

beliefs are weak!

Why was an interaction between perceived response-efficacy and vigilance not observed with respect to the other health behaviours (i.e., substance use, regular exercise, dietary fat consumption)? What is unique about (un)protected sex?

It must be remembered that only respondents in grade 11 were administered the questionnaire incorporating items on sexual behaviour. Adolescent competence in decision making has been found to improve with age, so that, for example, 16 year olds tend to be more vigilant than 13 and 14 year olds (Mann *et al*, 1989). Indeed, in the present study, secondary data analysis revealed a significant positive correlation between age and vigilance (r=.13, p<.01, see *Appendix* C, *Table's* C2-C5). Grade 11 students (mean age, 15.49 years) high on vigilance appeared *unanimous* in their motivation to avoid unsafe sex, hence the failure of beliefs about the efficacy of using protection to discriminate between intention scores. Such strong preference for what is (at least from a public health perspective) the most 'rational' decision, is likely to be diluted by the inclusion in the sample of grade 9 (mean age 13.54 years) and grade 10 (mean age, 14.48 years) respondents, two groups of younger and hence less competent decision makers. Since questionnaire items relating to substance-use, exercise, and fat consumption were not limited to grade 11 participants, uniformly strong intentions to avert threat (leading to floor/ceiling effects, and hence, interactions) were less likely to obtain for these behaviours.

The issue of sexual behaviour and AIDS/pregnancy in teenagers has long been of special interest to public health experts, and also attracted much publicity (*The Health of the Nation*, 1991; Jacobsen *et al*, 1993). Furthermore, unlike health risks associated with cigarette use, alcohol consumption, exercise and food habits (e.g., heart disease, cancer), one of the consequences of

unprotected sex, pregnancy, is very *short*-term. This means that adolescents faced with a decision whether to use contraception have to take account of a highly salient threat (Bury, 1991). Indeed, it has been suggested that the majority of adolescents who use contraception do so for protection against pregancy, rather than AIDS (Graham, 1994). Highly cognisant of the pregnancy (and AIDS) risks, teenagers high on vigilance will have more than enough reason to use contraception, even if they have doubts about its efficacy!

Although no evidence was found that vigilance and perceptions of response efficacy interact in predicting intentions to use substances, exercise regularly, and consume dietary fat, vigilance proved an independent predictor of intentions to exercise. Respondents disposed to careful appraisal of relevant cost-benefit information reported stronger intentions to exercise regularly. This trend endorses Janis's (1986) assertion that "vigilance generally leads to effective problem-solving behaviour that reduces or minimises the threat" (p.468). The fact that vigilance emerged as a significant predictor but not moderator with respect to exercise intentions, and as a moderator but not predictor with regard to intentions to have unsafe sex, has important theoretical implications. On the one hand this pattern substantiates Conflict-Theory propositions in the sense that the same coping pattern may have significant implications, both for the *strength* of relations between an adolescents health (i.e., efficacy) beliefs and decisions (i.e., intentions), and also for whether a teenager is motivated to adopt threat-reducing behaviour (or risky behaviour) in response to health-threats (see *Section* 2.4.8). On the other hand the pattern indicates that whether vigilance is better conceived as a moderator of belief-decision relations or as a determinant of health risk-taking depends on the particular health behaviour to which the concept is to be applied.

A researcher looking to assess the role of health beliefs and threat coping

patterns in adolescents' decisions regarding condom use seems better off assessing vigilance as a moderator of relations between perceptions of the efficacy of condom use and intended condom use. By contrast, similar research focusing on decisions relating to teenagers' physical exercise may best evaluate vigilance as a determinant (i.e., predictor) of intentions to exercise. In effect, the relevance of Conflict-Theory predictions about the role of vigilance as a moderator of belief-decision relations and as a precursor of health risk taking is qualified by the health behaviour in question!

Vigilance and perceived threat. The failure to obtain significant vigilance x threat interactions suggests that the extent to which respondents were motivated by their risk perceptions was unaffected by vigilance. Since vigilance entails careful appraisal of risk-benefit information, Janis (1983) posits stronger belief-decision relations when vigilance is dominant. Indeed, given that vigilance involves preference for threatening information, especially when threats are vague or ambigous (as health risks usually seem to be), it is reasonable to expect threat perceptions to play an important role in persons high on vigilance (Janis & Mann, 1977a, p.207).

However, the data suggest that being low (or high for that matter) on vigilance may not necessarily affect the extent to which adolescents are motivated by their risk perceptions. The reasons for this are not clear. Sheeran and Abraham (1996) have suggested that adolescents' minimisation of personal risk may lead to floor effects, hence attenuating vulnerability-intention relations. Fostered by ambiguities in threat information, adolescents' perception of invulnerability (and hence floor effects) may transcend individual differences in vigilance. However, the findings do suggest that teenagers' perceptions of vulnerability play a significant role in their health decisions, specifically, their intentions to exercise. Vulnerability was found to predict intentions to exercise,

with stronger risk perceptions relating to reduced intentions to exercise. The possible explanations for this inverse relation are two-fold. On the one hand, respondents with strong feelings of vulnerability may be motivated to adopt defensive avoidance strategies (e.g., denial, shifting responsibility) which reduce their anxiety and hence facilitate performance of health-damaging behaviours (Janis & Feshbach, 1953). On the other hand, Weinstein and Nicolich (1993) argue that correlations between risk perceptions (i.e., vulnerability beliefs) and (intended) health behaviour reflect *accuracy* of risk perceptions.

A negative relation between vulnerability beliefs and intentions to perform a threat-reducing behaviour suggests great accuracy in risk estimates. In effect, respondents who were not inclined to exercise regularly may rightly perceive themselves to be at risk of contracting heart disease, cancer, stroke, and/or high blood pressure later in life. Indeed, studies have shown that teenagers, while being somewhat "optimistic" in their risk judgements, do consider their previous/current risky behaviour when assessing personal risk, and hence are fairly correct in their vulnerability beliefs (Moore & Rosenthal, 1992; Cohn *et al*, 1995). Thus, far from being limited and biased in their vulnerability judgements, as Conflict-Theory suggests, low vigilant adolescents may be just as accurate as high vigilant teenagers in their appraisal of personal risk. A low preference for careful and objective cost-benefit appraisals may not necessarily prevent a person from using (readily available) knowledge of past and/or intended risk behaviour to arrive at authentic risk estimates. In fact, there is some evidence indicating that persons low on vigilance report *more* realistic (comparative) risk estimates than those higher on vigilance (see Van der Velde *et al*, 1992).

Most adolescents are aware that cancer, heart disease, stroke and (in

particular) AIDS, can be life-threatening (e.g., Rimberg & Lewis, 1994). Hence, teenagers generally tend to be convinced about the severity of these health threats (e.g., Abraham *et al*, 1994). Sheeran and Abraham (1996) suggest that the salience of a fatal outcome (i.e., HIV/AIDS) may lead to a rapid consensus regarding severity. Uniformly strong severity beliefs may produce a ceiling effect so that severity scores no longer differentiate between those who do and do not plan to use contraception (Sheeran & Abraham, 1996). Within this context of strong, universal awareness of the seriousness of a threat, being high or low on vigilance may not make much difference. However, the results reported in *Table* 4.1 (see *Section* 4.2.3) do not suggest particularly high perceptions of the severity of cardiovascular disease, cancer, and stroke (severity beliefs for AIDS seemed quite high though). Although it may be argued that adolescents simply do not acknowledge their appraisals of threat severity in making health decisions (Van der Pligt, 1994), this is not supported by the data. Perceptions of severity did prove to be a significant predictor of intentions to use substances and also intentions to consume dietary fat. Respondents with stronger severity beliefs reported higher intentions to engage in both risky behaviours.

The role of severity within the context of vigilance may be much more complex than originally suggested by Janis (1983, 1984). To begin with, the perceived seriousness of a disease (unlike vulnerability) may not be appraised as having any personal significance, unless of course one has already contracted the disease. The picture is further clouded by the fact that severity has been conceptualised as a multidimensional construct, incorporating both the medical seriousness of a disease (e.g., pain, vomiting, fever) and its psychosocial severity (e.g., embarrassment, being unable to leave the house, loss of confidence) (Sheeran & Abraham, 1996). If adolescents are more prone to

respond to the psychosocial seriousness of health threats, then a measure assessing medical severity will not adequately reflect genuine relationships between severity and other constructs. Furthermore, the fact that vigilance, but not severity, emerged as an independent predictor of intentions to exercise suggests that the severity-intention path was *mediated* rather than moderated by vigilance (i.e., perceptions of severity may provoke careful appraisal of consequences of alternative courses of action, leading to behaviour that effectively diminishes the threat). This interpretation is substantiated by the positive correlation observed between vigilance and severity (see *Appendix* C, *Table* C3).

It is notable that when each of perceived vulnerability and severity was entered together with vigilance and the corresponding interactive term to predict intentions to exercise, vigilance but not the threat cognition proved an independent predictor. These findings are significant for two reasons. First, it has been suggested that coping styles play only a *marginal* role in people's health decisions when considered within the context of health beliefs (Van der Velde & Van der Pligt, 1991; Abraham *et al*, 1994). Second, it has also been argued that even if coping styles play a significant direct role, their relevance is best highlighted with situation-specific rather than dispositional measures of coping (Leventhal *et al*, 1993). The present findings suggest that, at least in relation to adolescents' physical exercise, dispositional vigilance does play a significant role in a context where health perceptions of severity seem irrelevant.

4.4.2 Defensive avoidance as a moderator

It was hypothesised that beliefs better predict decisions in those who are low on defensive avoidance. However, no significant belief x defensive avoidance

interactions were observed. Defensive avoidance focuses on reducing anxiety through a variety of 'defensive' tactics, including evasion of threatening information, and/or minimisation of the likelihood and/or seriousness of the threat, or its personal relevance (Janis, 1986). When defensive avoidance is dominant, Janis (1983) argues, "...the decision maker will fail to engage in adequate information search and appraisal of consequences, overlooking or ignoring crucial information about relevant costs and benefits" (p.146). He posited that such conditions weaken relations between health beliefs and decisions.

Defensive avoidance and perceived efficacy. The results suggest that the extent to which respondents were motivated to act upon their efficacy beliefs was unrelated to the degree to which they used defensive tactics, at the expense of accurate and complete cost-benefit appraisals. Janis (1983, 1984) is not very clear as to why he expects defensive avoidance to prevent people from acting upon their *efficacy* appraisals. By definition, this coping style involves failure to acknowledge *risk* information. "In order to prevent arousal of anxiety or other painful affects, the person displaying defensive avoidance is selectively inattentive to threat cues..." (Janis, 1986, p.464).

Eagly & Chaiken (1993) review evidence suggesting that if people believe that a preventive behaviour is effective in reducing threat, they will be motivated to enact that behaviour, *whether or not they ignore/deny threat* (e.g., Rogers & Mewborn, 1976; Maddux & Rogers, 1983; Wurtele & Maddux, 1987). For example, Rogers and Mewborn (1976) conducted an experiment to determine the effects of manipulating efficacy, vulnerability and severity beliefs on undergraduates intentions to comply with recommended preventive behaviours (not smoking cigarettes, driving safely, and getting penicillin treatment (following contraction of veneral disease). Efficacy beliefs affected

intentions irrespective of the extent to which subjects acknowledged threat (i.e., defensive avoidance) (also see Sturges & Rogers, 1996).

Defensive avoidance was found to be an important predictor of intentions to exercise, in its own right. Respondents disposed to use this coping approach reported lower intentions to exercise, a trend consistent with the view that defensive avoidance relates to greater levels of health risk-taking (see *Section* 2.4.8). It is noteworthy that defensive avoidance, measured as a generalised tendency, emerged as a key predictor despite the strong influence of response-efficacy. This further contradicts the view that coping patterns play a negligible role in adolescents' health decisions when considered within the context of health beliefs (Abraham *et al*, 1994). Perhaps more importantly, the failure to observe an interaction between defensive avoidance and beliefs about the efficacy of regular exercise raises an important question; is defensive avoidance more meaningfully conceptualised as an independent predictor of adolescents' intentions to exercise, rather than as a moderator of relations between perceptions of exercise efficacy and intentions? The present findings suggest that the answer to this question is yes! Although teenagers may be motivated to exercise, believing that this course of action will significantly reduce the threat of ill health, they may also be discouraged from exercising as a result of denial of responsibility for maintaining their health, rationalisation of physical inactivity, and refusal to consider any health advantages of regular exercise.

Defensive avoidance and perceived threat. The absence of vulnerability x avoidance interactions suggests that the degree to which respondents' vulnerability beliefs influenced their intentions was unaffected by individual differences in defensive avoidance. Janis (1983) purports that, when people afflicted with disease use defensive avoidance, "...they tend to minimise or deny the seriousness of their clear-cut symptoms (which would reduce the correlation

between adherence [to recommended treatment] and [perceived] symptoms)..." (p.147). One implicit suggestion here is that defensive avoidance leads to generally low threat estimates, causing floor effects, so that perceived threat no longer differentiates between persons who do and those who do not perform a health behaviour.

Indeed, in recent research, the failure of perceived susceptibility to predict health decisions (intentions) among adolescents has been largely attributed to floor effects caused by their denial of personal risk (Sheeran & Abraham, 1996). Most adolescents tend to minimise personal vulnerability to health threats (Whalen *et al*, 1994), fostered by the ambiguity of threat information, a limited ability to anticipate future (hypothetical) consequences, and feelings of indestructability (Elkind, 1967). Thus, such denial of threat may obtain even in teenagers not generally disposed to defensive avoidance. Some health threats are so remote and intangible that they may simply have no motivational impact. Van der Pligt (1994) contends that "...the fact that adolescents may ignore the health consequences of smoking can hardly be seen as a defensive coping style: for them, the threat often concerns a long-term risk that is simply not acknowledged in their decision making" (p.136, also see Cohn *et al*, 1995). However, in the present study, perception of vulnerability proved a significant predictor of both intentions to exercise and intentions to use substances. Furthermore, and perhaps more impressively, defensive avoidance emerged an important predictor of intentions to exercise! Respondents with stronger perceptions of personal vulnerability, and those inclined to use defensive avoidance strategies reported lower intentions to exercise and (vulnerability only) greater intentions to use substances. These findings contradict Van der Pligt's (1994) argument.

Still, the absence of a vulnerability x avoidance interaction is surprising

when considered against the background of previous research (Janis & Feshbach, 1954; Goldstein, 1957) showing that individuals high on defensive avoidance are more prone to minimise personal risk. In essence, a salient threat increases the fear levels of high defensive avoidance persons up to a point where it (fear) induces defensive reactions. This suggests that persons high on defensive avoidance are more sensitive to threat (i.e., anxiety), so that perceived vulnerability ought to be a salient determinant of intentions in such individuals.

The findings also suggest that the extent to which respondents were motivated by perceived severity of threat was independent of their level of defensive avoidance. By definition, adolescents low on defensive avoidance should be more inclined to consider and act upon threat (severity) information (Janis & Mann, 1977a). However, Janis (1983, 1984) does not appear to take account of people's growing awareness of major (fatal) health risks, due to widespread publicity. Sheeran and Abraham (1996) have suggested that the salience of life-threatening risks such as HIV/AIDS may lead to a consensus amongst adolescents about severity. However, in the present study, severity independently predicted both intentions to use substances and intentions to consume dietary fat. Respondents with stronger perceptions of severity reported greater intentions to use substances and eat fatty foods. This seems to contradict Sheeran and Abraham's (1996) argument about ceiling effects. Severity beliefs do play an important role in adolescents health decisions. Interestingly, defensive avoidance, but not severity, significantly predicted intentions to exercise. Rather than moderating severity-intention relations, defensive avoidance may *mediate* the influence of severity (i.e., strong perceptions of severity may elicit the use of defensive avoidance strategies which reduce anxiety but also impede threat-reducing behaviour). Perhaps defensive avoidance can be more meaningfully conceptualised as a mediator of relations

between adolescents' threat perceptions and health decisions. It is clear from the results that defensive avoidance plays a significant role as an independent predictor of adolescents' behavioural intentions (relating to physical exercise). This interpretation of the role of defensive avoidance reflects the tenets of Hovland *et al*'s (1953) Fear-Drive Model and Janis's (1967) Family of Curves Model (see *Sections* 2.3.1 to 2.3.4), two early threat-coping frameworks from which Conflict-Theory was derived.

4.4.3 Hypervigilance as a moderator

It was hypothesised that beliefs better predict decisions in those who are low on hypervigilance. However, no significant belief x hypervigilance interactions emerged in predicting intentions for each health behaviour. This suggests that the extent to which respondents were motivated by their health beliefs was unrelated to the degree to which they were prone to panic and make impulsive, ill-considered choices under threat.

Hypervigilance and perceived efficacy. Janis (1983, 1984) posits that, since the hypervigilant individual is in an extremely anxious state, unable to think clearly about relevant potential outcomes, (s)he would quickly snap up any action that seems to offer immediate escape. Since a decision is made primarily on impulse rather than from careful appraisal of the efficacy of alternative actions, relations between efficacy beliefs and the decision will be greatly attenuated. However, the present findings suggest that adolescents may or may not be motivated by their perceptions of efficacy, irrespective of the presence or absence of hypervigilant tendencies. Perhaps efficacy beliefs are so heavily moderated by other situational cognitions (e.g., perceptions of one's ability to perform a behaviour) that generalised tendencies to make ill-considered, impulsive choices may play only a marginal role.

Hypervigilance may moderate the salience of efficacy beliefs in situations for which there are no clear means of escape, that is, where there are multiple alternatives all of which appear equally efficacious. This is often the scenario for people faced with sudden, and acute natural/environmental disasters (e.g., hurricanes, nuclear accidents), where no one is really sure what the appropriate course of action is for escaping the threat (Janis, 1986). Indeed, it is from people's reactions to such threats that Janis and Mann (1977a) developed the notion of hypervigilance. Most of the major health threats that adolescents are advised to protect themselves from can be averted through the adoption of specific, recommended, preventive actions. For example, most school-based anti-HIV/AIDS education programmes highlight regular contraceptive use as the main way to protect one's health (Bury, 1991). Similarly, programmes designed to reduce the incidence of heart disease, and cancer specifically recommend that teenagers exercise regularly and/or stop smoking cigarettes (Jacobsen *et al*, 1991). The presence of a salient recommended escape option implies a wide perceived difference in the likelihood of averting danger, between adopting and not adopting the recommended action. This may drastically reduce the amount of informational overload, and hence limit the level of vacillation, even in the more panic-prone individuals.

Interestingly, though, hypervigilance did emerge as an important independent predictor of intentions to exercise. Respondents disposed to use hypervigilance reported lower intentions to exercise, consistent with the view that hypervigilance relates to greater levels of health risk-taking (see *Section* 2.4.8). Response-efficacy was also a signifcant predictor of exercise intentions. This pattern of findings suggests that respondents were motivated to exercise regularly by strong beliefs about the threat-reducing efficacy of this action, but discouraged from exercising by a chronic near-panic state characterised by high

anxiety. Hypervigilance may prevent proper appraisal of the health (and other) benefits inherent in regular exercise, with the result that the individual continues to be inactive, taking solace in the fact that any relevant health risks are far from imminent. These findings suggest that, at least with regard to perceptions of efficacy and physical exercise, hypervigilance may be more usefully conceptualised as an independent determinant of exercise intentions, rather than as a moderator of efficacy-intention relations.

Hypervigilance and perceived threat. Janis (1983) was not explicit about why weak relations would obtain between risk perceptions and decisions in persons *low* on hypervigilance. He notes that the hypervigilant decision maker will be extremely worried about the risks of disease, consistent with view that hypervigilance entails a perception that threat is imminent, and escape routes are rapidly closing off (Janis & Mann, 1977a). This seems to imply ceiling effects: generally strong beliefs about threat would mean uniformly high perceptions of severity and (in particular) vulnerability, so that these beliefs no longer differentiate between persons who do and those who do not enact a health behaviour. Alternatively, the cognitive constriction (i.e., simplistic thinking, reduced memory span), impulsiveness and extreme vacillation, induced by the high anxiety, may all lead to decisions that poorly reflect threat appraisals.

It often suggested that the remoteness of many major health risks means that many adolescents may simply not acknowledge personal vulnerability in their decision making (Van der Pligt, 1994; Cohn *et al*, 1995). While the high hypervigilant teenager may be more sensitive to threat information, this seems unlikely to induce the kind of extreme fright of panic proportions which Janis and Mann (1977a) associate with hypervigilance. Indeed, research has shown that adolescents generally fail to acknowledge personal vulnerability to prominent health threats such as AIDS, heart disease, and cancer (Moore &

Rosenthal, 1991; Whalen *et al*, 1994). Fostered by the ambiguities surrounding the threat information they are exposed to, perceptions of invulnerability may cause a floor effect that transcends hypervigilance differentials. However, in the present study, vulnerability was an important predictor of intentions (to use substances and to exercise regularly), showing that this cognition does play a key role, despite the fact that heart disease, stroke, and cancer are remote threats from an adolescents' point of view.

It has also been argued that few people are unaware of the life-threatening potential of major health threats, and a consensus about the severity of risks like cancer and cardiovascular disease may produce a ceiling effect, irrespective of hypervigilance (Sheeran & Abraham, 1996). However, like vulnerability, severity also proved to be a relevant determinant of intentions (to use substances and to eat fatty foods) in the present study. Hypervigilance but not severity predicted intentions to exercise. Perhaps risk appraisals are *mediated* by hypervigilance (e.g., strong perceptions of severity may elicit hypervigilant behaviour which in turn reduces the likelihood of regular exercise). Like vigilance and defensive avoidance, hypervigilance may be more usefully assessed as an independent predictor of intentions and, perhaps, a mediator of relations between threat perceptions and intentions.

4.4.4 Methodological issues

Sample. All significant results obtained in the present study must be treated with caution given the large sample size. A large sample increases the likelihood of obtaining significant results, even for very modest relationships (Bryman & Cramer, 1994). However, the adoption of the 1% ($p<.01$) significance level means that the significant results can be regarded with greater confidence (Coolican, 1994).

Data analyses. It must be noted that the regression analyses conducted in the present study only looked at *linear* relationships between variables (Tabachnick & Fidell, 1996). The linear relationship represents a gradual, steady change in the influence of the predictor on the outcome measure as the moderator changes. It is this form of moderation that is generally assumed (Baron & Kenny, 1986). However, since a moderator effect may also reflect a *quadratic* or *step* function, the present findings must be interpreted strictly within the context of linear relations. If the effect of a coping style on belief-intention relations is quadratic, this interaction may not be detected by a linear function. Unfortunately, Conflict-Theory (like other social-psychological models) is not precise enough to specify the exact function by which coping styles moderate the effects of health beliefs on decisions (Baron & Kenny, 1986).

Data collection. Earlier in this chapter (see *Section* 4.2.1), some of the advantages of self-report questionnaire surveys (in terms of being able to assess unobservable constructs, and also obtain data from large samples of participants) were highlighted. However, questions have being raised about the ability of individuals to accurately report their thoughts and feelings (Abraham & Sheeran, 1993). This issue is of particular importance when dealing with adolescents whose self-reports and recollections may be more prone to inaccuracy. Conner and Waterman (1996) point out that questions assessing cognitions (i.e., beliefs, attitudes) are especially difficult to construct since respondents may not have an attitude or belief about a particular issue, or may have a fragile undeveloped perception. Also, cognitions tend to be complex multidimensional constructs and a measure may fail to tap the full range of dimensions. For example, perception of severity is thought to include both beliefs about medical severity (e.g., pain, weight loss) and psychosocial severity (e.g., embarrassment) (Sheeran & Abraham, 1996). In this regard, having a clear

theoretical model of the cognitions to be assessed can be useful in guiding questionnaire construction. In the present project, measures of health beliefs were based on the Health Belief Model (Janz & Becker, 1984) and Protection Motivation Theory (Rogers, 1983). Both models specify several cognitions and clearly define the nature of each[17].

As regards accuracy of self-reports, questionnaire responses are quite prone to bias. Hence, caution must be exercised in the interpretation of questionnaire data since some respondents may have provided healthier belief and lifestyle profiles than is actually the case. Coolican (1994) identifies several biases that may operate in questionnaire completion, hence compromising the authenticity of the data collected. An effect known as *response acquiescence set* may operate whereby respondents tend to agree or disagree with questionnaire items. However, items used in the present study were an unpredictable mixture so that subjects had to think about each item before giving a response. In addition to reducing response set, having an unpredictable mixture of items can also reduce demand characteristics whereby respondents try to interprete the purpose of the research and give responses that support the researchers expectations or hypotheses. Finally social desirability may operate. This involves respondents giving what they perceive to be socially desirable or favourable responses that project them in a "good light". This bias may be particularly prominent when items relate to health and subjects are required to give responses that may portray them as "unhealthful", "dirty", "irresponsible" or "foolhardy". But strong reassurances of confidentiality were provided and research suggests that such assurances are effective in minimising the tendency to give socially

[17]However, it is noteworthy that social cognition models, in particular the Health Belief Model, have been criticised for the multitude of operational definitions and measures used across studies to measure certain constructs (see review by Norman & Conner, 1996). Still, health behaviour models provide a clear theoretical background to research, specifying relevant variables, and the role of these factors in health decisions (Conner, 1993).

desirable answers (Murray & Perry, 1987).

Conner and Waterman (1996; also see Abraham & Sheeran, 1993; Ingham, 1993) suggest several ways by which biases in questionnaire completion can be minimised. First, the use of exact, simple, and unambigous words is essential, particularly for controversial or sensitive issues which carry significant moral undertones. The use of short simple questions can prevent respondents from developing answers prematurely. Although there are no clear guidelines as to what constitutes a 'short' question, in the present study efforts were made to limit the length of sentences (most sentences are limited to two lines). The use of forced-choice results in less bias than agree-disagree responses which as indicated above, are prone to response acquiescence set (Coolican, 1994). There were no agree-disagree items in the present study and every forced choice question was accompanied by clear alternative response options.

Questions which make assumptions that do not apply to all respondents need to be accompanied by evident preliminary questions which 'filter out' respondents who do not meet the particular assumption. In the present study, all questions based on assumptions were preceded by obvious preliminary items. For example, a question with options meant only for respondents who had consumed alcohol during the past 7 days ("How many drinks (glasses) did you have in the last seven days?"; 1-5 drinks, 6-10 drinks, > 10 drinks) was preceded by preliminary questions asking if respondents had ever consumed alcohol ("Have you ever had a proper alcoholic drink not just a sip?") and whether they had consumed alcohol during the past week ("Have you had any alcoholic drinks during the past 7 days?"). The use of open-ended questions allows respondents to respond in a relatively unconstrained way, hence providing information that even carefully developed closed-ended questions might bias. However closed ended questions, such as those used in the present study, are

more easily quantified, generating data that can be easily analysed statistically.

Measures. The use of single-item measures with respect to contraceptive-use, fat avoidance and physical exercise is an important limitation. Although items were adapted from previously tested scales (e.g., self-efficacy measures were adapted from Schwarzer's (1993) psychometric scales while intention measures were based on Ajzen & Fishbein's (1980) *Sample Questionnaire*), it is difficult to establish the reliability and/or validity of a single-item measure. The failure to relate health beliefs regarding a behaviour (e.g., beliefs about the efficacy of fat avoidance) to specific diseases (e.g., heart disease) may have attenuated genuine relationships. For example, the significant relation between beliefs about the efficacy of contraceptive-use and intentions to use condoms may have resulted partly because respondents interpreted 'health problems' to mean specifically AIDS, a highly publicised medical condition strongly linked with nonuse of contraceptives.

Previous applications of health beliefs to intentions and/or behaviour have assessed beliefs about response-efficacy by linking the performance or non performance of a behaviour to specific illnesses (e.g., Van der Velde & Van der Pligt, 1991; Abraham *et al*, 1994; Fruin *et al*, 1991; Wurtele & Maddux, 1987). For example Seydel *et al* (1990) measured response-efficacy with the following item; "The chance that (performing breast self-examination/participating in mass cancer screening) can lead to early detection of cancer/will reduce the risk of cancer, is..." (Answers rated on 5-point scales from "very small" to "very large"). In any case, Seydel *et al*'s study involved only one type of threat or illness (breast cancer) so that measures of vulnerability and severity were much more likely to impact on subjects self-reports of cancer-preventive behaviour.

Also, associations between health beliefs and intentions may have been obscured by the selection of a 2-month time frame for intentions but not other

measures (Ajzen & Fishbein, 1980). Ajzen and Fishbein state that "...just as a measure of intention must correspond to the behavioural criterion in action, target, context, and *time elements*, so too must the attitude correspond to the intentions" (p.56). In the present study for example, self-efficacy for not smoking was assessed by asking respondents "Do you think you can avoid smoking cigarettes if you want to?". This self-efficacy measure fails to take account of the 2-month time frame incorporated in the intention measure, "Do you intend to smoke cigarettes during the next 2 months?", so that relations between self-efficacy and intention may have been weakened since, for example, subjects who believe they can avoid smoking may not necessarily be confident that they can do so within the next 2 months. It would have been better to ask respondents "Do you think you can avoid smoking cigarettes *during the next 2 months* if you want to?".

4.4.5 Summary

This chapter reports a study which tested Conflict-Theory hypotheses concerning the role of coping styles as moderators of relations between health beliefs and decisions in adolescents. Little evidence of moderator effects was obtained, and this was limited to vigilance, and contradicted the hypothesis that beliefs better predict decisions in those who are high on vigilance. Beliefs about the efficacy of having protected sex interacted with vigilance in the prediction of intentions to have unsafe sex. This effect remained even after previous behaviour, self-efficacy and other variables were included. It is argued that differences in information processing and self-efficacy beliefs are important issues that may underlie the differential impact of beliefs about the efficacy of beliefs on intentions. No interactions were observed between health beliefs and each of defensive avoidance and hypervigilance, suggesting that these coping

modes may not be relevant to our understanding of weak or inconsistent belief-decision relations in teenagers. The fact that health beliefs and coping styles only accounted for a minute proportion of the variance in decisions is noteworthy. It suggests that, while empirical tests of belief x coping interactions have important theoretical and practical implications, health decisions amongst teenagers may be more heavily influenced by other factors, such as past behaviour, personality processes and social factors. For example, in a review of the role of social cognitions in health decisions, Norman and Conner (1996) noted that "...many health behaviours are determined not by [health beliefs]..., but rather by one's previous behaviour. This argument is based on the results of a number of studies showing past behaviour to be the best predictor of future behaviour" (p.207). Although there continues to be much debate about the predictive importance of health beliefs and coping styles within the context of other "better" predictors, such as past behaviour and social norms (e.g., see reviews by Van der Pligt, 1994; Sutton, 1994; Conner & Norman, 1996; Norman & Conner, 1996), this issue is not central to the present thesis. Finally, the present study was limited in terms of measurement factors, and the reliance on questionnaire data.

CHAPTER FIVE

CONFLICT-THEORY COPING STYLES AS PREDICTORS OF HEALTH RISK-TAKING

5.1 INTRODUCTION

This chapter reports a study testing Conflict-Theory hypotheses concerning the role of threat coping patterns as correlates of health risk-taking. Before presenting the study, the relevant background literature reported in *Chapters* 2 and 3 shall be reviewed briefly.

In *Chapter* 2, it was maintained that while most adolescents are aware of the major health risks, and recognise that their lifestyle affects their health, many fail to take health-protective steps (Nutbeam & Booth, 1994). Threat coping patterns have been implicated in adolescents' health decisions (e.g., Fruin *et al*, 1991; Abraham *et al*, 1994; Gladis *et al*, 1992). For example, the failure of many teenagers to adopt health-protective behaviour in response to threat has been partly attributed to their denial of personal vulnerability (e.g., Moore & Rosenthal, 1992; Gladis *et al*, 1992; Cohn *et al*, 1995).

Several psychological models posit that threat can evoke a variety of cognitive, emotional and behavioural coping responses, with significant implications for decision making (e..g, Hovland *et al*, 1953; Janis, 1967; Leventhal, 1970; Rippetoe & Rogers, 1987). In particular, Janis and Mann's (1977a) Conflict-Theory offers explicit hypotheses about how different coping reactions to threat - vigilance, defensive avoidance, hypervigilance - relate to risk-taking, within a health context.

Janis and Mann (1977a) propose that, since vigilance entails careful, unbiased search for and appraisal of relevant information, any decision made will be an "optimal" one, in the sense that threat is reduced or averted. Defensive avoidance focuses on reducing anxiety by procrastination, denial of responsibility, and use of rationalisations, thereby delaying the adoption of threat-reducing behaviour. Hypervigilance entails panic-like search for a solution with extreme vacillation. Believing that danger is imminent, the person

is likely to adopt a behaviour that offers immediate relief, without fully appreciating the long-term risks.

In *Chapter* 3, evidence was presented showing that Conflict-Theory coping constructs have been successfully applied to health decisions in adults (e.g., Eiser *et al*, 1990; Van der Velde & Van der Pligt, 1991; Van der Velde *et al*, 1992; White *et al*, 1994). For example, Van der Velde and Van der Pligt (1991) found that vigilance and defensive avoidance predicted, respectively, higher and lower intentions to use contraception in both homosexual and heterosexual adults. In another study (White *et al*, 1994) defensive avoidance was negatively related to women's preventive screening for cervical cancer. Eiser *et al* (1995) observed that vigilance was associated with greater recognition of the threat of skin cancer amongst adult holiday-makers. However, review of this literature revealed no study which extended Conflict-Theory threat-coping principles to health decisions amongst teenagers, despite evidence indicating that vigilance, defensive avoidance and hypervigilance may inform understanding of adolescent decision making within other contexts that involve realistic threats (e.g., career choice) (e.g., Burnett *et al*, 1989).

The present study aimed to address this gap in the literature, by extending to adolescents Conflict-Theory postulates about relations between threat coping patterns and health-related risk-taking. Results of the main study reported in *Chapter* 4 provide some evidence for vigilance, defensive avoidance and hypervigilance as important predictors of health risk-taking in teenagers. However, the primary goal of that study was to assess the role of these coping constructs as moderator variables. Coping styles were measured as generalised dispositions. Despite the evidence for coping patterns as independent predictor variables, some researchers argue that dispositional measures can be unreliable and that stronger relations between coping and decision measures will be

obtained when coping measures are specific to a particular context (Leventhal *et al*, 1993). Also, it has been argued that coping patterns play a more prominent role in persons who actually feel threatened by a health risk (Van der Pligt, 1994). Most adolescents denying and/or ignoring the health risks of cigarette use cannot be said to be employing defensive avoidance, since for them, the threat concerns dangers that are simply too remote to generate any anxiety. The sample used in the main study was a general one in that respondents did not constitute a particularly 'anxious' or 'threatened' group.

By contrast, the study reported in this chapter employed situation-specific measures of Conflict-Theory coping constructs, and used a sample of adolescents who actually felt personally threatened by, and hence anxious about, a health threat. The following hypotheses were tested:

(a) Higher levels of vigilance relate to *lower* levels of health risk-taking;

(b) Higher levels of defensive avoidance relate to *higher* levels of health risk-taking;

(c) Higher levels of hypervigilance relate to *higher* levels of health risk-taking.

5.2 METHOD

5.2.1 Design

The study was based on a cross-sectional questionnaire survey, similar to that used in previous research on coping styles and health-related behaviour (e.g., Abraham *et al*, 1994; Van der Velde & Van der Pligt, 1991; Van der Velde *et al*, 1992; Eiser *et al*, 1995; White *et al*, 1994). Structured but open-ended interviews (Coolican, 1994, p.121) were carried out during the selection of participants (see *Section* 5.2.4).

The health-risk behaviour addressed in this study was cigarette smoking. Substantial epidemiological evidence supports the importance of not smoking in

reducing one's risk of premature mortality (e.g., Amler & Dull, 1987). Smoking may triple one's chances of heart attack, and has been strongly implicated in lung cancer, emphysema and asthma (Jacobsen *et al*, 1993). Over 200,000 lives lost per year in the UK (mostly from cardiovascular disease and cancer) could be saved by the reduction and/or elimination of smoking (*The Health of the Nation*, 1991). Numerous health-promotion programmes have been targeted at adolescents to educate them about the health hazards of smoking, with a view to reducing cigarette use in this group (Ferguson & McKinlay, 1991). Despite being aware of the link between smoking and health risks (Sutton, 1992), adolescent cigarette use has remained at disturbing levels (Swadi, 1992). A recent survey of UK teenagers found that over 12% were regular smokers (i.e., smoked at least one cigarette per week) while almost one-half (47%) had tried smoking at least once (*Office of Population Censuses and Surveys*, 1994). Adult smoking has generally declined (Jacobsen *et al*, 1991).

Variables. Three *coping patterns* were assessed: (a) vigilance, (b) defensive avoidance, and (c) hypervigilance. When these coping modes are used in response to a health-related threat, defensive avoidance and hypervigilance purportedly delay and/or prevent the adoption of effective risk-reducing action, whereas vigilance motivates action aimed at averting the risk (Janis & Mann, 1977a, 1977b, 1983; Janis, 1986).

Health risk-taking was assessed in terms of current (previous)[1] smoking behaviour. However, research on threat and persuasion has traditionally distinguished between intentions to perform a behaviour and actual performance of that behaviour (see reviews by Rogers, 1975; Sutton, 1982; Eagly & Chaiken,

[1]In some studies, *current* behaviour is seen to reflect *previous* behaviour, and vice versa (e.g., Van der Velde & Van der Pligt, 1991). An item asking whether someone smokes up to *x* number of cigarettes a week (or whether one uses condoms regularly) is likely to elicit reports of smoking behaviour during the *present* week and also *preceding* weeks. Technically, unless one is interested in an individuals behaviour at the time of completing a questionnaire, *not before*, distinctions between current and previous behaviour seem irrelevant!

1993). Some studies applying Conflict-Theory coping modes to health decisions in adults have focused on relations between coping patterns and *intentions* to enact a health behaviour (e.g., Van der Velde & Van der Pligt, 1991; Van der Velde *et al*, 1992). Other investigations have measured actual health behaviour (e.g., White *et al*, 1994; Eiser *et al*, 1995). Van der Velde *et al* (1992) assessed *both* intentions and behaviour. To facilitate comparability with previous research, it was decided to measure *both* intentions to smoke and smoking behaviour in the present study. Thus, health risk-taking was defined in terms of both performance of health risky behaviour and intentions to engage in health risky behaviour.

Conflict-Theory proposes that vigilance, defensive avoidance and hypervigilance are influenced by decisional stress (i.e., anxiety generated by decisional conflict), and the presence or absence of three conditions: (a) arousal of decisional conflict (i.e., perception of risks both in taking and not taking protective action), (b) hope of finding a better decision alternative, and (c) belief that there is adequate time to search and deliberate before a decision is required (see *Section* 2.4; Janis & Mann, 1976). Although the effect of decisional conflict, decisional stress, hope of finding a better decision alternative, and time pressure on risk-taking are purportedly mediated by coping patterns (Janis & Mann, 1977a, 1977b), there is some evidence that these variables may impact directly on decisions (White *et al*, 1994).

Furthermore, *demographic variables* (i.e., age, gender and social class) have been strongly implicated in adolescents' cigarette use (e.g., Cohen *et al*, 1990; *Office of Population Censuses and Surveys*, 1994; Nelson *et al*, 1995). For example, epidemiological research has shown that cigarette use is more common among teenage girls, and those from lower social class background (see review by Swadi, 1992).

Thus, a secondary aim of the present study was to examine the role of coping patterns in health risk-taking, within the context of 'additional' variables - decisional conflict, decisional stress, hope of finding a better decision alternative, perceived time pressure, and age, gender, and social class.

5.2.2 Participants

To ensure that participants in the present study felt 'threatened' by the health risk posed by cigarette use, only those teenagers who *worried* about the risks to their health were asked to participate. Anxiety about threat reflects perceptions that the danger is *probable* and/or is severe (Rogers & Mewborn, 1976; Rippetoe & Rogers, 1987)[2].

Smokers and nonsmokers alike were targeted. Although persons not engaging in risky behaviour (i.e., nonsmokers) may not face an obvious health threat, no direct evidence has been found indicating that the threat of lung cancer (and other smoking-related diseases) is *more* salient to teenagers who smoke (Van der Pligt, 1994). Although research has shown that adolescent smokers are more inclined than nonsmokers to discount the health consequences of smoking (Virgili *et al*, 1991), it seems plausible that a wide array of coping procedures could also be present in nonsmokers, hence directly influencing their intentions to smoke in the future. Afterall, the perception that one is at risk is partly dependent on the perceived effectiveness of precaution (i.e., not smoking) in reducing threat: when precaution is thought to offer only partial protection, many people in the low-risk state will still believe that their risk is appreciable (Weinstein & Nicolich, 1993). Since young people may doubt the efficacy of not smoking in averting risk (Wardle & Steptoe, 1991), teenagers who do not

[2]Rippetoe and Rogers (1987) found that subjects in a high-threat group (i.e., high perceived severity of and/or vulnerability to a health threat) reported significantly greater fear arousal than did those in a low-threat group.

currently smoke (i.e., are at low risk) may still believe themselves to be at risk. Furthermore, the use of a broad sample including both smokers and nonsmokers could provide more statistical power[3]. Results would also be generalisable to nonsmokers with implications for the *prevention* of adolescent smoking.

The sample was drawn from a pool of 885 students from a local secondary school who had completed a health-related questionnaire as part of the main study (see *Chapter* 4). This questionnaire contained an item which asked respondents whether they presently had any worries at all about the use/nonuse of tobacco (see *Appendix* A, *Section* H, *Q7*). Response options were "yes" (n=87), "maybe" (n=156), "not sure" (n=148) and "no" (n=494). Those who responded "yes", or "maybe" were considered eligible for participation. Due to time constraints only 144 (59.25%) of the 243 eligible students were subsequently invited by letter to attend an interview[4]. The purpose of the interview was to identify (and exclude) individuals whose anxiety was *not* health-related. Of the 144 pupils invited, 111 (77.08%) actually attended. There were 45 (40.54%) boys and 66 (59.45%) girls aged 13 to 16 years (with a mean age of 14.12 years) and from years (grades) 9, 10 and 11. Ninety-nine (89.2%) were White, 8 (7.2%) were Black and 4 (3.6%) were of Asian origin. Participants were divided into several social class groups (on the basis of father's occupation) using the *Office of Population Censuses and Surveys* (1990) classification list: 'professional' (n=4), 'intermediate' (n=18), 'skilled nonmanual' (n=17), 'skilled manual' (n=48), 'partly skilled' (n=7), and 'armed forces and inadequately described' (n=7). Comparing participants with the larger original sample of students on demographic variables showed that participants tended to

[3] There would be greater variability in scores and hence a reduced likelihood of a type II error. The reasoning is that the more the respondents differ in risk status, the more they will differ in coping behaviour, and hence the greater the chances of detecting genuine relations between coping and (intended) risk behaviour (see Mitchell & Jolley, 1992, p.185).

[4]Imminent closure of the school for summer made it impossible to interview all eligible students.

be younger (t=5.01, d.f.=159.9, p<.0001). The subsample did not differ from the total sample on the variables of gender and social class.

5.2.3 Measures

Janis and Mann (1976, 1977a, 1977b, 1982) do not suggest how Conflict-Theory constructs may be effectively operationalised. Although Mann (1982) designed the Flinders Questionnaire to assess coping styles, a search of the literature did not reveal any standard questionnaire, scales or other measures for assessing decisional stress or mediating cognitions. Health-related research on Conflict-Theory is limited, and only one study was found which attempted to operationalise the model's notions of stress and mediating cognitions (see White *et al*, 1994).

White *et al* (1994) measured *decisional stress* by having subjects indicate the intensity of mood states (e.g., anxious, nervous) while contemplating preventive action (i.e., screening for cervical cancer). The alpha reliability for this measure was adequate (.84). White *et al* (1994) assessed *hope of finding a better alternative* by asking subjects to list alternative means of reducing risk (e.g., having a Pap-smear test, different screening locations). This measure effectively discriminated between low- and high-risk subjects, and is consistent with Janis's (1986) view that provision of information about decision alternatives increases optimism about resolving conflict. Given White *et al*'s (1994) effective operationalisation of stress and hope, adaptations of their measures were used in the present study. Perceived *time pressure* for averting danger was not assessed in the White *et al* (1994) study. A measure of this construct was therefore formulated based on the theoretical description of time pressure (Janis & Mann, 1977a).

A 41-item questionnaire was designed (see *Appendix* D) which incorporated measures of coping styles, stress, conflict, hope, time pressure, and smoking intentions and behaviour. Data on demographic variables were obtained via the questionnaire used in the main study (see *Appendix* A, *Section* A).

Coping styles. Measures of threat coping patterns (Janis & Mann, 1976, 1977a, 1977b, 1983) were adapted from an early version of the Flinders Questionnaire (Mann, 1982; Radford *et al*, 1986). This instrument incorporates 16 items (see *Appendix* F) assessing three (generalised) coping styles including vigilance, defensive avoidance, and hypervigilance (the two unconflicted coping styles are excluded). For the purpose of the present study, this earlier and shorter version of the Flinders instrument was preferred to the later, longer version (as used in the main study; see *Appendix* A, *Section* B) because items in the former seemed more adaptable to the issue of smoking and health. However, items from both instruments are generally assumed to measure the same coping constructs of vigilance, defensive avoidance, and hypervigilance (see Mann *et al*, 1997).

For the purpose of this study, all items were modified to assess coping in relation to cigarette smoking and the threat of smoking-related illnesses such as lung cancer and heart disease. Thus, for example, an item that read "I try to consider all the alternatives" was rephrased as "I have been considering how best to say no to cigarettes" and one that read "When I have a decision to make, I try not to think about it" was rephrased "I have been trying not to think about the danger of smoking". Each coping pattern was assessed by asking respondents to rate the extent to which they thought the items applied to themselves on a scale ranging from "not at all true" (1) to "very true" (5). Scores were summed to yield an index of each coping style.

Factor analysis was carried out to determine the existence of vigilance, defensive avoidance, and hypervigilance in the present sample. A principal components analysis with varimax rotation generated four groups of items (see *Table* 5.1: also see *Appendix* E, *Table* E1) with factor loadings ranging from .52 to .87, accounting for 60% of the variance. Use of varimax rotation is justified because each coping style is purportedly mediated by a unique set of conditions (see *Table* 2.1, *Chapter* 2) and hence considered distinctive (Janis & Mann, 1976).

The first group comprised 7 items reflecting the seeking of threat-relevant information (e.g., "I have been obtaining information about how to keep away from cigarettes", "I have been trying to find out the disadvantages of all the possible ways of saying no when people encourage me to smoke"), and careful evaluation of such information (e.g., "I have tried to understand how exactly cigarette smoke damages my health before deciding how to deal with it", "I have been taking a lot of care in deciding how exactly to protect my health from cigarette smoke"). This group was labelled *vigilance*.

The second group comprised 2 items involving a tendency to exaggerate the unfavourable features of threat-reducing behaviour, by playing up the inherent barriers to avoiding cigarette use (e.g., "I think it is very difficult to keep away from cigarettes"). These items are similar to the rationalisation "Smoking just seems to be an unbreakable habit for me" identified by Janis and Mann (1977a, p.346) as an argument used by smokers to 'bolster' their risky behaviour. This factor was therefore labelled *bolstering*.

The third group included 3 items reflecting active efforts to evade threat-relevant information, by not thinking about the threat (e.g., "I have been trying not to think about the danger of smoking to my health") and putting off a

Table 5.1 Factor analysis of coping items (only loadings >.50 are reported)

Item/measure	*Vigilance*	*Bolst.*	*Procrast.*	*Hypervig.*
(1) I have been thinking about different ways of refusing cigarette offers.	.75			
(12) I have been obtaining information about how to keep away from cigarettes.	.59			
(13) I have tried to understand how exactly cigarette smoke damages my health before deciding how to deal with it.	.65			
(16) I have been taking a lot of care in deciding how exactly to protect my health from cigarette smoke.	.57			
(4) I have been taking steps to avoid smoking on the spur of the moment.	.64			
(6) I have been trying to find out the disadvantages of all the possible ways of saying no when people encourage me to smoke.	.72			
(7) I have been considering how best to say no to cigarettes.	.79			
(5)I have been having difficulty staying away from cigarettes.		.87		
(11) I think it is very difficult to keep away from cigarettes.		.83		
(2) I have been trying not to think about the danger of smoking to my health.			.82	
(3) I don't think I have enough time to find an effective way of avoiding the cigarettes.			.56	
(8) I have been trying not to think about the danger of smoking.			.66	
(14) I have been trying not to think about the danger of smoking because nothing can be done about it.				.55
(15) I have not been able to think properly about the danger of smoking because of lack of time.				.70
(9) I can't make up my mind about how to avoid smoking because I'm scared of offending someone.				.83

Abbreviations: Bolst (BOLSTERING), Procrast (PROCRASTINATION) Hypervig (HYPERVIGILANCE).

decision on the issue (e.g., "I don't think I have enough time to find an effective way of avoiding the cigarettes"). This factor was labelled *procrastination.*

The final subset of items included 3 items reflecting feelings of helplessness (e.g., "I have been trying not to think about the danger of smoking because nothing can be done about it"), time constraints (e.g., "I have not been able to think properly about the danger of smoking because of lack of time"), and vacilliation (e.g., "I can't make up my mind about how to avoid smoking because I'm scared of offending someone"). This factor was labelled *hypervigilance.*

Cronbach alpha's, and descriptive data for the four emerging coping factors are presented in *Table* 5.2. The emergence of two defensive avoidance dimensions is not consistent with the original Flinders item design, but is compatible with Conflict-Theory which specifies three forms of defensive avoidance, including bolstering (use of rationalisations to justify a preferred course of action), and procrastination (putting off the decision). Secondary correlational analysis (see *Appendix* E, *Table* E4) showed that higher levels of decisional stress (see below) were associated with greater use of the hypervigilance, bolstering and procrastination factors. This is consistent with Conflict-Theory which relates hypervigilance and defensive avoidance with high decisional anxiety (see *Chapter* 2, *Table* 2.1, p.41). The two defensive avoidance factors also correlated positively with the perceived costs of *not* smoking (see below), consistent with the view that defensive avoidance involves focusing on and/or magnifying the possible gains of a risky course of action (Janis & Mann, 1977a; also, see *Chapter* 2, *Section*, 2.4.3). Overall, these associations provide some degree of criterion validity (Coolican, 1994) for the coping factors that have emerged from the factor analysis[5].

[5]However, there was little correspondence between these coping measures and coping factors described in the main study (see Chapter 4, p.100).

Decisional stress. In assessing decisional stress, it was assumed that stress associated with the option of smoking was already high since anxiety about cigarette use was a criterion for participation. Thus respondents were presented with a series of adjectives (White *et al*, 1994) "people use to describe themselves" and asked to indicate "how well each item describes the way you feel about *not* smoking cigarettes". Each adjective was rated on a 10-point scale from "not at all accurately" to "very accurately". The mood adjectives comprised two positive mood states (fine, comfortable) and three negative mood states (anxious, nervous, uneasy). The positive items were scored negatively. Principal components analysis with varimax rotation produced two factors corresponding to the original positive and negative mood items, with factor loadings ranging from .79 to .93 and explaining 84.7% of the variance (see *Appendix* E, *Table* E3). These were labelled *stress (low positive affect)* and *stress (high negative affect)*. Descriptive data are shown in *Table* 5.2.

Decisional conflict. Decisional conflict is purported to arise when risks are perceived both in taking and not taking protective action (Janis & Mann, 1976, 1977a). To assess the perceived *costs of smoking* and *costs of not smoking* (i.e., benefits of smoking), participants were asked to rate the extent to which they endorsed seven benefits of smoking and six costs of smoking on a scale ranging from "strongly disagree" (1) to "strongly agree" (5). In a comprehensive survey of childrens attitudes towards smoking, these measures had effectively discriminated between smokers and nonsmokers (see Charlton, 1984), and hence were considered to have sufficient validity for present study.

Principal components analysis with varimax rotation was performed to identify the salient constructs and this yielded three factors with factor loadings ranging from .52 to .82 and accounting for 51% of the variance (items with factor loadings above .50 were used to define factors; see Norusis, 1988). These

Table 5.2 Coping style, additional variable, and risk intention measures: Cronbach's alpha's, means and standard deviations

Measure	*No of items*	*C'Alpha*	*Min-Max*	*Mean*	*SD*
Coping styles					
Vigilance	7	.82	7-35	20.12	6.25
Procrastination	3	.55	3-15	7.17	2.64
Bolstering	2	.76	2-10	5.45	2.88
Hypervigilance	3	.70	3-15	6.04	2.48
Additional variables					
Dec. Stress (high negative affect)	3	.87	3-30	10.99	6.98
Dec. Stress (low positive affect)	2	.90	2-20	7.42	5.33
Costs of smoking (physio)	5	.70	5-25	20.02	3.64
Costs of not smoking (phar)	4	.71	4-20	8.88	3.21
Costs of not smoking (image)	3	.73	3-15	5.05	2.51
Dec. Conflict: costs of smoking (physio)x costs of not smoking (phar)	-	-	-	177.33	67.55
Dec. Conflict: costs of smoking (physio)x costs of not smoking (image)	-	-	-	99.36	50.27
Decisional alternatives	1	-	-	2.50	1.02
Time pressure (limited time)	1	-	1-10	6.15	1.99
Time pressure (in a hurry)	1	-	1-10	6.27	2.47
Intention to smoke	3	.81	3-10	14.20	8.34

Abbreviations: dec (DECISIONAL), physio (PHYSIOLOGICAL), phar (PHARMACOLOGICAL), image (IMAGE-RELATED).

were labelled perceived *physiological* costs of smoking, perceived *image-related* costs of not smoking and perceived *pharmacological* costs of not smoking (*Appendix* E, *Table* E2).

Items loading on the pharmacological factor seemed to represent the perceived 'drug-like' effects of smoking, in terms of weight control, confidence, calmed nerves and enjoyment (similar items clustered under a 'pharmacological' factor in McNeil *et al*'s (1989) study). Items loading under the physiological factor dealt mainly with the health hazards of smoking, in terms of cough, breathlessness, bronchitis and heart disease. This factor was labelled 'physiological' (rather than 'health') because of the item "smoking is smelly" which concerns the influence of smoking on the central nervous system. Items clustering under the 'image' factor concerned "showing off", "looking tough" and "looking grown up". Similar items loaded strongly under an "image" factor in McNeil *et al*'s study.

Two measures of decisional conflict were created: *costs of smoking (physiological)* x *costs of not smoking (pharmacological)*, and *costs of smoking (physiological)* x *costs of not smoking (image-related)*. Cronbach alpha's, and descriptive data are presented in *Table* 5.2.

Decision alternatives. Participants were required to list alternative ways by which they could effectively protect themselves from the health risks posed by cigarette use. Presumably, the greater the number of options recalled, the greater the optimism about finding an acceptable decision alternative. Simply abstaining from cigarette use appears to be the most reliable and strongly recommended way of preventing heart disease, bronchitis and smoking-related illnesses. However, 'compromise' alternatives such as smoking at a very reduced rate, using nicotine pads and not socialising with smokers (passive smoking) may also effectively reduce the risk of disease, at less cost to the individual than

total abstinence (Janis & Mann, 1977a, pp.317-321). An entry was considered 'valid' if it referred in any way to avoidance of cigarette smoking and/or passive smoking (e.g., keeping away from smokers, not smoking, using nicotine patches, cutting down on rate of smoking). Descriptive data are shown in *Table* 5.2.

Time pressure. Perception of sufficient time in which to search for a better alternative was gauged by asking participants whether they felt there was limited time to find an effective way of protecting themselves from disease(s) caused by cigarette smoke, and whether they were in a hurry to find an effective way of protecting themselves from diseases caused by cigarette smoke. Responses were made on a 10-point scale ranging from "no, I don't" to "yes, I do" for the first item and from "no, I'm not" to "yes, I am" for the second item. Together these two items formed an unreliable measure, generating a Cronbach alpha of .41. It was therefore decided to treat both items as separate single-item measures; *time pressure (limited time)* and *time pressure (in a hurry).* Descriptive data are indicated in *Table* 5.2.

Smoking intentions and behaviour. Three items adapted from previous research (Maddux & Rogers, 1983) were used to assess *intention to smoke.* These measured intention to smoke ("Do you intend to smoke cigarettes during the next two months?"; responses indicated on a 10-point scale from "no, I don't" to "yes, I do"), likelihood of smoking ("How likely is it that you will smoke cigarettes in the next year?"; answers given on a 10-point scale from "not at all likely" to "very likely"), and willingness to select smokers as friends ("Do you intend to limit the number of friends you have who smoke cigarette?": responses shown on a 10-point scale from "yes, I do" to "no, I don't"). Together these three items formed a reliable measure (see *Table* 5.1). *Smoking behaviour* was assessed with five response options; "never smoked" (1), "tried smoking

once" (2), "used to smoke" (3), "smoke less than one cigarette a week" (4), and "smoke one or more cigarettes per week" (5).

Demographic factors. Variables assessed were age (13-16 years), gender (1=male, 2=female), and social class (1=low; unskilled/ partly-skilled/ skilled-manual, 2=high; skilled-nonmanual/ intermediate/ professional)[6].

5.2.4 Procedure

Each subject attended a short individual interview, during which (s)he was asked to describe the nature of their worries regarding cigarette smoking;

> e.g., "What exactly are you worried about?", "Please describe the nature of your worries"

If necessary, (s)he was asked to clarify the source of their anxiety;

> e.g., "Would you say that you are concerned about the risks of smoking to your own health?"
> e.g., "Would you describe yourself as someone who is worried about the dangers to your health of cigarette smoking?"

The purpose of this exercise was to establish that subject's anxiety about cigarette use was related to the threat smoking posed to their health[7].

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[6]Social class was transformed into a binary variable because of the very low frequencies in some categories (Norusis, 1988, 1990). Please note that respondents classified under 'armed forces' or 'inadequately described' were treated as missing data.

[7]Adolescents may be anxious about negative consequences of smoking which are unrelated to health, for example, the disapproval of significant others, drain on pocket money, bad breath etc (see Charlton, 1984).

Seven participants who at this point expressed indifference about the health risk presented by cigarette use were excluded from further participation. The remaining respondents were asked to complete the questionnaire and then paid £1 for attendance. During questionnaire completion, each respondent was encouraged to ask for clarification if any items proved ambigous or difficult. Problematic items were explained carefully to the satisfaction of the participant. Examples of typical responses to the item on decision alternatives were given where subjects requested clarification. Questionnaire completion lasted about 10 minutes and the researcher checked each questionnaire for omissions before allowing the student to leave.

5.2.5 Data analysis

A series of multiple regression analyses were computed to examine the role of coping styles and additional variables as predictors of risk intentions and risk behaviour. Two sets of analyses were conducted. In the first analysis, each coping style (vigilance, procrastination, bolstering, hypervigilance) was entered as a predictor of smoking intention and behaviour. Analysis was performed *separately* for each coping style in order to establish their independent effects. To see if any observed relations persist within the context of other coping and additional variables, all coping measures (vigilance, defensive avoidance, hypervigilance) and relevant additional variables were subsequently entered *together* as predictors of smoking intentions and behaviour.

5.3 RESULTS

This section begins by considering data on the prevalence of risk behaviour amongst participants. Next, results pertaining to the main study hypotheses are presented.

The prevalence of risk behaviour roughly corresponds to that reported in recent surveys of teenage smoking (Ferguson & McKinlay, 1991; *Office of Population Censuses and Surveys*, 1992, 1994). Thirty three subjects (31.7%) had "never smoked", 22 (21.2%) had "tried once", 17 (16.3%) were previous smokers, 7 (6.7%) were occasional smokers (less than one cigarette a week) and 25 (24%) were regular smokers (at least one cigarette a week). In a recent survey (*Office of Population Censuses and Surveys*, 1994), 28% of 15-year olds in England were regular smokers, while 31% had never smoked.

The sections below describe the results of multiple regression analyses to identify significant predictors of health risk-taking measures.

5.3.1 Predicting health risk-taking from vigilance

It was hypothesised that higher levels of vigilance relate to lower levels of health risk-taking.

Table 5.3 shows the results of analysis to predict health risk-taking measures from vigilance. Vigilance predicted both risk intention ($t=-4.21$, $p<.0001$) and risk behaviour ($t=-2.55$, $p<.05$), accounting for 14% of the variance in intentions. Consistent with the hypothesis, higher levels of vigilance were related to lower intentions to smoke and less frequent cigarette use.

5.3.2 Predicting health risk-taking from defensive avoidance

It was hypothesised that higher levels of defensive avoidance relate to higher levels of health risk-taking.

Procrastination. *Table* 5.4 shows the results of analysis to predict risk-taking measures from procrastination, a form of defensive avoidance. Procrastination predicted both risk intentions ($t=4.78$, $p<.0001$) and risk behaviour ($t=3.90$,

Table 5.3 Prediction of risk intention and risk behaviour from vigilance.

	Intention to smoke	*Smoking behaviour*
Predictor	*Beta*	*Beta*
	(n=103)	(n=103)
Vigilance	-.38***	-.24*
R^2	.14	.05
F	17.75***	6.49*
Df	1,102	1,102

*p<.05, **p<.01, ***p<.001

Table 5.4 Prediction of risk intention and risk behaviour from procrastination

	Intention to smoke	*Smoking behaviour*
Predictor	*Beta*	*Beta*
	(n=103)	(n=103)
Procrastination	.42***	.36***
R^2	.18	.12
F	22.82***	15.23***
Df	1,102	1,102

*p<.05, **p<.01, ***p<.001

p<.001), contributing 18% and 12% of the variance respectively. Consistent with the hypothesis, higher levels of procrastination were associated with stronger intentions to smoke and more frequent smoking.

Bolstering. *Table* 5.5 shows the results of analysis to predict risk intentions and behaviour from bolstering, another form of defensive avoidance. Bolstering predicted both risk intention (t=5.51, p<.0001) and risk behaviour (t=4.74, p<.0001), accounting for 23% and 18% of the variance in intentions and behaviour, respectively. In line with the hypothesis, greater levels of bolstering were related to greater intentions to smoke and more frequent cigarette use.

5.3.3 Predicting health risk-taking from hypervigilance

It was hypothesised that higher levels of hypervigilance relate to higher levels of health risk-taking. *Table* 5.6 shows the results of analysis to predict risk-taking measures from hypervigilance. Hypervigilance predicted both risk intention (t=2.08, p<.05) and risk behaviour (t=2.59, p<.05), explaining 4% and 6% of the variance respectively. As hypothesised, higher levels of hypervigilance were associated with stronger intentions to smoke and more frequent smoking.

5.3.4 Predicting health risk-taking from coping and additional variables

Pearson *r* correlations were first computed to determine associations between health risk-taking measures and additional variables (i.e., age, gender, social class, decisional conflict, decisional stress, decision alternatives, perceived time pressure) to identify potential predictors. Past research has shown that risk intentions and behaviour are powerful correlates of each other (e.g., Van der Velde *et al*, 1992). Hence risk intention was assessed as an additional correlate

Table 5.5 Prediction of risk intention and risk behaviour from bolstering

	Intention to smoke	*Smoking behaviour*
Predictor	*Beta*	*Beta*
	(n=102)	(n=102)
Bolstering	.48***	.42***
R^2	.23	.18
F	30.31***	22.44***
Df	1,101	1,101

*p<.05, **p<001, ***p<.001

Table 5.6 Prediction of risk intention and risk behaviour from hypervigilance

	Intention to smoke	*Smoking behaviour*
Predictor	*Beta*	*Beta*
	(n=103)	(n=103)
Hypervigilance	.20*	.24*
R^2	.04	.06
F	4.32*	6.67*
Df	1,102	1,102

*p<.05, **p<.01, ***p<.001

Table 5.7 Correlations of risk intentions and risk behaviour with additional variables.

	Intention to smoke	*Smoking behaviour*
	r	*r*
Dec. Stress (negative affect)	.37**	.35**
Dec. Stress (positive affect)	.35**	.37**
Dec. Conflict:costs of smoking (physiol) x costs of not smoking (pharm)	.36**	.28**
Dec. Conflict:costs of smoking (physiol) x costs of not smoking (image)	.24*	.14
Decisional alternatives	.05	-.01
Time pressure (limited time)	-.28**	-.19
Time pressure (in a hurry)	-.07	-.03
Age	-.06	-.07
Gender	.18	.19*
Social class	-.06	-.12
Intention to smoke	*na*	.86**
Smoking behaviour	.86**	*na*

*p<.05, p<.01**: Abbreviations; dec (DECISIONAL), *na* (NOT APPLICABLE), *r* (PRODUCT MOMENT CORRELATION COEFFICIENT).

of risk behaviour, and vice versa. The results of these correlational analyses are presented in *Table* 5.7. Stronger intention to smoke was related to higher levels of decisional stress, and decisional conflict (both measures), time pressure (limited time) and more frequent smoking. Greater cigarette use was associated with higher levels of stress, conflict (physiological costs of smoking x pharmacological costs of not smoking), being female and stronger intentions to smoke.

Table 5.8 shows results obtained when coping styles and additional variables were used to predict risk-taking measures. Measures of vigilance, procrastination, bolstering, hypervigilance, stress, conflict (both measures), time pressure (limited time) and smoking behaviour were entered as predictors of intentions to smoke, while measures of vigilance, procrastination, bolstering, hypervigilance, stress, conflict (physiological costs of smoking x pharmacological costs of not smoking), gender and smoking intentions were used to predict smoking behaviour.

Quite impressively, the association of vigilance ($t=-3.14$, $p<.01$) and bolstering ($t=2.52$, $p<.05$) with smoking intentions remained significant, despite the pronounced influence of *smoking behaviour* ($t=13.77$, $p<.0001$). However, procrastination ($t=1.29$, $p=.19$) and hyervigilance ($t=-1.81$, $p=.07$) were no longer significant predictors. Furthermore, no coping variable predicted smoking behaviour, a measure strongly influenced by smoking intention ($t=13.17$, $p<.0001$).

5.3.5 Summary

All four coping measures emerged as significant predictors of both risk intentions and risk behaviour. The direction of these relations was consistent

Table 5.8 Prediction of risk intentions and risk behaviour from coping styles and additional variables.

Predictors	*Intentions to smoke* Beta	*Smoking behaviour* Beta
	(n=101)	(n=101)
Coping styles		
Vigilance	-.16**	.09
Procrastination	.07	-.04
Bolstering	.14*	-.05
Hypervigilance	.09	.09
Additional variables		
Dec. Stress (negative affect)	.05	-.02
Dec. Stress (positive affect)	-.01	.08
Dec. Conflict: costs of smoking (phy) x costs of not smoking (pharm)	.01	-.01
Dec. Conflict: costs of smoking (phy) x costs of not smoking (image)	.10*	*na*
Time pressure (limited time)	-.04	*na*
Gender	*na*	.07
Intention to smoke	*na*	.89***
Smoking behaviour	.73***	*na*
R^2	.83	.78
F	44.01***	36.17***
Df	10,90	9,91

Abbreviations: dec (DECISIONAL), phy (PHYSIOLOGICAL), pharm (PHARMACOLOGICAL), *na* (NOT APPLICABLE - VARIABLE NOT ENTERED IN EQUATION). *p<.05, **p<01, ***p<001

with the hypotheses: health risk-taking tended to increase with lower levels of vigilance, and higher levels of defensive avoidance and hypervigilance. Both vigilance and bolstering continued to predict risk intentions even after additional variables, including risk behaviour, were entered in the equation. However, relations of coping variables with risk behaviour were greatly attenuated following the inclusion of additional predictors.

5.4 DISCUSSION

The primary purpose of the present study was to test Conflict-Theory hypotheses that higher levels of vigilance relate to lower levels of health risk-taking, whereas higher levels of defensive avoidance and hypervigilance relate to higher levels of health risk-taking. A secondary aim was to test the relationships between coping patterns and risk-taking measures, within the context of additional Conflict-Theory and demographic variables. Results show that risk intentions and/or behaviour were predicted by all coping measures. The direction of these relations support the hypotheses. However, inclusion of risk intentions (to predict risk behaviour) and risk behaviour (to predict risk intentions) appeared to nullify certain relations between coping and risk-taking measures.

5.4.1 Predicting health risk-taking from vigilance

It was hypothesised that higher levels of vigilance relate to lower levels of health risk-taking. There was some support for this hypothesis.

Vigilance was found to predict risk intentions. Greater vigilance was associated with lower intentions to smoke. This is consistent with the hypothesis. Two vigilance items used were "I have tried to understand how exactly cigarette smoking damages my health before deciding how to deal with

it" and "I have been taking a lot of care in deciding how exactly to protect my health from cigarette smoke". Thus, subjects scoring high on vigilance may have sought relevant risk-benefit information, for example, the probability of contracting lung cancer from cigarette use, the efficacy of not smoking in reducing this threat, the severity of lung cancer, the general prognosis for lung cancer patients, and so on. The outcome of this information search may be a recognition that one is vulnerable, and the threat is severe, and hence a desire to avoid smoking and thereby avert the danger (Janis, 1983, 1986).

Previous research with adults has shown that such active unbiased search for and evaluation of relevant information tends to increase intentions to reduce and/or eliminate a health threat. For example, Van der Velde and Van der Pligt (1991) examined the role of vigilance in predicting contraceptive-use intentions in both homosexual and heterosexual adults. In either group, higher levels of vigilance (e.g., "You have thought about how to raise the subject of safe sex with your sexual partner") predicted stronger intentions to use condoms in future sexual encounters.

When the additional variables were entered in the equation, the relationship between vigilance and risk intentions remained significant, *despite the strong influence of smoking behaviour*! This further substantiates the hypothesis that vigilance is a determinant of health risk taking. Smoking can be addictive, and teenagers who smoke are far more likely than nonsmokers to plan to smoke in the future (Sutton, 1992a). Apparently, even after smoking behaviour has been accounted for, adolescents' motivation to smoke is still affected by vigilant cost-benefit appraisals. The salience of vigilance within the context of risk behaviour contradicts implicit suggestions that coping patterns are distal determinants of protection motivation, whose influence may be attenuated when more salient

factors (e.g., past behaviour) are taken into account (e.g., Abraham *et al*, 1994; Van der Velde & Van der Pligt, 1991).

Vigilance also predicted risk behaviour. In a study which examined relations between vigilance and sexual risk behaviour, Van der Velde *et al* (1992) found that vigilance (e.g., "You have thought about how to raise the subject of safe sex with your sexual partner") did not predict (subsequent) sexual behaviour. However, the role of vigilance was assessed within the context of other salient determinants of sexual behaviour including intentions to use condoms in future sexual encounters. In the present study, vigilance no longer predicted cigarette use when additional variables were considered. Instead, intention to smoke emerged as the sole determinant of risk behaviour. Perhaps the impact of vigilance on behaviour is accounted for by intentions. As proposed by Rogers (1975, 1983), objective appraisals of relevant costs and benefits may create 'protection motivation' (i.e., intentions) which in turn inhibits risky behaviour (see *Chapter* 2, *Section* 2.3.6).

5.4.2 Predicting health risk-taking from defensive avoidance

It was hypothesised that higher levels of defensive avoidance relate to higher levels of health risk-taking. There was support for this hypothesis.

Bolstering. As hypothesised, bolstering predicted greater risk intentions and more frequent cigarette use. Involving the use of rationalisations that play down the negative consequences of a behaviour, and/or exaggerate favourable consequences, bolstering purportedly delays and/or prevents the adoption of risk-reducing action. A person may acknowledge the health benefits of not smoking, but develop rationalisations that counterbalance this favourable consequence (Janis & Mann, 1977a, pp.91-92). Respondents in the present study diminished the attractiveness of not smoking by emphasising for example

the "difficulty" involved in avoiding cigarettes. This increases the appeal of tobacco use as a "less difficult" or "easier" option which one is therefore justified in adopting. Janis and Mann (1977a) have cited a similar rationalisation often used by heavy smokers, "smoking just seems to be an unbreakable habit for me" (p.346).

The importance of bolstering in fostering risk behaviour was observed by Janis and Mann amongst smokers attending their anti-smoking clinic, "some men and women who smoke two or three packs of cigarettes a day, for example, relied heavily on rationalisations that explicitly minimised the chances of their becoming cancer victims ("it won't happen to me"). Others fully acknowledged the risk of lung disease but adopted a fatalistic attitude or claimed that their habit was so uncontrollable that they could do nothing about it. All such rationalisations by a heavy smoker dampen the impact of information about health hazards, with the result that the smoker is only mildly concerned about the potential costs of his present course of action" (p.341). Given that subjects in the present study were cognisant of a health threat, there would indeed be a need amongst the smokers to "dampen" their perceived vulnerability by bolstering.

Studies have found relations between defensive avoidance measures and intentions to engage in risky health behaviour. For example, Van der Velde *et al* (1992) observed that adults with *low* intentions to use contraception in future sexual encounters scored higher on defensive avoidance (e.g., "You leave the choice of whether to practice safe sex or not to your sexual partner") compared with those who had *high* intentions. In the Van der Velde and Van der Pligt (1991) study, defensive avoidance predicted lower intentions to use contraception. However, it is not clear whether the measures of defensive avoidance used in these studies actually incorporated items assessing bolstering.

In Van der Pligt *et al*'s (1992) research, defensive avoidance also emerged as a significant predictor of sexual risk behaviour, with high levels of avoidance predicting greater risk behaviour. In a study which examined relations between defensive avoidance and women's decision to have a Pap smear test, White *et al* (1994) found that women who were overdue for their Pap test showed greater defensive avoidance than those who either initiated their last Pap test or were recruited to have the test. Items assessing bolstering (e.g., "No need to have a test if healthy") were incorporated in their defensive avoidance measure.

When additional variables were considered, bolstering no longer predicted risk behaviour. Any influence of bolstering on smoking may been attenuated by intention to smoke. For example, bolstering may increase risk intentions which in turn fosters actual risk behaviour. This particular interpretation is consistent with the view that (defensive) coping patterns directly affect intentions which in turn affect behaviour (Hovland *et al*, 1953; Janis & Feshbach, 1953; Van der Velde & Van der Pligt, 1992). Interestingly though, Van der Velde *et al* (1992) found that defensive avoidance predicted sexual risk behaviour ($p<.05$), *even after previous risk behaviour was taken into account.* The reasons for this are unclear, but the fact that Van der Velde *et al*'s measure of defensive avoidance assessed denial of responsibility (an aspect of avoidance not assessed in the present) may be important.

Procrastination. This coping measure was found to relate to both risk intentions and behaviour, as hypothesised. Procrastination results when the decision maker expects no serious penalties for "not making a decision now", and is characterised by a lack of interest in threatening information. This coping response is thought to be the first defensive tactic considered under threat, and is prone to manifest within the context of long-term threats (Janis & Mann, 1977a). Given the remoteness of heart disease and lung cancer, most teenagers

tend to feel they can "get away" with smoking cigarettes without expecting to suffer serious losses (Janis & Mann, 1977a). A firm decision to protect oneself from the danger of lung cancer and heart disease can be made "later" or "when I grow up". In this regard, it is not surprising that procrastination was a significant determinant of adolescents' intentions to smoke. This finding is consistent with previous research showing relations between defensive avoidance measures and health risk intentions (e.g., Van der Velde *et al*, 1992; Van der Velde & Van der Pligt, 1991).

When other variables were considered, procrastination no longer predicted either risk intention or behaviour. This suggests that procrastination is a distal determinant of adolescents' health risk-taking, perhaps mediated or moderated by other more salient factors. For example, procrastination may increase risky behaviour which strengthens intentions to engage in risk behaviour in the future. Similarly, procrastination may generate intentions that impact on behaviour (Hovland *et al*, 1953).

5.4.3 Predicting health risk-taking from hypervigilance

It was hypothesised that higher levels of hypervigilance relate to higher levels of health risk-taking. There was some support for this hypothesis.

Hypervigilance predicted both risk intentions and risk behaviour. This contradicts the view that many young people feel free to smoke in the knowledge that the threat of cardiovascular disease is unlikely to materialise in less than 20 years time (Janis & Mann, 1977a, p.81). When people use hypervigilance, they "...are likely to commit themselves impulsively to a hastily contrived course of action without taking fully into account its undesirable consequences" (Janis, 1986, p.466). For example, a teenager may hastily opt to quit (or avoid) smoking without being fully prepared to deal with the negative

consequences of this choice (e.g., peer disapproval). As a result, (s)he is prone to reverse this decision at the slightest sign of trouble.

Interestingly, previous studies on adults have found no relations between hypervigilance and health risk-taking measures. For example, in Van der Velde and Van der Pligt's (1991) study, hypervigilance failed to predict contraceptive use intentions, in either homosexual or heterosexual adults. Noting that hypervigilance entails panic-like behaviour without reaching well-balanced decisions, the authors concluded that hypervigilance may have neither a maladaptive nor an adaptive influence on behavioural intentions. Similar results were obtained by Van der Velde *et al* (1992) and Eiser *et al* (1990).

Janis and Mann (1977a) argue that hypervigilance "...appears to be a relatively rare reaction, largely confined to certain limited types of decisions, such as those made by medical patients facing an immediate threat of physical suffering or death" (Janis & Mann, 1977a, p.81). Indeed, when additional variables were considered in the present study, hypervigilance no longer predicted smoking intentions or behaviour. The serious health risks of smoking tend to occur so much later in life that a 'panic scenario', resulting from a perception of imminent threat seems highly improbable (Van der Pligt, 1994). In these circumstances, cigarette use is much more likely to be a function of past behaviour and other more salient coping procedures, such as vigilance and defensive avoidance.

5.4.4 Methodological issues

Sample. The present study involved a special sample of adolescents selected because they reported anxiety about the health risks of smoking. This selection criterion is in line with Van der Pligt's (1994) view that, for adolescents, long-term health risks such as heart disease and cancer, may not constitute

realistic threats because of their remoteness. Of course, amongst such a sample, coping behaviour, particularly the use of defensive avoidance, is likely to be pronounced, and indeed appeared so following data analysis. However, the use of a special sample means that the results obtained may not apply to the general adolescent population, many of whom may simply not, as Van der Pligt (1994) suggests, perceive a threat out of sheer ignorance and/or limited cognitive ability to anticipate future risks (Irwin & Millstein, 1986). Statistical power may also have been somewhat reduced.

Factor analyses. The computation of factor analyses on relevant measures using a sample of 104 does raise questions about the stability of the emerging factors. Although factor analysis can be carried out on samples smaller than this, a larger sample invariably means more confidence that the same factors would emerge in another study (Tabachnick & Fidell, 1996). Thus, the potential instability of the factors obtained in the present study is one important limitation. Researchers agree that, to begin with, there should be more subjects than variables, with an absolute minimum of 5 subjects per variable, and not less than 100 participants per analysis (Bryman & Cramer, 1994). It is worth mentioning that, in the present study, factor analysis of the cost/benefits of smoking involved 13 items with 8 subjects per item/variable. Factor analysis of coping behaviours used 16 items with 6.5 subjects per item/variable. The fact that the emerging smoking factors were roughly compatible with the McNeil *et al* (1989) study, and the coping factors comparable with factors from other research on Conflict-Theory (e.g., Van der Velde *et al*,1992; also see *Chapter* 4), does suggest some measure of stability.

Measures. The lack of standard measures of Conflict-Theory constructs did pose problems. For example, the measure of perceived decision alternatives ("In what ways can you effectively protect yourself from disease caused by cigarette

smoke?") may not have been the best way to assess this construct. Although White *et al* (1994) used a similar measure, it may have been better to provide participants with a list of carefully chosen alternatives, and then ask them to indicate those options they had considered. If anything, this would have avoided the problem of deciding whether a specific option was valid! Measuring perceived time pressure was especially problematic. Two single-item measures were used (e.g., "Do you feel there is limited time to find an effective way of protecting yourself from disease caused by cigarette smoking"). There is no way of establishing the psychometric usefulness of single-item measures (Eagly & Chaiken, 1993) and it is possible that these items failed to assess deadline pressure as originally conceptualised by Janis and Mann (1977a). Unreliability and poor validity of measures may partly account for the failure of perceived alternatives and time pressure to emerge as significant predictor variables.

Data collection. Given that data collection was mainly by questionnaire, caution must be exercised in the interpretation of results (Abraham & Sheeran, 1993; Conner & Waterman, 1996). A number of biases inherent in questionnaire completion may compromise quality of data obtained by this means. For example, respondents may be inclined to agree or disagree with most if not all questionnaire items (Coolican, 1994). However, the questionnaire used was an unfamiliar one to respondents so that the sequence of items and their response format was not predictable. It is hoped that this encouraged participants to think carefully about each question before responding. The presence of ambiguous, complicated or vague items may present obstacles to respondents (Conner & Waterman, 1996). Respondents were, however, encouraged to ask for clarification of confusing or difficult items. Furthermore, there is always the possibility that some respondents provided responses which project them in a socially desirable light, especially since the questionnaire had to be completed

on an individual basis in the presence of the researcher, and also because names were required (Coolican, 1994). Repeated assurances of confidentiality were provided and it is hoped that this helped minimise social desirability pressures. Finally, demand characteristics may operate in which respondents try to interpret the aim of the research in order to provide responses that either support or refute the researchers expectations (Coolican, 1994). Although participants were aware that the study dealt with their smoking-related habits and cognitions, it is unlikely that they were able to work out what specific variables were expected to be correlated.

5.4.5 Summary

This study tested in adolescents Conflict-Theory postulates concerning the role of threat coping patterns as predictors of health risk-taking. There was some evidence of relations between coping styles and risk-taking measures. The directions of these associations were consistent with the hypothesis. When additional variables were considered, the relations of vigilance and bolstering with risk intentions remained significant. Furthermore, coping styles were no longer related to actual risk behaviour. The study is limited in terms of the volunteer nature of the sample and reliance on questionnaire data.

CHAPTER SIX

SUMMARY AND CONCLUSIONS

6.1 INTRODUCTION

Research has shown that most adolescents are well-informed about major health risks such as AIDS and cardiovascular disease. Most teenagers are also aware of the link between their lifestyle and these health threats (Sutton, 1992; Modeste *et al*, 1994; Nutbeam & Booth, 1994). Despite their risk awareness, many adolescents continue to engage in maladaptive habits such as cigarette smoking and having unprotected sex (Kraft, 1993; Morrison *et al*, 1994).

How adolescents cope with threat has been implicated in their health decisions (Gladis *et al*, 1992; Abraham *et al*, 1994). For example, risk behaviour in teenagers is often attributed to their denial of personal vulnerability to threat (Moore & Rosenthal, 1992, 1996).

Janis and Mann's (1977a) Conflict-Theory model is a relevant formulation on the implications of different threat coping modes for decision making. Developed to explain adults' decisions, this model was applied to health decisions in adolescents, extending the model to a new population.

The threat coping styles specified by Conflict-Theory include vigilance, defensive avoidance, and hypervigilance. *Vigilance* entails objective appraisal of relevant cost-benefit information, is characterised by a moderate level of stress, and mediated by optimism about finding a solution, and the perception that there is sufficient time to search for and consider other alternatives. *Defensive avoidance* involves evasion of anxiety through procrastination and bolstering, is typified by a high level of stress, and mediated by pessimism about finding a better alternative. *Hypervigilance* entails panic-like search for a solution with impulsive adoption of any salient action that promises immediate escape from threat, is characterised by a high level of stress, and mediated by the belief that danger is imminent, so that time is insufficient in which to make a considered decision (Janis & Mann, 1976, 1977a).

The main study of the project, a large-scale cross-sectional survey, tested Conflict-Theory postulates that health beliefs - response-efficacy, severity, vulnerability - better predict decisions (intentions) in persons *high* on vigilance, or *low* on defensive avoidance or hypervigilance. Over 800 adolescents were administered a questionnaire incorporating measures of coping styles, health beliefs and intentions. Multiple regression analyses were then conducted to test for belief by coping interactions. This study focused on several important health behaviours - substance use, dietary fat avoidance, unprotected sex, and physical exercise.

A secondary survey tested Conflict-Theory postulates that vigilance relates to lower, whereas defensive avoidance and hypervigilance relate to higher, levels of health risk-taking. This study focused on cigarette smoking and its associated health risks. Over 100 adolescents who were worried about the health threat posed by cigarette use, were administered a questionnaire incorporating measures of coping patterns and smoking intentions and behaviour.

6.2 CONFLICT-THEORY COPING STYLES AS MODERATORS OF BELIEF-DECISION RELATIONS

It was hypothesised that health beliefs better predict decisions in persons *high* on vigilance, or *low* on defensive avoidance or hypervigilance. There was no support for these postulates.

In one instance, the data actually contradicted the hypothesis: beliefs about the efficacy of using protection during sexual intercourse better predicted intentions to have unprotected sex in respondents *low* on vigilance. Graphical representation of this interaction showed that participants high on vigilance were generally inclined to avoid unprotected sex, even when they doubted the efficacy of using protection. By contrast, low vigilance respondents with weak

efficacy beliefs reported strong intentions to have unprotected sex. This efficacy x vigilance interaction is explained in terms of differences between high and low vigilance subjects in *information preference*, and *self-efficacy for adopting protective action* (Janis & Mann, 1977a). More prone to objective cost-benefit appraisals, high vigilance respondents are likely to consider relevant information. Having protected sex, although perceived by some as ineffective in averting threat, may be judged to be the least risky option (Janis & Mann, 1983). Also, stronger self-efficacy beliefs amongst high vigilance subjects may facilitate the use of protection, irrespective of response-efficacy beliefs (Schwarzer & Fuchs, 1996).

The greater decision competence of older adolescents (Mann *et al*, 1989) may partly explain the lack of efficacy x vigilance interactions with respect to substance-use, exercise and fat avoidance. Only respondents in grade 11 were administered items on sexual behaviour, whereas *all* participants were administered items relating to the other health behaviours. Greater vigilance in grade 11 respondents (compared with teenagers in grade's 9 and 10) may have engendered the uniformly low intentions to avoid unsafe sex, producing a floor effect (and hence an interaction). Such pronounced risk-reducing intentions may not obtain with younger teenagers included in the sample. Furthermore, adolescents' motivation to avoid unprotected sex may be strengthened by the salience of the pregnancy threat associated with contraceptive-use (Graham, 1994). Long-term risks such as heart disease, stroke, and cancer, are less likely to generate a strong, universal desire to take protective action (Van der Pligt, 1994).

Although evidence for belief x coping interactions was limited, coping styles were found to be independent predictors of intentions. Higher levels of vigilance and lower levels of hypervigilance and defensive avoidance predicted greater

intentions to exercise regularly and (vigilance only) lower intentions to have unprotected sex. These findings reflect Conflict-Theory predictions about the role of coping styles in health risk-taking (see *Section* 6.3) and show that coping styles play an important role within the context of health beliefs (Van der Velde & Van der Pligt, 1991; Abraham et al, 1994). Overall, vigilance proved an important moderator of relations between efficacy beliefs and intentions regarding sexual intercourse and the use of protection. However, vigilance and, in particular, defensive avoidance and hypervigilance generally appeared to play little or no role as as moderators of belief-decision relations across a range of health behaviours relevant to adolescents. These trends, together with the independent associations of vigilance, defensive avoidance and hypervigilance with behavioural intentions, have significant implications for the applicability of Conflict-Theory to adolescents' health decision making, and also for the design of health education programs targeted at this age group.

6.2.1 Theoretical Implications

The interaction between vigilance and response-efficacy can help explain recent reports of insignificant relations between adolescent's intentions to use condoms and their beliefs about the effectiveness of condom use (Abraham *et al*, 1992; Abraham *et al*, 1994, 1996). A simple explanation based on the present findings is that subjects in these studies were generally high on vigilance, and hence already motivated to avoid risky sexual activities.

In one study involving 507 teenagers (aged 16-18), Abraham *et al* (1994) found no association between perceived condom effectiveness and a composite measure of condom-related behavioural intentions and behaviour likelihood. The authors suggested that condom efficacy may be more salient for more sexually experienced samples due to their greater vulnerability. However, the

majority of their subjects (75%) intended to use condoms with new sexual partners, a trend that suggests high vigilance and explains the failure of response-efficacy to discriminate between intention differentials. In a subsequent study with 258 *sexually active* 16-18 year-olds (Abraham *et al*, 1996), perceived condom effectiveness failed to predict intention to use condoms with new partners, invalidating the authors previous explanation. The uniformly strong efficacy and intention scores reported suggest high levels of vigilance and explain the predictive ineptness of perceived condom efficacy.

In proposing that health beliefs will better predict decisions when vigilance is dominant, Janis (1983, 1984) did not seem to consider that, as a result of their openminded search for risk-benefit information, persons high on vigilance are likely to adopt a presumably ineffective preventive action if unacceptable risks are associated with the salient alternatives. In the present study, the considerations that entered into the decision whether or not to have unprotected sex are not known. However, it is plausible that while using contraception during intercourse may be perceived as inefficacious by some, this option may nonetheless be seen to offer a much better chance of averting pregnancy and/or AIDS than having intercourse *without* protection!

Janis's (1983, 1984) view that threat perceptions are moderated by vigilance levels *may* be incorrect. Perhaps his predictions were meant to apply only in situations where people are unfamiliar with a threat, and hence still in the process of establishing their health beliefs. According to Janis and Mann (1977a), "If there are *vague* or *ambigous* threats that challenge the wisdom of what appears to be the best choice, the vigilant decision maker will actually prefer to obtain warnings and other nonsupportive messages in order to satisfy his need for specific information about the losses he might incur" (p.207). In this case, the objective threat appraisals of persons disposed to vigilance may

result in self-protective action (Janis, 1986). Defensive avoidance and hypervigilance now seem redundant as coping patterns with which health beliefs may interact in determining decisions. Strong efficacy beliefs may motivate action, whether or not people are disposed to ignore/deny threat (Rogers & Mewborn, 1976). Hypervigilance may play an important role in moderating the impact of health beliefs on "...certain limited types of decisions, such as those made by medical patients facing an *immediate* threat of physical suffering or death" (Janis & Mann, 1977a, p.81). Although Janis (1983, 1984) does not relate the issue of long-term threats to the operation of hypervigilance as a moderator, it is plausible that even the most panic-prone adolescent experiences little sense of urgency regarding remote health threats, and hence, is no less (or more) inclined than others to make decisions consistent with their health beliefs.

One major reason why coping styles appeared to play a negligible role as moderator variables may be the assessment of coping as dispositional rather than situation-specific constructs. Janis (1986) notes that generalised measures of coping styles reflect personality traits that are so broad in scope that they influence most decisions a person makes, whether they involve health or otherwise. However, he also acknowledges that such dispositional attributes do not often account for very much of the variance in behaviour change (p.473). In formulating his predictions, Janis (1983) did not distinguish between situational and dispositional coping. There appeared to be an implicit assumption that the proposed moderator effects obtain, irrespective of a contextual or trait emphasis on coping. However, the dispositional measures of coping developed by Mann and his colleagues (e.g., Mann, 1982; Mann *et al*, 1988) underscore the importance they attached to a trait perspective on coping. Whether more robust moderator effects obtain from situation-specific coping measures can only be ascertained from further research.

The fact that each of vigilance, defensive avoidance and hypervigilance emerged as independent predictors of intentions to exercise regularly and (vigilance only) intentions to have unprotected sex, highlights the psychometric attributes of Mann's (1982) generalised measures of coping. Amongst adolescents, dispositional coping measures, it seems, do explain a significant proportion of the variance in intended behaviour change for certain kinds of health decisions (i.e., to exercise regularly, have unprotected intercourse) but not for others (i.e., use substances, consume dietary fat). Perhaps, the fact that physical exercise and contraceptive use are associated with *short*-term consequences (e.g., better physique, unwanted pregnancy) may increase the salience of coping factors (Van der Pligt, 1994). The vigilance, defensive avoidance, and hypervigilance scales which emerged from factor analysis were all internally consistent (all Cronbach alpha's > .60). Thus references to the psychometric limitations of generalised coping measures cannot adequately explain the paucity of belief x coping interactions.

Furthermore, the significant independent relations of each coping style with behavioural intentions (which, it should be noted, obtained within the context of health beliefs) raises questions about the usefulness of conceptualising Conflict-Theory coping constructs as moderators of belief-decision relations, rather than autonomous predictors of health decisions (i.e., risk-taking). If the interaction between vigilance and perceived efficacy (of using protection) justifies the assessment of coping styles as important moderator variables, the question still remains as to whether such moderator effects apply across health beliefs (e.g., vulnerability, severity), coping styles (e.g., defensive avoidance, hypervigilance) and health behaviours (e.g., physical exercise, dietary fat consumption, substance use), and not just to perceptions of response-efficacy, vigilance, and the use of protection during intercourse. Given that no evidence

was found for the specific kinds of moderator effects proposed by Conflict-Theory, despite the range of coping, belief and intention measures assessed, Conflict-Theory proponents need to more clearly outline the conditions under which their predictions apply to adolescent health decision making, unless of course the postulates were formulated exclusively to explain decisions in adults. If this is so, it has to be made explicit.

For the time being, the paucity of belief x coping interactions endorses the common practice of excluding coping styles in relating components of the Health Belief Model (Janz & Becker, 1984) and Protection Motivation Theory (Rogers, 1983) to health-related intentions in adolescents (e.g., Rise & Holund, 1989; Fruin *et al*, 1991; Sturges & Rogers, 1996). Both models propose relations between health decisions and perceptions of vulnerability, severity, and response effectiveness or benefits. However, the present findings must be limited only to decisions relating to substance-use, physical activity, and dietary fat behaviour. Research associating response-efficacy measures to decisions concerning condom use may need to account for individual differences in vigilance. Relations between threat perceptions (vulnerability, severity), and condom use decisions may be assessed without incorporating coping measures. It must be stressed that the present project employed dispositional measures of coping, and further research involving threat-specific measures is required before any firm conclusions can be derived about the relevance of Conflict-Theory coping styles to belief-decision relations in adolescents.

6.2.2 Practical Implications

The results suggest that Conflict-Theory, in general, is an inadequate model of the role of coping styles in belief-decision relations. Hence, more sophisticated postulates will be required if successful educational programs based on this

model are to be developed and evaluated. At the moment, educational interventions designed to change adolescents health beliefs can safely ignore individual differences in dispositional threat coping styles, without compromising the effectiveness of the intervention. However, if health educators classify a population of adolescents on the basis of vigilance, it may be possible to reduce intentions to have unsafe sex in low vigilance persons by strengthening their perceptions of the efficacy for contraceptive use. Those high on vigilance may already be motivated to avoid unprotected sexual intercourse, even if they do not believe in the efficacy of using protection.

Furthermore, health educators may be able to effect direct changes in adolescents' motivation to exercise by modifying their coping behaviour. Changing people's general way of responding to threat can be difficult since long-term ingrained habits are not easily overcome. However, coping reactions within a specific context may be more responsive to intervention. On the basis of Conflict-Theory, a number of interventions have been developed that educators, working with adolescents on an individual basis, can use to foster vigilance and discourage defensive avoidance and hypervigilance. These procedures are reviewed by Janis and Mann (1977a). Enhancing the use of vigilance and minimising defensive avoidance and hypervigilance may effectively increase teenagers' motivation to exercise regularly. Promoting vigilance may also be efficacious in reducing the likelihood that a teenager will have unprotected intercourse. These changes may obtain irrespective of recipients' perceptions of the efficacy of preventive behaviour in health maintenance, personal vulnerability to health threats and the seriousness of the threat.

6.2.3 Avenues for further research

One important area for further research is to see whether the efficacy x vigilance interaction obtained in the present project is replicable in an experimental setting. In such research, subjects who score *high* or *low* on vigilance can be exposed to the usual communications designed to manipulate perceptions of efficacy (for contraceptive use), and then assessed on their intentions (to adopt AIDS-preventive behaviour). Thus, vigilance will be included as an additional variable in the factorial design. If such research corroborates the present findings, it would have important implications for the selection of target adolescents populations at whom theoretically based health education programs are to be directed.

It would also be interesting to see if the use of *threat-specific* rather than generalised coping measures results in more robust moderator effects. Reports of dispositional coping are more prone to bias. For example, instructions to report 'general' styles of coping may elicit recall of coping procedures one aspires to, or procedures that are very remote in time but highly memorable, perhaps because their outcomes were especially satisfying. The result is that reports may be biased toward reporting on the goals or functions of coping rather than actual coping behaviours (Leventhal *et al*, 1993). Situation-specific coping measures (e.g., concerning AIDS) have been found to play a much more salient role in 'high-risk' individuals (e.g., homosexuals) than in 'low-risk' ones (heterosexuals) (Van der Velde & Van der Pligt, 1991) and it may be productive to examine the role of context-specific coping measures in a sample of adolescents who have some reason for believing themselves to be at risk.

6.3 CONFLICT-THEORY COPING STYLES AS PREDICTORS OF HEALTH RISK-TAKING

It was hypothesised that higher levels of vigilance relate to lower levels of health risk-taking. There was support for this hypothesis, in that vigilance predicted lower intentions to take risks and less risky behaviour. This endorses the view that careful and objective appraisal of relevant cost-benefit information facilitates threat-reducing action (Janis & Mann, 1977a). Secondly, it was hypothesised that higher levels of defensive avoidance relate to higher levels of health risk-taking. The data supported this hypothesis. Greater procrastination and bolstering predicted stronger risk intentions, and greater risk behaviour, consistent with the view that denial and/or minimisation of threat leads to maladaptive decisions (Janis & Mann, 1977a). Thirdly, it was hypothesised that higher levels of hypervigilance relate to higher levels of health risk-taking. There was support for this hypothesis. Hypervigilance predicted greater risk intentions and behaviour, indicating that panic-like and impulsive decision making does have a maladaptive influence on adolescents' health risk-taking (Janis, 1986).

6.3.1 Implications and areas for further research

The results substantiate Conflict-Theory postulates that vigilance relates to greater health risk-taking, whereas defensive avoidance and hypervigilance relate to reduced health risk-taking. The findings generally validate the results of previous applications of Conflict-Theory coping constructs to health decisions (see Van der Velde & Van der Pligt, 1991; Van der Velde *et al*, 1992; Eiser *et al*, 1990; White *et al*, 1994). Most of these studies focused on adult subjects and the present findings confirm the generalisability of their results to adolescents. However, as the present findings suggest, Conflict-Theory

hypotheses may no longer apply when additional variables are considered. In particular, risk intention may play a dominant role in the prediction of risk behaviour, negating the influence of coping patterns. Similarly, relations between coping styles and risk intention may be attenuated by risk behaviour. The fact that vigilance and bolstering both remained key predictors of risk intentions *after* accounting for *risk behaviour*, underscores the importance of these coping modes in adolescents' health decisions.

The present findings suggest that health promotion programmes targeted at adolescents may effectively reduce intended health risk-taking by increasing vigilance and reducing bolstering. One strength of the conflict model is that it suggests a variety of interventions for enhancing vigilance. The most notable of these interventions include the balance-sheet procedure, emotional role playing and stress inoculation for post-decisional setbacks (Janis & Mann, 1976, 1977a, 1982). The balance-sheet procedure has been used successfully to increase adherence to vigilant health-related decisions amongst adults. Some limited evidence suggests that this procedure may be effective with adolescents (Mann, 1972).

Future research should examine the generalisability of the present findings to other risk behaviours relevant to adolescence. One health area worth addressing is HIV/AIDS preventive habits. Unprotected sexual intercourse amongst adolescents places them at risk of HIV infection, especially since contraceptive use in this age group is inconsistent (Jacobsen *et al*, 1991). Indeed it has been suggested that less than half of sexually active adolescents in the UK use contraception on a regular basis, despite being very knowledgeable about the risks of not just HIV/AIDS but also unwanted pregnancies and other STD's (Bury, 1991). The fact that both risk awareness and risk behaviour are high suggests a considerable degree of defensive coping (Hovland *et al*, 1953). Both

vigilance and bolstering may impinge on motivation to use contraception (Van der Velde *et al*, 1992).

6.4 GENERAL DISCUSSION

6.4.1 Overview of the findings

The primary objective of the present project was to extend to adolescents Conflict-Theory postulates concerning threat coping styles as moderators of relations between health beliefs and decisions. A secondary aim was to test in the same population Conflict-Theory predictions about relations between coping patterns and health risk-taking. The following hypotheses were tested:

(a) Health beliefs (vulnerability, severity, response-efficacy) better predict decisions in persons *high* on vigilance.

(b) Health beliefs better predict decisions in those *low* on defensive avoidance.

(c) Health beliefs better predict decisions in persons *low* on hypervigilance.

(d) *Higher* levels of vigilance relate to *lower* levels of health risk-taking.

(e) *Higher* levels of defensive avoidance relate to *higher* levels of health risk-taking.

(f) *Higher* levels of hypervigilance relate to *higher* levels of health risk-taking.

The findings can be summarised as follows:

(a) There is no evidence that health beliefs better predict decisions in adolescents *high* on vigilance. Instead, efficacy beliefs (concerning the effectiveness of having protected sexual intercourse) better predict intentions (relating to unprotected sex) in persons *low* on vigilance. This moderator effect remains significant despite adjusting for important additional variables, such as past behaviour. Overall, however, the strength of belief-decision relations may

not depend on levels of vigilance. There is some evidence that vigilance predicts intentions (to exercise regularly, and have unprotected sex), independent of health beliefs.

(b) There is no evidence that health beliefs better predict decisions in adolescents *low* on defensive avoidance. Belief-decision relations may be unaffected by levels of defensive avoidance. However defensive avoidance predicts intentions (to exercise regularly), independent of health beliefs.

(c) There is no evidence that health beliefs better predict decisions in adolescents *low* on hypervigilance. Belief-decision relations may not be conditional on levels of hypervigilance. There is however evidence that hypervigilance predicts intentions (to exercise regularly), irrespective of health beliefs.

(d) *Higher* levels of vigilance predict *lower* intentions to adopt health risky behaviour and *less* risky behaviour. Vigilance remains an important determinant of intentions, but not behaviour, after accounting for additional variables such as past behaviour.

(e) *Higher* levels of defensive avoidance predict *higher* levels of risk intentions and risk behaviour. When additional variables are considered, bolstering, but not procrastination, remains a key predictor of intentions. Neither variable continues to predict risk behaviour.

(f) *Higher* levels of hypervigilance predict *greater* risk intentions and risk behaviour. Accounting for additional variables negates the impact of hypervigilance on both intentions and behaviour.

The overall conclusion which emerges from the entire set of findings is that, amongst adolescents, dispositional threat coping styles play only a marginal role as moderators of relations between health beliefs and decisions. In particular, the use of vigilance affects associations between response-efficacy beliefs and

decisions relating to the use of protection during sexual intercourse. Each of vigilance, defensive avoidance, and hypervigilance predicts intentions to engage in certain health behaviours, irrespective of health beliefs. Health risk-taking is negatively associated with the use of vigilance and positively related to defensive avoidance and hypervigilance. However, other factors such as past behaviour may attenuate the salience of coping factors.

This project provides some evidence for the relevance of threat coping patterns to adolescents health decisions and, in doing so, broadens our understanding of the role of psychological factors in the health-related lifestyles of this age group. To the author's knowledge, no previous research has provided this kind of elaborate, theoretically based test of the validity of threat coping patterns in adolescents' health decisions. The project is elaborate because it considers a number of different but important health behaviours, and is theory-driven by its adoption of Janis and Mann's (1976) Conflict-Theory framework. The project constitutes the first application to adolescents of Conflict-Theory postulates concerning the role of threat coping styles in health behaviour decisions. Support for the model has been limited: there was no evidence that the use of vigilance, defensive avoidance or hypervigilance moderates belief-decision relations in ways suggested by Conflict-Theory. There was however some evidence for vigilance as an important moderator, and also for coping styles as predictors of health risk-taking.

6.4.2 Some broader implications

The present findings could be interpreted within the threat-coping theoretic frameworks central to the reinforcement perspective of the Yale communication/persuasion researchers (Hovland *et al*, 1953) and the cognitive consistency perspective (e.g, Festinger, 1957; Abelson, 1968). These

formulations include Hovland *et al*'s (1953) Fear-Drive Model, Janis's (1967) Family-of-Curves Model, Leventhal's (1970) Parallel-Response Model, and its recent reformulations (Leventhal *et al*, 1983; Leventhal *et al*, 1993), and Rogers (1983) Protection Motivation Theory. Also included are Abelson's (1968) dissonance-reduction conceptualisations. As indicated in *Chapter's* 2 and 3, Conflict-Theory was developed primarily from Janis and Mann's (1976, 1977a, 1977b) analysis of this literature.

Based on Janis and Feshbach's (1953) early research, the Fear-Drive Model (Hovland *et al*, 1953) proposes that threat generates fear to which people may respond in a variety of ways. A reduction in the level of fear reinforces the learning of any response that accompanies it. Threat will fail to induce adoption of recommended protective action if defensive responses such as discounting the importance of the threat, or its personal relevance, more effectively reduce anxiety. In the present study, defensive avoidance was found to predict greater levels of health-risky behaviour. Specifically, respondents' use of defensive tactics may effectively reduce fear, and hence be reinforced, diminishing the likelihood of threat-reducing behaviour. An elaboration of the Fear-Drive Model, Janis's (1967) Family-of-Curves Model proposes that the relation between fear and acceptance of threat-reducing behaviour resembles a U-shaped curve, with the optimal point occuring at the level of fear at which persuasion starts to be 'interfered' with. Respondents high on defensive avoidance can be assumed to have crossed this optimal threshold, and hence become disinclined to act to reduce threat.

Leventhal's (1970) Parallel-Response Model identifies two separate processes - danger control, a cognitive problem solving response compatible with vigilance, and fear control, an anxiety-reducing response reflecting defensive avoidance. Leventhal's (1970) premise that danger and fear control,

respectively, facilitate and inhibit adaptive action reflects the present findings - vigilance and defensive, respectively, were negatively and positively related to risk-taking. Danger control purportedly entail appraisals of threat and efficacy, and is motivated by a desire to avert threat, while fear control involves evasion of threat cues, and minimising the importance of the threat. The paucity of belief x coping interactions in the present project suggests that a generalised desire to avert danger or reduce anxiety may not affect the extent to which health beliefs influence decision making. This interpretion may also reflect on more recent versions of the Parallel-Response Model (Leventhal *et al*, 1983; Leventhal *et al*, 1993).

Essentially an expectancy-value interpretation of Leventhal's model, Rogers (1983) Protection Motivation Theory posits direct paths from health beliefs (vulnerability, severity, response-efficacy, self-efficacy) to behavioural intentions. Overall, the present findings suggest that these paths are unaffected by dispositional coping styles. Nonetheless, with respect to contraceptive use, the results indicate that only in adolescents *low* on vigilance would response-efficacy play a significant role in predicting intentions. The present findings suggest that Rogers' (1983) model may benefit from incorporating vigilance as an integral component, as suggested by Van der Velde and Van der Pligt (1991; also see Rippetoe & Rogers, 1987), particularly in the prediction of condom-related decisions in adolescents (see Abraham *et al*, 1994).

The findings relating to coping and health risk-taking also concur with the early views of some cognitive consistency theorists, such as Abelson (1968) and Festinger (1957). Cognitive consistency perspectives posit that, in a bid to reduce dissonance, people may employ cognitive strategies which may prevent attitude/behaviour change. According to Abelson (1968), responses such as denial and bolstering - constructs later adopted by Janis and Mann (1977a) -

may successfully reduce dissonance, and hence impede the adoption of self-protective action in the face of threat. This effect on threat-reduction is consistent with the impact of defensive avoidance on health risk-taking in the present project.

Although social psychologists have long recognised that people may respond to threat in a variety of ways, with significant implications for decision making, the relevance of threat coping patterns to health behaviour research, particularly with adolescents, has been uncertain (Rippetoe & Rogers, 1987; Van der Velde & Van der Pligt, 1991; Abraham *et al*, 1994; Van der Pligt, 1994). Weak and inconsistent relations between coping and decision measures has prompted suggestions that coping patterns play only a marginal role in peoples' health-related choices (Van der Velde & Van der Pligt, 1991; Abraham *et al*, 1994). With regard to adolescents, Van der Pligt (1994) for example has argued that "...the fact that adolescents may ignore the health consequences of smoking can hardly be seen as a defensive coping style: for them, the threat often concerns a long-term risk that is simply not acknowledged in their decision making" (p.136).

The present findings suggest that any conclusions that threat coping patterns are irrelevant to adolescent health decisions may be premature. Coping patterns, conceptualised within a Conflict-Theory framework, appear to play a limited but important role. There is sufficient evidence to warrant assessment of vigilance as a moderator, in research seeking to predict contraceptive use from efficacy beliefs, particularly amongst adolescents in their mid teens (i.e., aged 15-16 years) whose vigilance habits are better developed than those of younger teenagers. There is even stronger evidence for the role of coping patterns in adolescents' health risk-taking: both vigilance and bolstering continued to predict intentions to smoke cigarettes, even after the effects of current smoking

behaviour were partialled out! This evidence suggests that certain coping patterns do play a significant role within the context of *long*-term health risks, contrary to Van der Pligt's (1994) argument.

6.4.3 Themes for future research

Health-related research on Conflict-Theory has been limited. In view of the present findings, a number of important themes have been identified which need to be addressed in future research, before any firm conclusions can be reached about the role of threat coping patterns in adolescents' and adults' health decisions.

An important theme concerns the role of coping patterns as *moderator* or *mediator* variables. Prior to this project, studies have generally assessed vigilance, defensive avoidance and hypervigilance as mediators of belief-intention relations (e.g., Rippetoe & Rogers, 1987; Abraham *et al*, 1994; Van der Velde & Van der Pligt, 1991). Such research has yielded limited support for the validity of coping responses. However, while coping measures may fail to "explain" (i.e., mediate) the relationship between beliefs and intentions, coping patterns, as the present findings indicate, may nonetheless affect the strength of relations (i.e., moderate) between beliefs and intentions. While a moderating effect may reflect an underlying mediating process, and vice versa, the absence of one type of effect does not necessarily imply the absence of the other (Baron & Kenny, 1986). Thus, it is necessary for future research to redress the balance by focusing on the role of coping variables as moderators, rather than mediators, of belief-decision relations.

There has been much debate about whether threat coping patterns are best assessed as *dispositional* traits or *situation-specific* responses (e.g., Janis, 1986; Leventhal, *et al*, 1993). The present findings show that both conceptualisations

are relevant, although trait measures of coping may be more usefully applied as moderator variables (Baron & Kenny, 1986). Health beliefs were found to interact significantly with a dispositional measure of vigilance in predicting intentions. Given that situation-specific coping measures can be more accurately measured (Leventhal *et al*, 1993), it would be useful to determine whether situation-specific coping has a more pronounced moderating effect on belief-decision relations, compared with dispositional coping.

A third and final important theme for future research is the salience of threat coping patterns in *high risk* vs *low risk* samples. In general, research has found stronger, more direct effects of vigilance and defensive avoidance measures in high-risk adult samples, such as homosexuals (e.g., Van der Velde *et al*, 1992; Van der Velde & Van der Pligt, 1991). Indeed, people who have some reason for believing themselves to be at risk can be expected to engage in more elaborate and diverse coping behaviour to avert the threat. Participants in the present project were not particularly vulnerable to risks, and it would be useful to test Conflict-Theory postulates in a high risk adolescent sample.

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APPENDIX A

HEALTH QUESTIONNAIRE

HEALTH QUESTIONNAIRE

Please read this questionnaire carefully and answer each question. It is completely PRIVATE and will not be used by anyone except researchers at *Nene College*. Write your name clearly below and then read the instructions that follow.

SURNAME_____

FIRST NAME_____

Most of the questions can be answered by putting a tick in the box next to the answer that applies to you - like this..

Yes [X]
No [ ]

Some questions do not apply to everybody, so sometimes it tells you by the box which questions you should answer next. If there is nothing by the box, you should answer the next question.

Some other questions can be answered by drawing a circle around a number on a scale - like this...

No, not at all - 1 - 2 - 3 - 4 - (5) - 6 - 7 - 8 - 9 - 10 Yes, very much

Now turn over!

SECTION A

(1) What is your year of study?_____

(2) Are you male or female? **MALE[ ]** **FEMALE[ ]**

(3) How old are you? **YEARS[ ] MONTHS[ ]**

(4) What is your date of birth? **DAY[ ]** **MONTH[ ]** **YEAR[ ]**

(5) What is your father's job? Please write down exactly what he does. EXAMPLES INCLUDE: car mechanic, labourer, teacher, miner, fitter, farmer, farm worker or unemployed. If you don't know, or your father is not living with you, there is no need to write anything.

_____

_____

(6) What is your mother's job? Please write exactly what she does. EXAMPLES INCLUDE: housewife, secretary, nurse, cleaner, factory worker, teacher or unemployed. If you don't know, or if your mother is not living with you, there is no need to write anything.

_____

_____

(7) What is your ethnic background?

White [ ]

Black [ ]

Asian [ ]

Other _____

SECTION B (FLINDERS QUESTIONNAIRE)

People differ in the way they feel and go about making decisions. Please show how you normally make decisions by ticking the box which best applies to you for each statement below.

	Not at all true for me	Some-times true	Often true	Almost always true
(1) I feel confident about my ability to make decisions.	[ ]	[ ]	[ ]	[ ]
(2) I am not as good as most people in making decisions.	[ ]	[ ]	[ ]	[ ]
(3) I think that I am a good decision maker	[ ]	[ ]	[ ]	[ ]
(4) I feel so discouraged that I give up trying to make decisions.	[ ]	[ ]	[ ]	[ ]
(5) The decisions I make turn out well.	[ ]	[ ]	[ ]	[ ]
(6) It is easy for other people to convince me that their decision rather than mine is the correct one.	[ ]	[ ]	[ ]	[ ]
(7) I avoid making decisions.	[ ]	[ ]	[ ]	[ ]
(8) I take a lot of care before I make my choice.	[ ]	[ ]	[ ]	[ ]
(9) I put off making decisions.	[ ]	[ ]	[ ]	[ ]
(10) When faced with a decision, I go along with what others suggest.	[ ]	[ ]	[ ]	[ ]
(11) I panic if I have to make decisions quickly.	[ ]	[ ]	[ ]	[ ]
(12) I'd rather let someone else make a decision for me so that it won't be my problem.	[ ]	[ ]	[ ]	[ ]
(13) Once I have made a decision, then I don't change my mind.	[ ]	[ ]	[ ]	[ ]

	Not at all true for me	Some-times true	Often true	Almost always true
(14) I prefer to leave decisions to others.	[ ]	[ ]	[ ]	[ ]
(15) Whenever I get upset by having to make a decision, I choose on the spur of the moment.	[ ]	[ ]	[ ]	[ ]
(16) I like to think about a decision before I make it.	[ ]	[ ]	[ ]	[ ]
(17) When I have to make a decision, I wait a long time before starting to think about it.	[ ]	[ ]	[ ]	[ ]
(18) I feel as if I'm under tremendous time pressure when making decisions.	[ ]	[ ]	[ ]	[ ]
(19) I can't think straight if I have to make a decision in a hurry.	[ ]	[ ]	[ ]	[ ]
(20) When I make a decision, I feel that I've made the best one possible.	[ ]	[ ]	[ ]	[ ]
(21) I put little effort into making decisions.	[ ]	[ ]	[ ]	[ ]
(22) The possibility that some small thing might go wrong causes me to immediately change my mind about what I'm going to do.	[ ]	[ ]	[ ]	[ ]
(23) I like to make decisions myself.	[ ]	[ ]	[ ]	[ ]
(24) When I'm forced to make a decision, I couldn't care which way I choose.	[ ]	[ ]	[ ]	[ ]
(25) I choose on the basis of some small thing.	[ ]	[ ]	[ ]	[ ]
(26) I tend to drift into decisions without thinking about them.	[ ]	[ ]	[ ]	[ ]
(27) When I decide to do something, I get right on with it.	[ ]	[ ]	[ ]	[ ]
(28) I don't like to take responsibility for making decisions.	[ ]	[ ]	[ ]	[ ]

	Not at all true for me	Some-times true	Often true	Almost always true
(29) When making decisions, I tend to choose the first alternative that comes to mind.	[ ]	[ ]	[ ]	[ ]
(30) I prefer to do what others choose because I don't like to be different.	[ ]	[ ]	[ ]	[ ]

SECTION C

(1) Do you smoke at all nowadays?

Yes [ ]

No [ ]

(2) Now which of the following statements best describes you? (tick one)

I have never smoked	[ ]	--Go to Question 3
I have only ever tried smoking once	[ ]	--Go to Question 4
I used to smoke sometimes but I never smoke a cigarette now	[ ]	--Go to Question 4
I sometimes smoke cigarettes now but I don't smoke as many as one a week	[ ]	--Go to Question 4
I usually smoke between one and six cigarettes a week	[ ]	--Go to Question 4
I usually smoke more than six cigarettes a week	[ ]	--Go to Question 4

(3) Just to check, which one of the following statements best describes you?

I have never tried smoking a cigarette, not even a puff or two	[ ]
I did once have a puff or two of a cigarette, but I never smoke now	[ ]
I do sometimes smoke cigarettes	[ ]

(4) Have you ever had a proper alcoholic drink not just a sip? (examples of alcoholic drinks are beer, larger, cider, shandy, wine, martini, sherry, spirits, liqueurs)

Yes [ ]

No [ ]--Go to Question 8

(5) Which of these statements best describes you?

I *never* drink alcohol now [ ]--Go to Question 8

I drink alcohol *only on very special occasions* [ ]--Go to Question 8

I *occasionally* drink alcohol [ ]

I drink alcohol regularly [ ]

(6) Have you had any alcoholic drinks during the past 7 days?

Yes [ ]

No [ ]--Go to Question 8

(7) How many drinks (glasses) did you have in the last seven days?

1 to 5 drinks [ ]

6 to 10 drinks [ ]

More than 10 drinks [ ]

(8) Have you ever used drugs (e.g., glue sniffing, solvent abuse, use of marijuana, cocaine, heroine) to get high?

Yes [ ]

No [ ]--Go to Question 10

(9) Do you ever use drugs to get high nowadays?

Yes [ ]

No [ ]

(10) Which of the following exercises have you done in the past WEEK? (For each exercise you tick, write down the NUMBER OF TIMES you did that exercise in the past WEEK and the AVERAGE AMOUNT OF TIME you spent doing that exercise on each occasion)

EXERCISE (Tick those you have done in the past week)		NUMBER OF TIMES DONE IN THE PAST WEEK (for those ticked)	AVERAGE AMOUNT OF TIME SPENT ON EACH OCCASION (In Minutes)
Gymnastics	[ ]	_____	_____
Dancing	[ ]	_____	_____
Badminton	[ ]	_____	_____
Aerobics	[ ]	_____	_____
Canoeing	[ ]	_____	_____
Karate	[ ]	_____	_____
Judo	[ ]	_____	_____
Football	[ ]	_____	_____
Running	[ ]	_____	_____
Rope skipping	[ ]	_____	_____
Basket ball	[ ]	_____	_____
Bicycling	[ ]	_____	_____
Brisk Walking	[ ]	_____	_____
Lawn tennis	[ ]	_____	_____
Swimming	[ ]	_____	_____
Squash	[ ]	_____	_____
Rugby	[ ]	_____	_____
Wrestling	[ ]	_____	_____
Bowling	[ ]	_____	_____
Volley ball	[ ]	_____	_____
Baseball	[ ]	_____	_____
Rowing	[ ]	_____	_____
Hockey	[ ]	_____	_____
Other exercises (name them)_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____

(11) Have you ever had any form of sexual intercourse with another person?

Yes [ ]

No [ ]--Go to Question 13

(12) Which of the statements below best describes you?

I ALWAYS use a reliable contraception method (e.g., condoms) when having sex [ ]

I SOMETIMES use a reliable contraception method when having sex [ ]

I NEVER use a reliable contraception method when having sex [ ]

(13) Do you make conscious efforts to avoid fatty foods (e.g., eggs, butter, sausages, bacon, chips)?

No, never [ ]

Yes, but not often [ ]

Yes, often [ ]

Yes, very often [ ]

SECTION D

---

(1) How likely do you think you are to develop each of the following diseases by the age of 40 **(show your answer by drawing a circle around a number)?**

Heart disease	**Not at all likely**	1--2--3--4--5--6--7--8--9--10	**Very likely**
Stroke		1--2--3--4--5--6--7--8--9--10	
Cancer		1--2--3--4--5--6--7--8--9--10	
High blood pressure		1--2--3--4--5--6--7--8--9--10	
AIDS		1--2--3--4--5--6--7--8--9--10	

(2) How SERIOUS do you think the following diseases are to *YOUR OWN* health?

Heart disease	**Not at all serious**	1--2--3--4--5--6--7--8--9--10 **Very serious**
Stroke		1--2--3--4--5--6--7--8--9--10
Cancer		1--2--3--4--5--6--7--8--9--10
High blood pressure		1--2--3--4--5--6--7--8--9--10
AIDS		1--2--3--4--5--6--7--8--9--10

SECTION E

---

(1) Do you believe that exercising regularly (that is at least three times a week, for 20 minutes or more each time) REDUCES your chance of developing health problems?

No, not at all 1--2--3--4--5--6--7--8--9--10 Yes, very much

(2) Do you believe NOT drinking alcohol REDUCES your chance of developing health problems?

No, not at all 1--2--3--4--5--6--7--8--9--10 Yes, very much

(3) Do you believe NOT smoking cigarettes REDUCES your chance of developing health problems?

No, not at all 1--2--3--4--5--6--7--8--9--10 Yes, very much

(4) Do you believe having protected sex (that is with contraception) REDUCES your chance of developing health problems?

No, not at all 1--2--3--4--5--6--7--8--9--10 Yes, very much

(5) Do you believe NOT using drugs REDUCES your chance of developing health problems?

No, not at all 1--2--3--4--5--6--7--8--9--10 Yes, very much

(6) Do you believe NOT eating fatty foods (e.g., eggs, butter, red meat) REDUCES your chance of developing health problems?

No, not at all 1--2--3--4--5--6--7--8--9--10 Yes, very much

SECTION F

---

(1) Do you think you *can* exercise regularly if you want to?

No, I can't 1--2--3--4--5--6--7--8--9--10 Yes, I can

(2) Do you think you *can* avoid drinking alcohol if you want to?

No, I can't 1--2--3--4--5--6--7--8--9--10 Yes, I can

(3) Do you think you *can* avoid smoking cigarettes if you want to?

No, I can't 1--2--3--4--5--6--7--8--9--10 Yes, I can

(4) Do you think you *can* have protected sex (that is, with contraception) if you want to?

No, I can't 1--2--3--4--5--6--7--8--9--10 Yes, I can

(5) Do you think you *can* avoid using drugs if you want to?

No, I can't 1--2--3--4--5--6--7--8--9--10 Yes, I can

(6) Do you think you *can* avoid eating fatty foods if you want to?

No, I can't 1--2--3--4--5--6--7--8--9--10 Yes, I can

SECTION G

---

(1) Do you intend to eat fatty foods during the next 2 months?

No, I don't 1--2--3--4--5--6--7--8--9--10 Yes, I do

(2) Do you intend to smoke cigarettes during the next 2 months?

No, I don't--1--2--3--4--5--6--7--8--9--10--Yes, I do

(3) Do you intend to drink alcohol during the next 2 months?

No, I don't--1--2--3--4--5--6--7--8--9--10--Yes, I do

(4) Do you intend to exercise regularly (that is, exercise at least three times a week, for up to 20 minutes each time) during the next 2 months?

No, I don't--1--2--3--4--5--6--7--8--9--10--Yes, I do

(5) Do you intend to use drugs during the next 2 months?

No, I don't--1--2--3--4--5--6--7--8--9--10--Yes, I do

(6) Do you intend to have unprotected sex (that is, without reliable contraception like condoms) during the next 2 months?

No, I don't--1--2--3--4--5--6--7--8--9--10--Yes, I do

SECTION H

---

(1) How WORRIED are you generally about the risks of eating *fatty* foods?

Not at all worried--1--2--3--4--5--6--7--8--9--10--Very worried

(2) How WORRIED are you generally about the risks of smoking?

Not at all worried--1--2--3--4--5--6--7--8--9--10--Very worried

(3) How WORRIED are you generally about the risks of drinking alcohol?

Not at all worried--1--2--3--4--5--6--7--8--9--10--Very worried

(4) How WORRIED are you generally about the risks of using drugs?

Not at all worried--1--2--3--4--5--6--7--8--9--10--Very worried

(5) How WORRIED are you generally about the risks of having unprotected sex (that is, without condoms)?

Not at all worried--1--2--3--4--5--6--7--8--9--10--Very worried

(6) How WORRIED are you generally about the risks of NOT exercising regularly?

Not at all worried--1--2--3--4--5--6--7--8--9--10--Very worried

(7) Have you presently got any WORRIES at all about smoking or not smoking?

Yes [ ]

Maybe [ ]

Not sure [ ]

No [ ]

YOU HAVE FINISHED.

THANK YOU

VERY MUCH FOR YOUR HELP

APPENDIX B

HEALTH QUESTIONNAIRE (MODIFIED)

HEALTH QUESTIONNAIRE (MOD)

Please read this questionnaire carefully and answer each question. It is completely PRIVATE and will not be used by anyone except researchers at *Nene College*. Write your name clearly below and then read the instructions that follow.

SURNAME_____

FIRST NAME_____

Most of the questions can be answered by putting a tick in the box next to the answer that applies to you - like this..

Yes [X]
No [ ]

Some questions do not apply to everybody, so sometimes it tells you by the box which questions you should answer next. If there is nothing by the box, you should answer the next question.

Some other questions can be answered by drawing a circle around a number on a scale - like this...

No, not at all - 1 - 2 - 3 - 4 - (5) - 6 - 7 - 8 - 9 - 10 Yes, very much

Now turn over!

SECTION A

(1) What is your year of study?_____

(2) Are you male or female? **MALE[ ]** **FEMALE[ ]**

(3) How old are you? **YEARS[ ] MONTHS[ ]**

(4) What is your date of birth? **DAY[ ]** **MONTH[ ]** **YEAR[ ]**

(5) What is your father's job? Please write down exactly what he does. EXAMPLES INCLUDE: car mechanic, labourer, teacher, miner, fitter, farmer, farm worker or unemployed. If you don't know, or your father is not living with you, there is no need to write anything.

_____

_____

(6) What is your mother's job? Please write exactly what she does. EXAMPLES INCLUDE: housewife, secretary, nurse, cleaner, factory worker, teacher or unemployed. If you don't know, or if your mother is not living with you, there is no need to write anything.

_____

_____

(7) What is your ethnic background?

White [ ]

Black [ ]

Asian [ ]

Other _____

SECTION B (FLINDERS QUESTIONNAIRE)

People differ in the way they feel and go about making decisions. Please show how you normally make decisions by ticking the box which best applies to you for each statement below.

	Not at all true for me	Some-times true	Often true	Almost always true
(1) I feel confident about my ability to make decisions.	[ ]	[ ]	[ ]	[ ]
(2) I am not as good as most people in making decisions.	[ ]	[ ]	[ ]	[ ]
(3) I think that I am a good decision maker	[ ]	[ ]	[ ]	[ ]
(4) I feel so discouraged that I give up trying to make decisions.	[ ]	[ ]	[ ]	[ ]
(5) The decisions I make turn out well.	[ ]	[ ]	[ ]	[ ]
(6) It is easy for other people to convince me that their decision rather than mine is the correct one.	[ ]	[ ]	[ ]	[ ]
(7) I avoid making decisions.	[ ]	[ ]	[ ]	[ ]
(8) I take a lot of care before I make my choice.	[ ]	[ ]	[ ]	[ ]
(9) I put off making decisions.	[ ]	[ ]	[ ]	[ ]
(10) When faced with a decision, I go along with what others suggest.	[ ]	[ ]	[ ]	[ ]
(11) I panic if I have to make decisions quickly.	[ ]	[ ]	[ ]	[ ]
(12) I'd rather let someone else make a decision for me so that it won't be my problem.	[ ]	[ ]	[ ]	[ ]
(13) Once I have made a decision, then I don't change my mind.	[ ]	[ ]	[ ]	[ ]

	Not at all true for me	Some-times true	Often true	Almost always true
(14) I prefer to leave decisions to others.	[ ]	[ ]	[ ]	[ ]
(15) Whenever I get upset by having to make a decision, I choose on the spur of the moment.	[ ]	[ ]	[ ]	[ ]
(16) I like to think about a decision before I make it.	[ ]	[ ]	[ ]	[ ]
(17) When I have to make a decision, I wait a long time before starting to think about it.	[ ]	[ ]	[ ]	[ ]
(18) I feel as if I'm under tremendous time pressure when making decisions.	[ ]	[ ]	[ ]	[ ]
(19) I can't think straight if I have to make a decision in a hurry.	[ ]	[ ]	[ ]	[ ]
(20) When I make a decision, I feel that I've made the best one possible.	[ ]	[ ]	[ ]	[ ]
(21) I put little effort into making decisions.	[ ]	[ ]	[ ]	[ ]
(22) The possibility that some small thing might go wrong causes me to immediately change my mind about what I'm going to do.	[ ]	[ ]	[ ]	[ ]
(23) I like to make decisions myself.	[ ]	[ ]	[ ]	[ ]
(24) When I'm forced to make a decision, I couldn't care which way I choose.	[ ]	[ ]	[ ]	[ ]
(25) I choose on the basis of some small thing.	[ ]	[ ]	[ ]	[ ]
(26) I tend to drift into decisions without thinking about them.	[ ]	[ ]	[ ]	[ ]
(27) When I decide to do something, I get right on with it.	[ ]	[ ]	[ ]	[ ]
(28) I don't like to take responsibility for making decisions.	[ ]	[ ]	[ ]	[ ]

	Not at all true for me	Some-times true	Often true	Almost always true
(29) When making decisions, I tend to choose the first alternative that comes to mind.	[ ]	[ ]	[ ]	[ ]
(30) I prefer to do what others choose because I don't like to be different.	[ ]	[ ]	[ ]	[ ]

SECTION C

(1) Do you smoke at all nowadays?

Yes [ ]

No [ ]

(2) Now which of the following statements best describes you? (tick one)

I have never smoked	[ ]	--Go to Question 3
I have only ever tried smoking once	[ ]	--Go to Question 4
I used to smoke sometimes but I never smoke a cigarette now	[ ]	--Go to Question 4
I sometimes smoke cigarettes now but I don't smoke as many as one a week	[ ]	--Go to Question 4
I usually smoke between one and six cigarettes a week	[ ]	--Go to Question 4
I usually smoke more than six cigarettes a week	[ ]	--Go to Question 4

(3) Just to check, which one of the following statements best describes you?

I have never tried smoking a cigarette, not even a puff or two	[ ]
I did once have a puff or two of a cigarette, but I never smoke now	[ ]
I do sometimes smoke cigarettes	[ ]

(4) Have you ever had a proper alcoholic drink not just a sip? (examples of alcoholic drinks are beer, larger, cider, shandy, wine, martini, sherry, spirits, liqueurs)

Yes [ ]

No [ ]--Go to Question 8

(5) Which of these statements best describes you?

I *never* drink alcohol now [ ]--Go to Question 8

I drink alcohol *only on very special occasions* [ ]--Go to Question 8

I *occasionally* drink alcohol [ ]

I drink alcohol regularly [ ]

(6) Have you had any alcoholic drinks during the past 7 days?

Yes [ ]

No [ ]--Go to Question 8

(7) How many drinks (glasses) did you have in the last seven days?

1 to 5 drinks [ ]

6 to 10 drinks [ ]

More than 10 drinks [ ]

(8) Have you ever used drugs (e.g., glue sniffing, solvent abuse, use of marijuana, cocaine, heroine) to get high?

Yes [ ]

No [ ]--Go to Question 10

(9) Do you ever use drugs to get high nowadays?

Yes [ ]

No [ ]

(10) Which of the following exercises have you done in the past WEEK? (For each exercise you tick, write down the NUMBER OF TIMES you did that exercise in the past WEEK and the AVERAGE AMOUNT OF TIME you spent doing that exercise on each occasion)

EXERCISE (Tick those you have done in the past week)		NUMBER OF TIMES DONE IN THE PAST WEEK (for those ticked)	AVERAGE AMOUNT OF TIME SPENT ON EACH OCCASION (In Minutes)
Gymnastics	[ ]	_____	_____
Dancing	[ ]	_____	_____
Badminton	[ ]	_____	_____
Aerobics	[ ]	_____	_____
Canoeing	[ ]	_____	_____
Karate	[ ]	_____	_____
Judo	[ ]	_____	_____
Football	[ ]	_____	_____
Running	[ ]	_____	_____
Rope skipping	[ ]	_____	_____
Basket ball	[ ]	_____	_____
Bicycling	[ ]	_____	_____
Brisk Walking	[ ]	_____	_____
Lawn tennis	[ ]	_____	_____
Swimming	[ ]	_____	_____
Squash	[ ]	_____	_____
Rugby	[ ]	_____	_____
Wrestling	[ ]	_____	_____
Bowling	[ ]	_____	_____
Volley ball	[ ]	_____	_____
Baseball	[ ]	_____	_____
Rowing	[ ]	_____	_____
Hockey	[ ]	_____	_____
Other exercises (name them)_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____

(11) Which of the statements below best describes you?

I ALWAYS use a reliable contraception method (e.g., condoms) when having sex [ ]

I SOMETIMES use a reliable contraception method when having sex [ ]

I NEVER use a reliable contraception method when having sex [ ]

(12) Do you make conscious efforts to avoid fatty foods (e.g., eggs, butter, sausages, bacon, chips)?

No, never [ ]

Yes, but not often [ ]

Yes, often [ ]

Yes, very often [ ]

SECTION D

---

(1) How likely do you think you are to develop each of the following diseases by the age of 40 **(show your answer by drawing a circle around a number)?**

Heart disease	**Not at all likely**	1--2--3--4--5--6--7--8--9--10	**Very likely**
Stroke		1--2--3--4--5--6--7--8--9--10	
Cancer		1--2--3--4--5--6--7--8--9--10	
High blood pressure		1--2--3--4--5--6--7--8--9--10	
AIDS		1--2--3--4--5--6--7--8--9--10	

(2) How SERIOUS do you think the following diseases are to *YOUR OWN* health?

Heart disease	**Not at all serious**	1--2--3--4--5--6--7--8--9--10	**Very serious**
Stroke		1--2--3--4--5--6--7--8--9--10	
Cancer		1--2--3--4--5--6--7--8--9--10	
High blood pressure		1--2--3--4--5--6--7--8--9--10	
AIDS		1--2--3--4--5--6--7--8--9--10	

SECTION E

(1) Do you believe that exercising regularly (that is at least three times a week, for 20 minutes or more each time) REDUCES your chance of developing health problems?

No, not at all 1--2--3--4--5--6--7--8--9--10 Yes, very much

(2) Do you believe NOT drinking alcohol REDUCES your chance of developing health problems?

No, not at all 1--2--3--4--5--6--7--8--9--10 Yes, very much

(3) Do you believe NOT smoking cigarettes REDUCES your chance of developing health problems?

No, not at all 1--2--3--4--5--6--7--8--9--10 Yes, very much

(4) Do you believe NOT using drugs REDUCES your chance of developing health problems?

No, not at all 1--2--3--4--5--6--7--8--9--10 Yes, very much

(5) Do you believe NOT eating fatty foods (e.g., eggs, butter, red meat) REDUCES your chance of developing health problems?

No, not at all 1--2--3--4--5--6--7--8--9--10 Yes, very much

SECTION F

(1) Do you think you *can* exercise regularly if you want to?

No, I can't 1--2--3--4--5--6--7--8--9--10 Yes, I can

(2) Do you think you *can* avoid drinking alcohol if you want to?

No, I can't 1--2--3--4--5--6--7--8--9--10 Yes, I can

(3) Do you think you *can* avoid smoking cigarettes if you want to?

No, I can't 1--2--3--4--5--6--7--8--9--10 Yes, I can

(4) Do you think you *can* avoid using drugs if you want to?

No, I can't 1--2--3--4--5--6--7--8--9--10 Yes, I can

(5) Do you think you *can* avoid eating fatty foods if you want to?

No, I can't 1--2--3--4--5--6--7--8--9--10 Yes, I can

SECTION G

---

(1) Do you intend to eat fatty foods during the next 2 months?

No, I don't 1--2--3--4--5--6--7--8--9--10 Yes, I do

(2) Do you intend to smoke cigarettes during the next 2 months?

No, I don't--1--2--3--4--5--6--7--8--9--10--Yes, I do

(3) Do you intend to drink alcohol during the next 2 months?

No, I don't--1--2--3--4--5--6--7--8--9--10--Yes, I do

(4) Do you intend to exercise regularly (that is, exercise at least three times a week, for up to 20 minutes each time) during the next 2 months?

No, I don't--1--2--3--4--5--6--7--8--9--10--Yes, I do

(5) Do you intend to use drugs during the next 2 months?

No, I don't--1--2--3--4--5--6--7--8--9--10--Yes, I do

SECTION H

(1) How WORRIED are you generally about the risks of eating *fatty* foods?

Not at all worried--1--2--3--4--5--6--7--8--9--10--Very worried

(2) How WORRIED are you generally about the risks of smoking?

Not at all worried--1--2--3--4--5--6--7--8--9--10--Very worried

(3) How WORRIED are you generally about the risks of drinking alcohol?

Not at all worried--1--2--3--4--5--6--7--8--9--10--Very worried

(4) How WORRIED are you generally about the risks of using drugs?

Not at all worried--1--2--3--4--5--6--7--8--9--10--Very worried

(5) How WORRIED are you generally about the risks of NOT exercising regularly?

Not at all worried--1--2--3--4--5--6--7--8--9--10--Very worried

(6) Have you presently got any WORRIES at all about smoking or not smoking?

Yes [ ]

Maybe [ ]

Not sure [ ]

No [ ]

YOU HAVE FINISHED.

THANK YOU

VERY MUCH FOR YOUR HELP

APPENDIX C

SECONDARY DATA REGARDING COPING STYLES AS MODERATORS OF BELIEF-DECISION RELATIONS

Table C1 Results of principal components analysis (varimax rotation) of coping items (7-30) from the Flinders Decision Making Questionnaire.

Factor	Eigenvalue	Percent of variance explained	Cumulative percent
1	5.80343	24.2	24.2
2	2.05685	8.6	32.8
3	1.57320	6.6	39.3
4	1.24674	5.2	44.5
5	1.03734	4.3	48.8

VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.
VARIMAX converged in 9 iterations.

	Factor 1 (DEF)	Factor 2 (HYP)	Factor 3 (??)	Factor 4 (VIG)	Factor 5 (??)
(7)AVOID	.73103	.15762	.12163	-.04380	.01699
(8)VIGILAN	-.08499	.15412	-.63608	.38727	.06703
(9)AVOID	.70176	.19218	.13064	-.00102	-.13105
(10)UNCON	.33399	.02806	.05476	-.20199	.61344
(11)HYPER	.22491	.62859	.06706	-.12102	.15509
(12)UNCON	.62432	.19295	.08270	-.13781	.36233
(13)VIGILAN	.06252	-.03838	.08906	.65968	-.06358
(14)AVOID	.72373	.16250	.08752	-.12505	.27139
(15)HYPER	.21168	.36232	.27810	.06864	.23317
(16)VIGILAN	-.05082	.16909	-.63084	.35930	-.01074
(17)AVOID	.22640	.45924	.07454	.03810	.04963
(18)HYPER	.17988	.71351	-.02991	-.05267	.04320
(19)HYPER	.02358	.76987	.03007	-.09652	.11689
(20)VIGILAN	-.15159	-.17188	-.24011	.61895	.00064
(21)AVOID	.08764	.13272	.54643	.03738	.12879
(22)HYPER	.09462	.35315	.01114	-.11920	.50432
(23)VIGILAN	-.40836	-.08128	-.08846	.51532	-.15153
(24)UNCON	.09471	.10089	.48499	.08523	.46436
(25)HYPER	-.05037	.10349	.21351	.07232	.57178
(26)UNCON	.09751	.19395	.66880	-.00312	.11543
(27)VIGILAN	-.10488	-.00977	-.08098	.68685	-.03834
(28)AVOID	.52988	.24590	.13639	-.12870	.27630
(29)UNCON	.27086	.04447	.46693	-.01353	.34634
(30)UNCON	.45371	.11527	.08142	-.21457	.51358

Items 1 to 6 assess *decision self-esteem* and were therefore excluded from the analysis.
Abbreviations: DEF, AVOID (Defensive avoidance), HYP, HYPER (Hypervigilance), VIG, VIGILAN (Vigilance), UNCON (Unconflicted change or adherence),?? (Factor not clearly defined).

Table C2 Pearson correlations between health cognitions, coping styles, cognition x coping style terms, additional variables and intentions relating to substance use.

	(1)	(2)	(3)	(4)	(5)	(6)
(1)RESP.EFFICACY	1.0000					
(2)VULNERABILITY	-.1073*	1.0000				
(3)SEVERITY	.0529	.0835*	1.0000			
(4)VIGILANCE	.1034*	-.0914*	.0808*	1.0000		
(5)DEF.AVOIDANCE	-.0258	.1089*	-.0450	-.3772*	1.0000	
(6)HYPERVIG	.0594	.0989*	-.0012	-.2204*	.4343*	1.0000
(7)EFFIC.X VIG	.6177*	-.1436*	.0735*	.8231*	-.3055*	-.1457*
(8)VUL.X VIG	-.0407	.7428*	.1090*	.5357*	-.1431*	-.0597
(9)SEV.X VIG	.0877*	-.0108	.7052*	.7220*	-.2846*	-.1460*
(10)EFFIC.X AVOID	.2745*	.0707*	-.0131	-.3251*	.9265*	.4295*
(11)VUL.X AVOID	-.0534	.5396*	.0122	-.3236*	.8251*	.3865*
(12)SEV.X AVOID	.0209	.1371*	.3646*	-.2992*	.8652*	.4007*
(13)EFFIC.X HYPER	.4044*	.0476	.0271	-.1620*	.3798*	.9139*
(14)VUL.X HYPER	-.0165	.6259*	.0581	-.2085*	.3848*	.7707*
(15)SEV.X HYPER	.0788*	.1333*	.4829*	-.1351*	.3533*	.8287*
(16)SELF.EFFICACY	.2013*	-.1472*	-.0037	.0711*	-.0478	-.0151
(17)FEAR	.2832*	-.1044*	.0084	-.0004	.0281	.0824*
(18)SUBSTAN.USE	-.2094*	.1333*	.0765*	.0108	-.0344	-.0448
(19)AGE	.0601	.0241	.0924*	.1297*	-.1025*	-.0244
(20)GENDER	.0544	.1674*	-.0234	-.0544	-.0116	.0933*
(21)SOCIAL CLASS	.0617	-.0763*	.0731*	.0795*	-.0270	-.0569
(22)SUB.INTENTION	-.1831*	.1817*	.1153*	.0493	-.0400	-.0665

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

	(7)	(8)	(9)	(10)	(11)	(12)
(7)EFFIC.X VIG	1.0000					
(8)VUL.XVIG	.3768*	1.0000				
(9)SEV.X VIG	.5961*	.4327*	1.0000			
(10)EFFIC.X AVOID	-.1153*	-.1493*	-.2299*	1.0000		
(11)VUL.X AVOID	-.2899*	.2019*	-.2269*	.7496*	1.0000	
(12)SEV.X AVOID	-.2234*	-.0898*	.0155	.8266*	.7598*	1.0000
(13)EFFIC.X HYPER	.0796*	-.0711*	-.0902*	.5014*	.3278*	.3705*
(14)VUL.X HYPER	-.1833*	.3478*	-.1099*	.3589*	.6348*	.3892*
(15)SEV.X HYPER	-.0714*	.0090	.2118*	.3663*	.3550*	.5525*
(16)SELF.EFFIC	.1684*	-.0928*	.0401	.0104	-.0897*	-.0452
(17)FEAR	.1457*	-.0914*	-.0103	.1032*	-.0122	.0288
(18)SUBSTAN.USE	-.1163*	.1244*	.0763*	-.0908*	.0113	-.0008

	(7)	(8)	(9)	(10)	(11)	(12)
(19)AGE	.1447*	.0951*	.1494*	-.0767*	-.0686*	-.0468
(20)GENDER	-.0184	.1073*	-.0426	.0059	.0673*	-.0227
(21)SOCIAL CLASS	.0946*	-.0290	.0987*	-.0123	-.0430	.0157
(22)SUB.INTENTION	-.0747*	.1907*	.1108*	-.0735*	.0364	.0131

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

	(13)	(14)	(15)	(16)	(17)	(18)
(13)EFFIC.X HYPER	1.0000					
(14)VUL.X HYPER	.6788*	1.0000				
(15)SEV.X HYPER	.7756*	.6850*	1.0000			
(16)SELF-EFFICACY	.0687*	-.0976*	-.0184	1.0000		
(17)FEAR	.1727*	.0038	.0810*	.3218*	1.0000	
(18)SUBSTAN.USE	-.1086*	.0246	.0027	-.5687*	-.3978*	1.0000
(19)AGE	.0140	.0023	.0319	-.0199	-.1254*	.1639*
(20)GENDER	.1052*	.1524*	.0699*	.0259	.0612	-.0005
(21)SOCIAL CLASS	-.0428	-.0643	-.0167	.0903*	.0880*	-.0501
(22)SUB.INTENTION	-.1193*	.0373	.0025	-.6016*	-.3730*	.8407*

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

	(19)	(20)	(21)	(22)
(19)AGE	1.0000			
(20)GENDER	-.0360	1.0000		
(21)SOCIAL CLASS	.0357	.0519	1.0000	
(22)SUB.INTENTION	.1763*	-.0100	-.0060	1.0000

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

Abbreviations: RESP.EFFICACY, EFFIC (response-efficacy), DEF.AVOIDANCE, AVOID (defensive avoidance), HYPERVIG, HYPER (hypervigilance), VIG(vigilance), VUL (vulnerability to disease), SEV (severity of disease), SUBSTAN.USE (substance use), SUB,INTENTION (substance use intentions).

Table C3 Pearson correlations between health cognitions, coping styles, cognition x coping style terms, additional variables, and intentions relating to exercise.

	(1)	(2)	(3)	(4)	(5)	(6)
(1)RE.EXER	1.0000					
(2)VULNERABILITY	-.0928*	1.0000				
(3)SEVERITY	.0729*	.0835*	1.0000			
(4)VIGILANCE	.1448*	-.0914*	.0808*	1.0000		
(5)DEF.AVOIDANCE	-.0728*	.1089*	-.0450	-.3772*	1.0000	
(6)HYPERVIG	-.0634	.0989*	-.0012	-.2204*	.4343*	1.0000
(7)EFFIC.X VIG	.6842*	-.1383*	.0816*	.7914*	-.3195*	-.2131*
(8)VUL.XVIG	-.0014	.7428*	.1090*	.5357*	-.1431*	-.0597
(9)SEV.X VIG	.1274*	-.0108	.7052*	.7220*	-.2846*	-.1460*
(10)EFFIC.X AVOID	.2946*	.0830*	-.0085	-.3142*	.8933*	.3743*
(11)VUL.X AVOID	-.0764*	.5396*	.0122	-.3236*	.8251*	.3865*
(12)SEV.X AVOID	-.0242	.1371*	.3646*	-.2992*	.8652*	.4007*
(13)EFFIC.X HYPER	.3895*	.0547	.0359	-.1541*	.3545*	.8582*
(14)VUL.X HYPER	-.0890*	.6259*	.0581	-.2085*	.3848*	.7707*
(15)SEV.X HYPER	-.0172	.1333*	.4829*	-.1351*	.3533*	.8287*
(16)SELF-EFFICACY	.2104*	-.1258*	.0374	.2275*	-.1559*	-.0563
(17)FEAR	.2034*	-.0500	.0346	.1072*	-.0797*	-.0503
(18)ENERG.OUTPUT	.0874*	-.1344*	-.0042	.0965*	-.0646	-.0461
(19)AGE	.1201*	.0241	.0924*	.1297*	-.1025*	-.0244
(20)GENDER	.0120	.1674*	-.0234	-.0544	-.0116	.0933*
(21)SOCIAL CLASS	.0937*	-.0763*	.0731*	.0795*	-.0270	-.0569
(22)EXE.INTENTION	.2262*	-.1152*	.0303	.1692*	-.1200*	-.1013*

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

	(7)	(8)	(9)	(10)	(11)	(12)
(7)EFFIC.X VIG	1.0000					
(8)VUL.XVIG	.3563*	1.0000				
(9)SEV.X VIG	.5800*	.4327*	1.0000			
(10)EFFIC.X AVOID	-.0733*	-.1286*	-.2271*	1.0000		
(11)VUL.X AVOID	-.2880*	.2019*	-.2269*	.7436*	1.0000	
(12)SEV.X AVOID	-.2453*	-.0898*	.0155	.7988*	.7598*	1.0000
(13)EFFIC.X HYPER	.0935*	-.0551	-.0853*	.4971*	.3145*	.3526*
(14)VUL.X HYPER	-.2176*	.3478*	-.1099*	.3279*	.6348*	.3892*
(15)SEV.X HYPER	-.1310*	.0090	.2118*	.3253*	.3550*	.5525*
(16)SELF-EFFICACY	.2653*	.0349	.1698*	-.0604	-.1912*	-.1135*
(17)FEAR	.1930*	.0035	.0871*	-.0039	-.0561	-.0501
(18)ENERG.OUTPUT	.1186*	-.0591	.0472	-.0146	-.1189*	-.0143

	(7)	(8)	(9)	(10)	(11)	(12)
(19)AGE	.1729*	.0951*	.1494*	-.0502	-.0686*	-.0468
(20)GENDER	-.0401	.1073*	-.0426	-.0022	.0673*	-.0227
(21)SOCIAL CLASS	.1115*	-.0290	.0987*	.0023	-.0430	.0157
(22)EXE.INTENTION	.2414*	.0044	.1164*	-.0162	-.1318*	-.0738*

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

	(13)	(14)	(15)	(16)	(17)	(18)
(13)EFFIC.X HYPER	1.0000					
(14)VUL.X HYPER	.6444*	1.0000				
(15)SEV.X HYPER	.7316*	.6850*	1.0000			
(16)SELF-EFFICACY	.0482	-.1082*	-.0264	1.0000		
(17)FEAR	.0584	-.0251	-.0282	.1416*	1.0000	
(18)ENERG.OUTPUT	.0058	-.0976*	-.0239	.2286*	.1034*	1.0000
(19)AGE	.0250	.0023	.0319	.1049*	.0209	-.0159
(20)GENDER	.0860*	.1524*	.0699*	-.0228	.0251	-.3958*
(21)SOCIAL CLASS	-.0147	-.0643	-.0167	.0150	.0617	-.0216
(22)EXE.INTENTION	.0235	-.1296*	-.0713*	.4191*	.3852*	.3703*

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

	(19)	(20)	(21)	(22)
(19)AGE	1.0000			
(20)GENDER	-.0360	1.0000		
(21)SOCIAL CLASS	.0357	.0519	1.0000	
EXE.INTENTION	.0983*	-.0646	.0779*	1.0000

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

Abbreviations: RESP.EFFICACY, EFFIC (response-efficacy), DEF.AVOIDANCE, AVOID (defensive avoidance), HYPERVIG, HYPER (hypervigilance), VIG(vigilance), VUL (vulnerability to disease), SEV (severity of disease), ENERG.OUTPUT(energy output), EXE.INTENTION (exercise intentions).

Table C4 Pearson correlations between health cognitions, coping styles, cognition x coping style terms, additional variables, and intentions relating to dietary fat consumption.

	(1)	(2)	(3)	(4)	(5)	(6)
(1)RE.DIET	1.0000					
(2)VULNERABILITY	.0637	1.0000				
(3)SEVERITY	.0990*	.0835*	1.0000			
(4)VIGILANCE	.1098*	-.0914*	.0808*	1.0000		
(5)DEF.AVOIDANCE	-.0159	.1089*	-.0450	-.3772*	1.0000	
(6)HYPERVIG	.0194	.0989*	-.0012	-.2204*	.4343*	1.0000
(7)REDETVIG	.7009*	-.0414	.1120*	.7481*	-.2594*	-.1466*
(8)VUL.XVIG	.0983*	.7428*	.1090*	.5357*	-.1431*	-.0597
(9)SEV.X VIG	.1342*	-.0108	.7052*	.7220*	-.2846*	-.1460*
(10)EFFIC.X AVOID	.3784*	.1211*	.0110	-.2871*	.8661*	.3748*
(11)VUL.X AVOID	.0300	.5396*	.0122	-.3236*	.8251*	.3865*
(12)SEV.X AVOID	.0440	.1371*	.3646*	-.2992*	.8652*	.4007*
(13)EFFIC.X HYPER	.4943*	.1123*	.0666	-.1382*	.3341*	.8349*
(14)VUL.X HYPER	.0532	.6259*	.0581	-.2085*	.3848*	.7707*
(15)SEV.X HYPER	.0865*	.1333*	.4829*	-.1351*	.3533*	.8287*
(16)SELF-EFFICACY	.1745*	-.0391	.0485	.1079*	-.0653	-.0198
(17)FEAR	.3746*	.0768*	.0629	-.0095	-.0219	.0715*
(18)FAT CONSUMP.	.1681*	-.0528	-.0085	.0493	-.0440	.0217
(19)AGE	.1440*	.0241	.0924*	.1297*	-.1025*	-.0244
(20)GENDER	.1345*	.1674*	-.0234	-.0544	-.0116	.0933*
(21)SOCIAL CLASS	.0254	-.0763*	.0731*	.0795*	-.0270	-.0569
(22)DIET.INTENTION	-.1118*	.0545	.1073*	-.0051	.0341	-.0181

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

	(7)	(8)	(9)	(10)	(11)	(12)
(7)EFFIC.X VIG	1.0000					
(8)VUL.XVIG	.4184*	1.0000				
(9)SEV.X VIG	.5817*	.4327*	1.0000			
(10)EFFIC.X AVOID	.0191	-.0915*	-.1895*	1.0000		
(11)VUL.X AVOID	-.2114*	.2019*	-.2269*	.7439*	1.0000	
(12)SEV.X AVOID	-.1728*	-.0898*	.0155	.7933*	.7598*	1.0000
(13)EFFIC.X HYPER	.1881*	-.0129	-.0472	.5156*	.3314*	.3519*
(14)VUL.X HYPER	-.1309*	.3478*	-.1099*	.3571*	.6348*	.3892*
(15)SEV.X HYPER	-.0454	.0090	.2118*	.3455*	.3550*	.5525*
(16)SELF-EFFICACY	.1600*	.0149	.1010*	.0300	-.0052	-.0318
(17)FEAR	.2173*	.0403	.0488	.1203*	.0361	.0113
(18)FAT CONSUMP.	.1357*	-.0106	.0450	.0130	-.0478	-.0478

	(7)	(8)	(9)	(10)	(11)	(12)
(19)AGE	.1828*	.0951*	.1494*	-.0285	-.0686*	-.0468
(20)GENDER	.0324	.1073*	-.0426	.0428	.0673*	-.0227
(21)SOCIAL CLASS	.0651	-.0290	.0987*	-.0016	-.0430	.0157
(22)DIET.INTENTION	-.0821*	.0441	.0561	-.0049	.0345	.0815*

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

	(13)	(14)	(15)	(16)	(17)	(18)
(13)EFFIC.X HYPER	1.0000					
(14)VUL.X HYPER	.6732*	1.0000				
(15)SEV.X HYPER	.7423*	.6850*	1.0000			
(16)SELF-EFFICACY	.0942*	-.0262	.0343	1.0000		
(17)FEAR	.2387*	.1144*	.0882*	.2564*	1.0000	
(18)FAT CONSUMP.	.0989*	-.0117	.0283	.3527*	.4944*	1.0000
(19)AGE	.0559	.0023	.0319	.1049*	.0299	-.0013
(20)GENDER	.1427*	.1524*	.0699*	.1386*	.3070*	.3320*
(21)SOCIAL CLASS	-.0276	-.0643	-.0167	.0295	.0569	.0420
(22)DIET.INTENTION	-.0812*	.0139	.0253	-.2695*	-.3676*	-.5060*

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

	(19)	(20)	(21)	(22)
(19)AGE	1.0000			
(20)GENDER	-.0360	1.0000		
(21)SOCIAL CLASS	.0357	.0519	1.0000	
(22)DIET.INTENTION	.1340*	-.2080*	-.0137	1.0000

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

Abbreviations: RESP.EFFICACY, EFFIC (response-efficacy), DEF.AVOIDANCE, AVOID (defensive avoidance), HYPERVIG, HYPER (hypervigilance), VIG(vigilance), VUL (vulnerability to disease), SEV (severity of disease), FAT CONSUMP. (dietary fat consumption), DIET.INTENTION (dietary fat intentions).

Table C5 Pearson correlations between health cognitions, coping styles, cognition x coping style terms, additional variables, and intentions relating to unsafe sex.

	(1)	(2)	(3)	(4)	(5)	(6)
(1)RESP.EFFICACY	1.0000					
(2)VUL.(TO AIDS)	-.0437	1.0000				
(3)SEV.(OF AIDS)	.0228	.0193	1.0000			
(4)VIGILANCE	.0709	-.0839*	.0684*	1.0000		
(5)DEF.AVOIDANCE	-.0380	.1139*	-.0714*	-.3772*	1.0000	
(6)HYPERVIG	-.0120	.0681*	-.0051	-.2204*	.4343*	1.0000
(7)EFFIC.X VIG	.7029*	-.0207	.0898	.7404*	-.2664*	-.1249*
(8)VUL.X VIG	-.0230	.8700*	.0471	.2964*	-.0449	-.0248
(9)SEV.X VIG	.0533	-.0394	.7663*	.6365*	-.2706*	-.1290*
(10)EFFIC.X AVOID	.2848*	.1134*	-.0353	-.3028*	.9265*	.3764*
(11)VUL.X AVOID	-.0954	.7210*	-.0100	-.2476*	.6101*	.3073*
(12)SEV.X AVOID	-.0065	.1165*	.4407*	-.2758*	.7892*	.3788*
(13)EFFIC.X HYPER	.4072*	.0826	.0540	-.0978	.2782*	.8975*
(14)VUL.X HYPER	-.0500	.7935*	.0323	-.1644*	.3268*	.5185*
(15)SEV.X HYPER	.0138	.0842*	.5697*	-.1193*	.3052*	.7538*
(16)SELF-EFFICACY	.1953*	.0357	.0931	.1645*	-.0223	-.0284
(17)FEAR	.1922*	.0231	.1916*	.0410	-.0377	.0759
(18)SEX.EXPERIEN.	.1031	-.0424	.1229*	-.0582	-.0161	-.0137
(19)AGE	.1012	-.0785*	.1051*	.1297*	-.1025*	-.0244
(20)GENDER	.1182	.1033*	.0136	-.0544	-.0116	.0933*
(21)SOCIAL CLASS	.1072	-.0290	.0692*	.0795*	-.0270	-.0569
(22)SEX.INTENTION	-.2919*	.1073	-.0360	-.1396*	.1578*	.0392

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

	(7)	(8)	(9)	(10)	(11)	(12)
(7)EFFIC.X VIG	1.0000					
(8)VUL.X VIG	.2367*	1.0000				
(9)SEV.X VIG	.5026*	.2133*	1.0000			
(10)EFFIC.X AVOID	-.0179	-.0295	-.1925*	1.0000		
(11)VUL.X AVOID	-.1866*	.5095*	-.1650*	.5473*	1.0000	
(12)SEV.X AVOID	-.1641*	-.0139	.1241*	.8070*	.5275*	1.0000
(13)EFFIC.X HYPER	.1913*	.0217	-.0027	.4534*	.2181*	.2998*
(14)VUL.X HYPER	-.0819	.6338*	-.0770*	.3180*	.7975*	.3138*
(15)SEV.X HYPER	-.0112	.0279	.3265*	.3010*	.2568*	.5972*
(16)SELF-EFFICACY	.2201*	.0998	.1601*	.0505	-.0041	.0428
(17)FEAR	.1345*	.0675	.1685*	.0428	-.0257	.0920
(18)SEX.EXPERIEN.	.0221	-.0658	.0541	.0057	-.0219	.0570

	(7)	(8)	(9)	(10)	(11)	(12)
(19)AGE	.1835*	-.0163	.1540*	.2933*	-.0857*	-.0243
(20)GENDER	-.0062	.1011*	-.0202	.0940	.0651	-.0036
(21)SOCIAL CLASS	.0972	-.0062	.1068*	.0900	-.0379	.0143
(22)SEX.INTENTION	-.2506*	-.0041	-.1241*	.0371	.1499*	.1076

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

	(13)	(14)	(15)	(16)	(17)	(18)
(13)EFFIC.X HYPER	1.0000					
(14)VUL.X HYPER	.4775*	1.0000				
(15)SEV.X HYPER	.7729*	.4381*	1.0000			
(16)SELF-EFFICACY	.0887	.0293	.0334	1.0000		
(17)FEAR	.1703*	.0415	.1939*	.1451*	1.0000	
(18)SEX.EXPERIEN.	.0301	-.0214	.0426	-.0411	.0601	1.0000
(19)AGE	.2310*	-.0579	.0509	.1693*	-.0374	.1643*
(20)GENDER	.2883*	.1216*	.0926*	.0508	.2496*	.1332*
(21)SOCIAL CLASS	.0117	-.0485	-.0184	.0518	.1007	-.0845
(22)SEX.INTENTION	-.0696	.0841	.0156	-.1967*	-.1450*	.1472*

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

	(19)	(20)	(21)	(22)
(19)AGE	1.0000			
(20)GENDER	-.0360	1.0000		
(21)SOCIAL CLASS	.0357	.0519	1.0000	
(22)SEX.INTENTION	-.0623	-.2069*	.0161	1.0000

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

Abbreviations: RESP.EFFICACY, EFFIC (response-efficacy), DEF.AVOIDANCE, AVOID (defensive avoidance), HYPERVIG, HYPER (hypervigilance), VIG(vigilance), VUL (vulnerability to AIDS), SEV (severity of AIDS), SEX. EXPERIEN (experience of sexual intercourse), SEX. INTENTION (intentions to have unsafe sex).

APPENDIX D

HEALTH (SMOKING) QUESTIONNAIRE

HEALTH (SMOKING) QUESTIONNAIRE

SURNAME_____

FIRST NAME_____

Please read the items below and show how much you *agree* with each item by circling a number

	Strongly Disagree				Strongly Agree
(1) Smoking is good for showing off (image).	1	2	3	4	5
(2) Smoking causes cough (physio).	1	2	3	4	5
(3) Smoking looks tough (image).	1	2	3	4	5
(4) Smoking causes breathlessness (physio).	1	2	3	4	5
(5) Smoking looks grown up (image).	1	2	3	4	5
(6) Smoking causes bronchitis (physio).	1	2	3	4	5
(7) Smoking calms the nerves (pharma).	1	2	3	4	5
(8) Smoking causes heart disease (physio).	1	2	3	4	5
(9) Smoking is fun (pharma).	1	2	3	4	5
(10) Smoking is smelly (physio).	1	2	3	4	5
(11) Smoking keeps weight down (pharma).	1	2	3	4	5
(12) Smoking is a waste of money (-).	1	2	3	4	5
(13) Smoking gives confidence (pharma).	1	2	3	4	5

TURN OVER

(1) Do you feel there is LIMITED TIME to find an effective way of protecting yourself from disease caused by cigarette smoke?

No, I don't 1--2--3--4--5--6--7--8--9--10 Yes, I do

(2) Are you IN A HURRY to find an effective way of protecting yourself from disease caused by cigarette smoke?

No, I'm not 1--2--3--4--5--6--7--8--9--10 Yes, I am

(3) In what ways can YOU effectively protect yourself from disease caused by cigarette smoke? (list them below)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Below is a list of words people use to describe themselves. Please indicate how ACCURATELY each word DESCRIBES THE WAY YOU FEEL ABOUT ***NOT*** SMOKING CIGARETTES (For each word, draw a circle around a number to show your answer).

	Not at all accurately	Very accurately
(1) FINE (low pos.affect)	1--2--3--4--5--6--7--8--9--10	
(2) COMFORTABLE (low pos.affect)	1--2--3--4--5--6--7--8--9--10	
(3) ANXIOUS (high neg.affect)	1--2--3--4--5--6--7--8--9--10	
(4) NERVOUS (high neg.affect)	1--2--3--4--5--6--7--8--9--10	
(5) UNEASY (high neg.affect)	1--2--3--4--5--6--7--8--9--10	

The smoke from cigarettes is dangerous to your health. Please show how you have been dealing with the DANGER that CIGARETTE SMOKE presents to YOUR health.

	Not at all true				Very true
(1) I have been thinking about different ways of refusing cigarette offers.	1	2	3	4	5
(2) I have been trying not to think about the danger of smoking to my health.	1	2	3	4	5
(3) I don't think I have enough time to find an effective way of avoiding the cigarettes.	1	2	3	4	5
(4) I have been taking steps to avoid smoking on the spur of the moment.	1	2	3	4	5
(5) I have been having difficulty staying away from cigarettes.	1	2	3	4	5
(6) I have been trying to find out the disadvantages of all the possible ways of saying no when people encourage me to smoke.	1	2	3	4	5

	Not at all true				Very true
(7) I have been considering how best to say no to cigarettes.	1	2	3	4	5
(8) I have been trying not to think about the danger of smoking.	1	2	3	4	5
(9) I can't make up my mind about how to avoid smoking because I'm scared of offending someone.	1	2	3	4	5
(10) I have been searching frantically for an effective way of refusing cigarette offers.	1	2	3	4	5
(11) I think it is very difficult to keep away from cigarettes.	1	2	3	4	5
(12) I have been obtaining information about how to keep away from cigarettes.	1	2	3	4	5
(13) I have tried to understand how exactly cigarette smoke damages my health before deciding how to deal with it.	1	2	3	4	5
(14) I have been trying not to think about the danger of smoking because nothing can be done about it.	1	2	3	4	5
(15) I have not been able to think properly about the danger of smoking because of lack of time.	1	2	3	4	5
(16) I have been taking a lot of care in deciding how exactly to protect my health from cigarette smoke.	1	2	3	4	5

---

(1) Now which of the following statements best describes you? (tick one)

I have never smoked	( )
I have only ever tried smoking once	( )
I used to smoke sometimes but I never smoke a cigarette now	( )
I sometimes smoke cigarettes now but I don't smoke as many as one a week	( )
I usually smoke at least one cigarette a week	( )

(2) Do you intend to smoke cigarettes during the next 2 months?

No, I don't 1--2--3--4--5--6--7--8--9--10 Yes, I do

(3) How likely is it that you will smoke cigarettes during the next 2 months?

Not at all likely 1--2--3--4--5--6--7--8--9--10 Very likely

(4) Do you intend to limit the number of friends you have who smoke cigarettes?

Yes, I do 1--2--3--4--5--6--7--8--9--10 No, I don't

APPENDIX E

SECONDARY DATA REGARDING COPING STYLES AS PREDICTORS OF HEALTH RISK-TAKING

Table E1 Results of principal components analysis (varimax rotation) of coping items adapted from the early version of the Flinders Decision Making Questionnaire.

Factor	Eigenvalue	Percent of variance explained	Cumulative percent
1	3.95647	24.7	24.7
2	3.36284	21.0	45.7
3	1.16897	7.3	53.1
4	1.09481	6.8	59.9

VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.
VARIMAX converged in 6 iterations.

	Factor 1 (VIG)	Factor 2 (HYP)	Factor 3 (PROC)	Factor 4 (BOLS)
V1	.75466	-.06627	-.01109	.06587
V10	.52852	.64389	-.02295	.06769
V11	-.05078	.21666	.05891	.82790
V12	.58645	-.08515	.07508	-.05509
V13	.64578	.02084	-.19885	-.05509
V14	-.13707	.54808	.46465	.31014
V15	.09255	.69875	.25882	.15883
V16	.57340	.10103	-.40683	-.34298
V2	-.11213	-.08328	.81829	.08330
V3	.11751	.29881	.55690	.00233
V4	.64495	.20446	.02323	-.15028
V5	.00811	.10408	.24757	.87022
V6	.71970	.16453	-.08312	.20984
V7	.79207	.08806	-.07467	-.00478
V8	-.17597	.19678	.65752	.21363
V9	.00673	.82835	.01371	.07705

Abbreviations: V (Item, or Question), VIG (Vigilance), HYP (Hypervigilance), PROC (Defensive avoidance - procrastination), BOLS (Defensive avoidance - bolstering).

Table E2 Results of principal components analysis (varimax rotation) of smoking costs and benefit items adapted from Charlton's (1984) survey.

Factor	Eigenvalue	Percent of variance explained	Cumulative percent
1	3.46793	26.7	26.7
2	2.13519	16.4	43.1
3	1.14596	8.8	51.9

VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.
VARIMAX converged in 5 iterations.

	Factor 1 (IMAGE)	Factor 2 (PHYSIOL)	Factor 3 (PHARM)
SM1	.62123	.18210	.43916
SM10	-.31423	.49855	.10242
SM11	.42872	.34271	-.61093
SM12	-.38880	-.13327	-.05412
SM13	.57128	.34087	-.33852
SM2	-.42939	.61369	.01912
SM3	.73950	.22097	.35818
SM4	-.28014	.74571	.15634
SM5	.57876	.04826	.46511
SM6	-.35919	.58966	.04242
SM7	.66928	.34971	-.16521
SM8	-.42676	.37075	.03522
SM9	.64668	.10377	-.22821

Abbreviations: SM (Item or Question), IMAGE (Image-related factor), PHYSIOL (Physiological factor), PHARM (Pharmacological factor).

Table E3 Results of principal components analysis (varimax rotation) of decisional stress items, adapted from White *et al*'s (1994) study.

Factor	Eigenvalue	Percent of variance explained	Cumulative percent
1	3.07930	61.6	61.6
2	1.15344	23.1	84.7

VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.
VARIMAX converged in 3 iterations.

	Factor 1 (NEGATIVE AFFECT)	Factor 2 (POSITIVE AFFECT)
STRESS1	.17692	.92680
STRESS2	.23283	.92416
STRESS3	.89923	.06726
STRESS4	.89847	.24087
STRESS5	.79269	.35696

Abbreviations: STRESS (Stress items or Questions).

Table E4 Pearson correlations between coping styles, additional variables, risk intention, and risk behaviour.

	(1)	(2)	(3)	(4)	(5)	(6)
(1)VIGILANCE	1.0000					
(2)DEF.PROC	-.2010*	1.0000				
(3)DEF.BOLS	-.0986	.3440*	1.0000			
(4)HYPERVIG	.0197	.4427*	.4112*	1.0000		
(5)STRESSNE	.0792	.4627*	.4023*	.4242*	1.0000	
(6)STRESSPO	.0145	.3083*	.4741*	.2816*	.4511*	1.0000
(7)COST.PHA	-.2935*	.3929*	.2562*	.1905	.3015*	.1266
(8)COST.PHY	.1088	-.0723	-.0681	-.0471	-.2115*	.0143
(9)COST.SI	-.0735	.2686*	.1517	.2087*	.3745*	.1372
(10)PHY.PHAR	-.2460*	.3150*	.2229*	.1550	.1445	.0944
(11)PHY.SI	-.0254	.2061*	.1020	.1768	.2481*	.1271
(12)ALTERNAT	-.0819	-.0610	.0089	-.1221	-.1677	-.0498
(13)TIME1	.0399	-.0180	-.1286	-.1348	-.0796	-.1517
(14)TIME2	.3613*	-.1691	-.0338	.1389	.0271	.0502
(15)AGE	-.1028	-.0593	-.0360	-.0429	-.0460	.0691
(16)GENDER	-.1400	-.0816	-.0324	-.1705	-.0974	-.0988
(17)SES.DIV	.0314	-.1003	-.0229	-.2464*	-.0080	.0115
(18)INTENT	-.3851*	.4276*	.4805*	.2016*	.3685*	.3463*
(19)SMO.STA	-.2447*	.3605*	.4264*	.2479*	.3528*	.3739*

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

ABBREVIATIONS: DEF.BOLS (bolstering) DEF.PROC (procrastination), HYPERVIG (hypervigilance), STRESSNE (negative affect), STRESSPO (positive affect), COST.PHA (pharmacological costs of not smoking), COST.PHY (physiological costs of smoking), COST.SI (Image-related costs of not smoking), PHY.PHA. (physiological costs of smoking x pharmacological costs of not smoking), PHY.SI (physiological costs of smoking x image-related costs of not smoking), ALTERNAT. (decision alternatives), TIME 1 (time pressure, in a hurry) TIME 2 (time pressure, limited time), SES.DIV (social class), INTENT (smoking intentions), SMOK.STA (smoking behaviour).

	(7)	(8)	(9)	(10)	(11)	(12)
(7)COST.PHA	1.0000					
(8)COST.PHY	-.1273	1.0000				
(9)COST.SI	.4643*	-.2106*	1.0000			
(10)PHY.PHAR	.8530*	.3748*	.3129*	1.0000		
(11)PHY.SI	.3913*	.1945	.8992*	.4693*	1.0000	
(12)ALTERNAT	-.0148	.2689*	-.1305	.1143	-.0009	1.0000
(13)TIME1	.0713	.2577*	.0686	.2081*	.1881	.1811
(14)TIME2	-.1929*	.2184*	-.0554	-.1016	.0046	.0537
(15)AGE	-.1134	.3075*	-.1623	.0306	-.0595	.0910
(16)GENDER	.0078	.0432	-.1265	.0554	-.0937	.0097
(17)SES.DIV	-.0111	.0316	-.0883	.0047	-.0613	.0653
(18)INTENT	.4479*	-.1787	.3210*	.3584*	.2361*	.0472
(19)SMO.STA	.3608*	-.1527	.2019*	.2815*	.1398	-.0091

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

	(13)	(14)	(15)	(16)	(17)	(18)
(13)TIME1	1.0000					
(14)TIME2	.2657*	1.0000				
(15)AGE	.0606	.1556	1.0000			
(16)GENDER	.0130	-.1835	-.0360	1.0000		
(17)SES.DIV	-.0708	-.1143	.0357	.0519	1.0000	
(18)INTENT	-.0710	-.2765*	-.0552	.1785	-.0613	1.0000
(19)SMO.STA	-.0288	-.1899	-.0678	.1995*	-.1192	.8692*

* - Signif. LE .05 * - Signif. LE .01 (2-tailed)

ABBREVIATIONS: DEF.BOLS (bolstering) DEF.PROC (procrastination), HYPERVIG (hypervigilance), STRESSNE (negative affect), STRESSPO (positive affect), COST.PHA (pharmacological costs of not smoking), COST.PHY (physiological costs of smoking), COST.SI (Image-related costs of not smoking), PHY.PHA. (physiological costs of smoking x pharmacological costs of not smoking), PHY.SI (physiological costs of smoking x image-related costs of not smoking), ALTERNAT. (decision alternatives), TIME 1 (time pressure, in a hurry) TIME 2 (time pressure, limited time), SES.DIV (social class), INTENT (smoking intentions), SMOK.STA (smoking behaviour).

APPENDIX F

FLINDERS QUESTIONNAIRE - EARLY VERSION

FLINDERS QUESTIONNAIRE - EARLY VERSION (see Radford et al, 1986)

Vigilance items:

I like to consider all the alternatives.

I try to find out the disadvantages of all alternatives.

I consider how best to carry out the decision.

When making decisions I like to collect lots of information.

I try to be clear about my objectives before choosing.

I take a lot of care before choosing.

Defensive avoidance items:

When I have a decision to make I try not to think about it.

I feel uncomfortable about making decisions.

I avoid making decisions.

Whenever I face a difficult decision, I feel pessimistic about finding a good solution.

I don't make decisions unless I really have to.

Hypervigilance items:

I feel as if I'm under tremendous time pressure when making decisions.

Whenever I get upset by having to make decisions I choose on the spur of the moment.

The possibility that some small thing might go wrong causes me to swing abruptly in my preferences.

I choose on the basis of some small thing.

I can't think straight if I have to make decisions in a hurry.