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HEALTH RELATED BEHAVIOUR, STRESS AND WELL-BEING DURING ORGANISATIONAL CHANGE

DAVID KEITH INGLEDEW

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UNIVERSITY COLLEGE OF NORTH WALES
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SUMMARY

This study investigated whether some coping strategies are better or worse than others, by virtue of their links with health behaviours, or their stress buffering effects. It also investigated whether some ways of attributing for success and failure in health behaviour change are better or worse than others, through their effects upon feelings, expectations, and intentions. Employees of a hospital that was closing down completed questionnaires at two points in time, one year apart (baseline N = 109; of which 102 successfully followed up). Analysis was by a combination of multivariate analysis of variance, latent class analysis, exploratory and confirmatory factor analysis, and regression analysis.

The evidence supported a four-dimensional view of coping (cf., Cox & Ferguson, 1991), and (less strongly) a two-type model of routine health behaviours. There was little evidence that coping strategies were linked to either routine health behaviours or to health behaviours used as ways of coping. However, the use of health damaging behaviours as ways of coping was predicted somewhat by avoidance coping.

Having controlled for negative affectivity, there was little evidence that coping or resources buffered the effect of stressors on well-being, or that coping mediated between resources and well-being (cf., Cohen & Edwards, 1989). There were, however, main effects of coping on well-being (e.g., avoidance coping acted to increase mental symptoms); and main and interactive effects of stressors and resources on coping (e.g., stressors acted to increase avoidance coping but resources buffered this effect).

The evidence supported a four-dimensional view of attributions (cf., McAuley, Duncan, & Russell, 1992), but with differences between attributions for success and failure. There was only limited support for Weiner's (1986) model applied to health behaviour change. Of particular interest were the interactive effects of attributions on affective reactions and on intention; these effects invariably involved the stability dimension.

CHAPTER 1

INTRODUCTION

Structure of the Thesis

This thesis comprises six chapters. Chapter 1 (this chapter) describes in general terms the background to the project, and the theoretical approach that was taken. It does not contain a detailed literature review. This is because each of Chapters 2 to 5 are self-contained papers which contain their own literature reviews. These chapters have been produced as working papers published by the author's institution (which was felt to be a good research training). They have been edited for inclusion in the thesis only as far as was necessary to achieve the required format (for example page numbering). There is thus some repetition, for example of citations, between the chapters, but no more than would be expected in a set of papers. It was thought better to compile the thesis this way, rather than lose the advantage of each chapter being self-sufficient. Chapter 6 provides a general discussion and overall conclusion to the thesis.

Background to the Research

This study was centred upon the employees of a large British psychiatric hospital which was being closed in line with government policy. The closure was, however, protracted rather than instantaneous. The intention to close the hospital was made public in 1987; there was to be a process of retrenchment over a number of years. By 1991, final closure within three years was envisaged. Meanwhile, alternative facilities were being built up in the community. Staff at the hospital were not faced with the prospect of redundancy as such. In fact, the new service provision would require more staff, not fewer.

Staff were, however, faced with uncertainty about the future, and disruption to their lives. This was especially so because, over a period of a century and a half, the hospital and the local community had become intertwined. Generations within the same families had worked there. It is not unreasonable to liken the situation to that of a mill town or pit village.

The author of this thesis became involved when, in discussions with management, it became apparent that, although the patients' welfare during closure was being researched, that of staff was not. That is not to say that staff welfare was being ignored; for example, outside counsellors had been employed. It was felt, however, that there was room for a research project which took health as its focal point, and considered the factors that might lead to an optimal outcome in this regard. The project would have a longitudinal aspect. It was clear, however, that because of recent events, any outsider could anticipate encountering some mistrust.

Procedures

Ethical approval was obtained for the project. The project was questionnaire based. The questionnaires, and the data gathering process, were piloted on a group of five staff (one of whom subsequently became a subject). Following publicity through the hospital's team briefing system, the researcher sent a personalised letter to all staff (excluding doctors) of the hospital. These non-medical staff numbered approximately 600. It was decided not to include doctors because they were not so affected by the closure; senior doctors' sphere of operation was wider than the hospital, and junior doctors were usually on short-term placements. In the letter, staff were invited to take part in a study of how they "look after their health and well-being during the period of change". They were informed of what would be involved, and given a choice of data gathering sessions which they could attend in work time. They were reassured that this was a University and not a management project, and that all information would be treated in the strictest confidence and not published in a form that would identify any individual. They were also promised feedback.

The data gathering sessions were group sessions, in that more than one person could be there at the same time (it actually varied from one to ten at a time). The sessions were, however, confidential, each individual working on their own questionnaire booklet. The researcher acted as master of ceremonies, introducing and explaining each section of the booklet. These sessions took from two to four hours, with breaks. When the data had been analysed, three months later, all subjects were sent feedback. This was in the form of a personalised letter, listing the individual's scores on key variables, these scores being in quintiles, ranging from 1 (representing low compared with the group as a whole) to 5 (representing high).

The following summer, the researcher sent a personalised letter to all subjects, and then telephoned to arrange a time and place to meet. Those who had moved were visited where they currently worked. Subjects were seen individually, to have a discussion, and to complete further questionnaires. This took from one to two hours.

A total of 110 individuals took part in the first phase of the study. This initial participation rate was somewhat disappointing, although good enough for most of the multivariate analyses that were envisaged. It meant that there has been a high degree of self-selection; subjects were predominantly from nursing and administrative jobs, rather than ancillary staff. As noted, there was a pre-existing suspicion of outsiders. However, once recruited to the study, the quality of data obtained was very high; there was very little missing data, and no sense of dissemblance. Furthermore, the follow-up rate, 102 out of the original 110, was remarkably high. This must to some extent be attributed to the care and attention given to subjects. Although there was never any claim that this project would be of benefit to the subjects themselves, many did indicate that they found it an enjoyable and thought provoking process. It might be argued that such close involvement with subjects could lead to biasing of the results. However, the subjects were always assured that what was wanted were their personal views and experiences. By creating a situation of confidence, bias was, if anything, reduced. The questionnaires used are reproduced in Appendices A and B.

Supplementary data was also gathered from a second hospital, a general hospital in a similar area. This is referred to in Chapters 2 and 3.

Theoretical Model

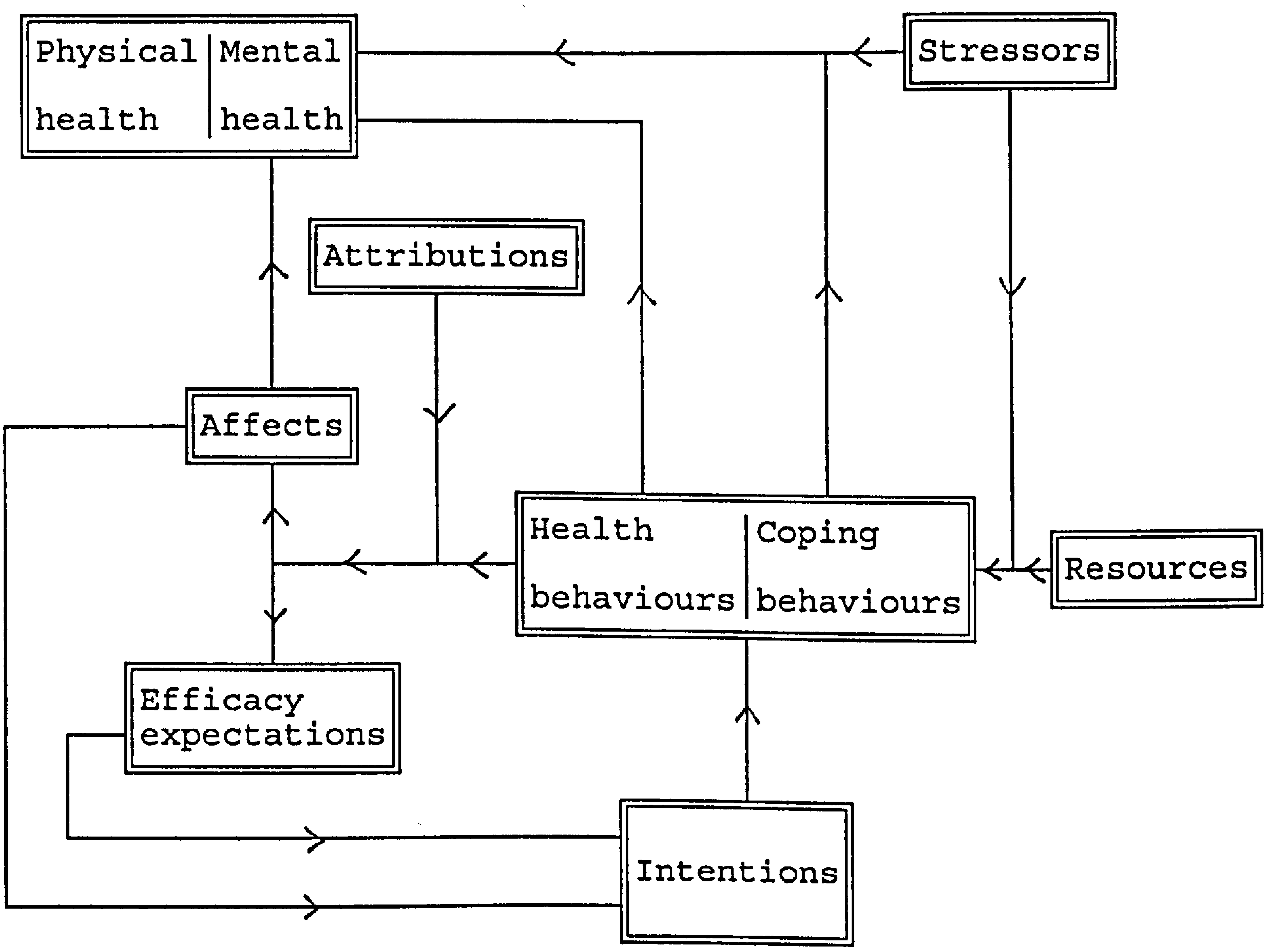
As noted, the thinking behind this research project was that it would take health as a focal point, and consider the factors that might lead to an optimal outcome in this regard. The situation was one in which, in everyday terms, people were under a lot of strain, during which time they would need to cope and to look after themselves, otherwise their health might suffer. An individual might be said to have coped if they came through without great cost to their general well-being, and without resorting to health-damaging behaviours. An individual might be said to have looked after themselves if they set out to maintain, or even improve, their health promoting lifestyle, and persisted with those intentions. This line of thinking led the researcher to focus on the literatures relating to coping strategies, health behaviours, and attributions. A model was developed, which can be seen as comprising three parts, as depicted in Figure 1. The following is a brief description and justification. Each chapter of the thesis contains its own literature review that further elaborates the issues.

The first part of the model proposes that *some behaviours, termed health behaviours, have a direct effect upon health*. Furthermore, *some behaviours are both health behaviours and coping strategies* (hence they are enclosed in the same box).

The term health behaviour is used here to refer to behaviour which has health as a consequence, not necessarily as a goal. The idea that behaviour can have a direct effect upon health is not a contentious proposition. In Britain and in other industrialised countries, the last century has seen a transformation of public health, from a situation where infectious diseases were the major contributors to mortality, to one where non-infectious diseases are the leading causes of death (e.g., McKeown, 1976). In recent decades, there has been an increasing recognition that personal behaviours are important risk factors for these non-infectious diseases. Landmark studies include the British work on smoking and lung cancer (Doll & Hill, 1950, 1964), and the American work on

Figure 1

Model Employed in the Research



lifestyle and mortality in Alameda County (e.g., Berkman & Breslow, 1983; Schoenborn, 1993). This acceptance of personal behaviours as risk factors is now so complete that such behaviours are incorporated into national and international health strategies as targets for change alongside environmental improvements and health service developments (Ingledew, 1989).

Such a recognition that personal behaviours are important risk factors should not be equated with a presumption that the individual is personally responsible for his or her health. As those researching inequalities in health have argued (e.g., Whitehead, 1987), behavioural risk factors account for only some of the variation in risk, and, furthermore, behaviours themselves can be seen as having environmental causes. Nor can it be presumed that an individual who behaves healthily in one respect (e.g., exercises regularly) will necessarily behave healthily in other respects (e.g., drink only in moderation). On the contrary, the evidence to date suggests that health behaviour is multidimensional (e.g., Stephens, 1986). Indeed, the technique of health risk appraisal (e.g., Wagner, Beery, Schoenbach, & Graham, 1982) is founded on the premise that discrete health behaviours contribute cumulatively (additively or interactively) towards an individual's overall risk of death.

The idea that health behaviours are used as ways of coping with stressful situations appears frequently in the literature (e.g., Roskies, 1991; Wills, 1990; Long, 1993), and certainly this is a prevalent lay perception. In addition, other possible forms of relationship between health behaviour and coping strategies can be envisaged, for example, individuals with different routine health behaviours might differ in their coping strategies.

The second part of the model proposes that *stressors have an effect upon health, but coping strategies moderate this effect. Moreover, coping is determined by certain resources (perceived control, social support) interacting with stressors.*

Recent decades have seen a flourishing of research under the umbrella term stress. In such stress research, the emphasis has variously been on the individual's response (e.g., Selye, 1956), on environmental stimuli ranging from major life events (e.g., Holmes & Rahe, 1967) to more minor daily hassles (e.g., Kanner, Coyne, Schaeffer, & Lazarus, 1981), or on the transaction between the individual and the environment (e.g., Lazarus & Folkman, 1984).

Moreover, in this stress research, the balance of attention has shifted from the stressor-health relationship per se to the role of moderating variables (e.g., Rabkin & Struening, 1976). Prominent among such moderating variables are coping strategies. Edwards (1988) has succinctly identified the various theoretical approaches to coping, and their strengths and weaknesses:

> Psychoanalytical approaches to coping consider contact with reality to be necessary for coping to occur, even though some forms of adjustment rely upon the *denial* of reality. In addition, these approaches typically define coping in terms of successful adjustment thereby obscuring the relationship between coping and outcomes. Personal trait or style approaches to coping assume a correspondence between traits or styles and subsequent coping behaviors, though relevant studies indicate that this correspondence is often weak at best. Furthermore, the trait or style approach often describes coping as stable and unidimensional, while this is usually not the case. Stage approaches to coping often fail to specify the factors which influence stage duration and transition, underrepresent the variability found in actual coping behaviors and require the difficult task of placing these behaviors into discrete categories. Describing coping in terms of specific methods or foci also contains drawbacks, such as difficulty in distinguishing various methods and foci, incomplete consideration of the determinants of coping method and foci, and inattention to the mechanism by which coping influences stress and well-being. (p. 241)

Edwards' (1988) concern about the problem of distinguishing the various methods and foci can now be alleviated to some extent. The diverse literature has been reviewed by Cox and Ferguson (1991), who concluded that the conventional dichotomy of problem- and emotion-focused coping should be supplemented with two other dimensions, reappraisal and avoidance. In their review, Parker and Endler (1992) concluded that there are three basic dimensions: problem-focused, emotion-focused, and avoidance. This reflects upon previous attempts to answer the question of whether any one way of coping is any better than another in terms of health outcomes, for example Suls and Fletcher's (1985) meta-analysis of avoidant versus nonavoidant coping, or Aldwin and Revenson's (1987) review of emotion- versus problem-focused coping. Clearly, any such conclusion based upon a simple dichotomy of coping must be very circumscribed, given the evidence that there are more than two basic dimensions of coping. Furthermore, others have suggested that the perceived controllability of the stressor must also be considered (e.g., Folkman, 1991).

Edwards' (1988) concern about the incomplete consideration of the determinants of coping method and foci relates to the proposition in the model that coping is determined by certain resources (perceived control, social support) interacting with stressors. Cohen and Edwards (1989) have reviewed research into the role of personal resources in stress buffering. They reach very few substantive conclusions because they are so concerned about the design of much of this research. However, they are reasonable satisfied with the evidence regarding locus of control as a stress buffer. The construct of locus of control (Rotter, 1966) was initially adopted by health researchers as a possible determinant of health behaviour, a promise which has largely not been fulfilled (see below). It subsequently became adopted as a possible stress buffer, where its promise has been more fulfilled (e.g., Cohen & Edwards, 1989; Payne, 1988; but see Hurrell & Murphy, 1991). It is a multidimensional concept (Paulhus & Christie, 1981), one which may be easily confused with other constructs such as self efficacy (e.g., Palenzuela, 1988). Clearly, also, locus of control is only one aspect of aspect of the wider notion of personal control which has gained a prominent position in health-related research (e.g., Steptoe & Appels, 1989).

Cohen and Edwards (1989) do not review the literature on social support as a stress buffer, but their methodological warnings would still be valid. Interest in social support was spawned by the evidence from longitudinal studies that social integration (measured by an index of social ties) predicted lower mortality, after controlling for baseline health and other risk factors (e.g., House, Landis, & Umberson, 1988). The idea that social support might operate as a stress buffer is a prevalent one. Cohen and Wills' (1985) conclude from their review that whereas social integration may have a main effect on health, it is the perceived availability of relevant social support that has a buffering effect; although for others the data are not so clear cut (e.g., Barrera, 1988).

In the case of personal resources as stress buffers, Cohen and Edwards (1989) note that it is often suggested but rarely tested that these personal resources exert their effect via an influence on coping. Similarly, it has been suggested that social support may exert a buffering effect via an effect upon coping (Cohen, 1988; Thoits, 1986; Cutrona & Russell, 1990).

In addition, it has been suggested that negative affectivity (Watson & Pennebaker, 1989) should be routinely taken into account in stress research because it might bias self-reports not only of stressors and symptoms, but also of putative moderators (Payne, 1988). In the interests of parsimony, this is not shown in the model, but it is considered in the research.

There is a more specific literature on unemployment and health (e.g., Warr, 1987); however, as noted, subjects were not directly threatened with unemployment. There is also a more specific literature on transitions (e.g., Fisher & Cooper, 1990); however, such literature generally has a positive connotation of growth and development, and it would be presumptuous to attach such a positive connotation to the hospital closure. Therefore, it seemed appropriate to draw upon the more general literatures on life stress (e.g., Fisher & Reason, 1988) and occupational stress (e.g., Cooper & Payne, 1988).

The third part of the model proposes that *behaviour (specifically perceived success and failure in relation to* *intentions) has an influence on efficacy expectations and affects, but this influence is moderated by attributions. Efficacy expectations and affects then influence intentions, which in turn influence future behaviour. In addition, affects influence health.*

This is an attempt to introduce a cyclical component into the model that could account for individuals' health (and coping) behaviours changing over time. Weiner (1979, 1986; Weiner, Frieze, Kukla, Reed, Rest, & Rosenbaum, 1971) has applied attributional concepts derived from the thinking of the likes of Heider (1958) and Kelley (1971, 1973) to the area of achievement motivation. He suggests that attributions for success or failure determine affective reactions and success expectations, both of which then determine subsequent behaviour. Bandura (1977, 1986), although not primarily concerned with attributions, has applied them within his self-efficacy theory. He suggests that previous performance influences self-efficacy, that this effect is moderated by attributions, and that self-efficacy influences future behaviour. Such attributional models have been applied with a modest degree of success to the study of health behaviour (Kok, Den Boer, De Vries, Gerards, Hospers, & Mudde, 1992), and it seems that this is a line of research worth pursuing especially given the scope for attributional interventions (Försterling, 1988).

The model employed in this research can be seen as adaptation of Weiner's (1986) model, incorporating efficacy expectations coupled with intentions, rather than success expectations. It is argued that Weiner (1986) could afford to focus on success expectations because he was dealing with situations (e.g., academic) where it could be assumed that the individual would be making an attempt (because they had little choice). In the present research, and in general when studying health-related behaviour change, it cannot be assumed that the individual will be making an attempt (they do have choice). Hence, it becomes appropriate to focus on efficacy expectations and intentions rather than success expectations.

In addition, in the model, affects are seen as having an influence upon health. This is in deference to attributional models that are more concerned with mental health (Abramson, Seligman, & Teasdale, 1978). However, this path was not tested in the present research, because of the unlikelihood of being able to detect an effect of a small number of attributional events upon subsequent general well-being.

Initially, it was proposed to also include health value and health outcome expectation and in the present research. Recent research into health behaviour has been dominated by value expectancy theories (Rosenstock, Strecher, & Becker, 1988). For example, the Health Belief Model (e.g., Janz & Becker, 1984) incorporates perceived susceptibility (subjective perception of the risk of contracting a condition), perceived severity (subjective perception of the seriousness of contracting the condition), perceived benefits (subjective perception of the benefits of the health action in reducing the health threat), and perceived barriers (subjective perception of the costs of the health action). It also includes cues to action (stimuli to trigger the decision-making process); and assumes a high health value. Janz and Becker are pleased with the predictive utility of the model, although Harrison, Mullen, and Green (1992), employing a stricter approach to meta-analysis, are more circumspect. Rosenstock et al. seek a symmetry between Bandura's Social Cognitive Theory (Bandura, 1986) and the Health Belief Model. They argue that whereas outcome expectations are already implicit in the Model, efficacy expectations need to be added to the Model. A growing body of literature does suggest that efficacy expectations have considerable predictive utility in relation to health behaviour (e.g., Strecher, DeVellis, Becker, and Rosenstock, 1986). By contrast, initial enthusiasm that outcome expectation (locus of control) might also be a useful predictor of health behaviour (Strickland, 1978; Wallston & Wallston, 1978) has given way to disappointment. It is now argued that outcome expectations will only predict in interaction with efficacy expectations and health value (e.g., Wallston, 1989, 1991, 1992). However, even then, there will be no prediction when health is not the pertinent goal. Similarly, the Health Belief Model cannot be expected to predict behaviours that affect health but which are undertaken for nonhealth reasons (Janz & Becker, 1984). In this project, health value was measured, as was the health-specific outcome expectation for each of the health behaviours. However, these were ultimately not included in the analyses, because it became increasingly obvious that the presumption that the behaviours were being conducted for health reasons was unwarranted. It can be noted that self-efficacy measures make no assumptions as to the underlying goal of the behaviour; this may well account for their superior predictive utility.

Chapters of the Thesis

The chapters of the thesis are as follows. Chapters 2 and 3 are concerned with the first part of the model. However, they are not concerned to test whether some behaviours, termed health behaviours, have a direct effect on health; this is taken for granted, given the aforementioned evidence. Chapters 2 and 3 are concerned with the relationships between health behaviours and coping strategies (the contents of the health behaviour/coping strategies box). They ask whether one way of coping is better or worse than another in the sense of being linked with health behaviours that are in themselves health promoting or damaging.

Chapter 2 examines the structure of coping strategies, factor analysing the COPE coping strategies inventory (Carver, Scheier, & Weintraub, 1989), working from the suggestion that there might be four basic coping dimensions, problem-focused, emotion-focused, reappraisal and avoidance (e.g., Cox & Ferguson, 1991). Chapter 2 also examines the structure of routine health behaviours. Previous factor analytical studies of such routine health behaviours have produced equivocal results (e.g., Stephens, 1986). Here, a different approach is taken, employing latent class analysis, looking for categorical rather than continuous latent variables, that is to say looking for health behaviour types. Chapter 2 then examines the relationships between coping dimensions and health behaviour types.

Chapter 3 examines the extent to which people acknowledge using health behaviours as ways of coping, and explores the structure of those health behaviours. It then looks at the extent to which such health behaviour dimensions are predicted by other, more documented, coping dimensions (the aforementioned problem-focused, emotion-focused, reappraisal, and avoidance). Although existing coping inventories have included some health behaviours as items, typically as indicators of avoidance, such inclusions have been sporadic (e.g., Folkman & Lazarus, 1988; Carver et al., 1989). Perhaps there is a need to emphasise the different foci of Chapters 2 and 3. Both Chapters are concerned with the relationships between coping strategies and health behaviours, but whereas Chapter 2 focuses on routine health behaviours, Chapter 3 focuses specifically on health behaviours when they are used as ways of coping.

Chapter 4 is concerned with the second part of the model. It examines whether and which coping strategies ameliorate the effects of stressors on well-being, and whether and which resources bolster coping efforts. (It also, of necessity, examines the structure of stressors and of well-being). It thus asks whether and how one way or coping is better or worse than another in the sense of buffering the effects of stressors. This is territory that has been extensively explored in the past. However, the current research tries to take account of previous methodological shortcomings, specifically the need to conduct appropriate tests of moderation and mediation (Cohen & Edwards, 1989; Baron & Kenny, 1986), and the need to control for negative affectivity as a confounding variable (Watson & Pennebaker, 1989). It also includes a longitudinal component, coping and health data having being gathered at two points in time.

Chapter 5 is concerned with the third part of the model. It examines the structure of attributions, based upon the work of Russell and associates (McAuley, Duncan, & Russell, 1992). It then goes on to examine whether and in what way attributions influence efficacy expectations and affects, and thence intentions and future behaviour. It thus asks whether and how one way of attributing is better or worse than another in terms of the effect on how one feels, and whether one will try to maintain a health promoting lifestyle, drawing upon the theories of Weiner (1986) and Bandura (1986). This research thus contributes to a nascent literature on how attribution and self-efficacy theories can be applied to health promotion (Kok et al., 1992). It includes a longitudinal component in so much as intentions were measured at baseline, whilst perceived success/failure and the other variables were measured a year later.

Chapter 6 restates the main findings, and discusses methodological limitations that might circumscribe the conclusions. It discusses the theoretical implications, including the utility of the model in Figure 1. It elaborates the implications for practice. Even without foreknowledge of this discussion, it is clear that the model above is one which lends itself to interventions; it is a cyclical model, with exogenous variables (resources, stressors, and attributions) that appear open to influence. Finally, Chapter 6 ends with suggestions for further research.

CHAPTER 2

COPING STRATEGIES AND HEALTH BEHAVIOURS: DIMENSIONALITY AND RELATIONSHIPS*

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Abstract

Having reviewed the measurement and dimensionality of coping strategies, the measurement and dimensionality of health behaviours, and the relationship between coping strategies and health behaviours, two studies are reported.

In Study 1, the dimensionality of coping strategies was explored by applying confirmatory factor analysis to Carver, Scheier, and Weintraub's (1989) COPE scales. Three data sets were used, one being Carver et al.'s own data, the other two being separate samples of hospital workers. The results were consistent with a four-dimensional view of coping: problem-focused coping, reappraisal, emotion-focused coping, and avoidance. Four COPE scales were identified as being consistently good indicators of the four coping dimensions. These scales were used in Study 2 (and in other studies).

In Study 2, the dimensionality of health behaviour was explored by applying latent class analysis to health behaviour data from one of the hospital samples. The results were weakly consistent with a two-type model of health behaviour: those showing healthy behaviour, and those showing more mixed behaviour. Health behaviour types did not differ significantly on coping strategies (the four COPE scales identified in Study 1). Men and women did differ on these coping strategies, women demonstrating more emotion-focused coping.

Other ways in which coping strategies and health behaviours might be related are discussed. Ultimately, this relates to the question of whether any one way of coping can be said to be better than another.

Introduction

Definition, Measurement, and Dimensionality of Coping

Coping has been defined as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141).

Cox and Ferguson (1991), and Parker and Endler (1992), review the measurement and dimensionality of coping. See also F. Cohen (1987), Costa and McCrae (1989), Edwards (1988), Latack and Havlovic (1992), Stone, Helder, and Schneider (1988). A distinction can be made between dispositional (trait) and episodic measures (F. Cohen, 1987). Folkman and Lazarus' (1988) Ways of Coping Questionnaire is much used. More recent instruments include those of Amirkhan (1990), Carver, Scheier, and Weintraub (1989), and Endler and Parker (1990). This literature is by no means consistent regarding the number and nature of coping strategies. It is perhaps more consistent when the diverse coping strategies are reduced to a smaller number of what are often called coping functions (i.e., what is achieved by the coping strategies). According to Cox and Ferguson (1991), in addition to the conventional dichotomy of problem- and emotion-focused coping, two other dimensions might be considered, one concerned with reappraisal and the other with avoidance. Parker and Endler (1992) settle for three basic dimensions: emotion-focused, problem-focused and avoidance.

Definition, Measurement, and Dimensionality of Health Behaviour

Health behaviour has been defined by Kasl and Cobb (1966) as "any activity undertaken by a person believing himself to be healthy for the purpose of preventing disease or detecting it at an asymptomatic stage" (p. 246). This definition implies that the behaviour is goal directed and that the goal is avoiding ill-health. However, much behaviour that has health consequences is not health-directed. Exercise, for example, has health consequences, but can be pursued for a variety of reasons, only one of which is health (Markland & Hardy, 1993). Hereafter, the term health behaviour will be used to refer to behaviour which has health as a consequence, not necessarily as a goal.

Kar and Berkanovic (1987) identify three approaches to measuring health behaviours: detailed measures of specific actions; summated indicators of healthy behaviour; and health risk appraisal scales. A summated indicator is typically a score derived from adding up the number of activities performed out of a recommended list. A health risk appraisal can be viewed as a more sophisticated variant of the summated indicator, allowing for weightings and even interactions. Clearly, summated indicators and health risk appraisals require that the measures of individual behaviours are reliable and valid in the first place. Summated rating scales have been criticised extensively by Slater and Linder (1988) and health risk appraisal by Wagner, Beery, Schoenbach, and Graham (1982). Over and above their many criticisms, it needs to be said that summated indicators and health risk appraisals are measures of risk, they are not measures of behaviour. To add up behaviours to measure risk is based on the assumption that the behaviours are independent, whereas to add up behaviours to measure some common cause requires evidence that the behaviours are associated.

The measurement of individual health behaviours has evolved as much in the social survey tradition as in the psychometric tradition. Questions are often borrowed or adapted from previous surveys. For example, in a recent pan-European survey, Wardle and Steptoe (1991) acknowledged a debt to the US National Health Interview Survey (Schoenborn, 1988) and the British Health and Lifestyle Survey (Blaxter, 1990). The use of standard questions allows for comparability between surveys, but leaves open the question of validity. Given the complexity of most health behaviours, establishing valid measures is a daunting task. Simpler measures often compare well with more complex measures, for example in the case of alcohol use (Midanik, Klatsky, & Armstrong, 1989; Hilton, 1989).

The bivariate relationships between health behaviours are often found to be weak. For example, Blair, Kohl, and Brill's

(1990) literature review suggests that physical activity is associated with several other health behaviours, but the associations are typically weak. By way of an exception, there does appear to be a consistent relationship between alcohol use and tobacco use (e.g., Istvan & Matarazzo, 1984; Stephens, 1986). In contrast to the weak bivariate relationships, there appears to be considerable stability of health behaviours in adulthood (Breslow & Enstrom, 1980; Rakowski, 1987), although perhaps not from childhood to adulthood (Mechanic, 1979). It would appear that, having arrived at adulthood, the individual pursues several unconnected ruts. However, this conclusion must be tempered by the fact that weak empirical relationships could be due to poor measurement.

The multivariate relationships between health behaviours suggest that health behaviour is multi-dimensional (Belloc & Breslow, 1972; Calnan, 1985; Harris & Guten, 1979; Kannas, 1982; Kivelä, Nissinen, & Puska, 1988; Krick & Sobal, 1990; Kronenfeld, Goodyear, Pate, Blair, Howe, Parker, & Blair, 1988; Langlie, 1979; Mechanic & Cleary, 1980; Norman, 1985; Sobal, Revicki, & DeForge, 1992; Steele & McBroom, 1972; Stephens, 1986; Tapp & Goldenthal, 1982; Terre, Drabman, & Meydrech, 1990; Williams & Wechsler, 1972). There is, however, little consistency in the number and nature of dimensions reported. Equally, there is little consistency in the behaviours investigated, the operationalisation of constructs, or the study populations (Stephens, 1986).

Relationships Between Coping and Health Behaviours

Several possible forms of relationship between health behaviours and coping strategies can be envisaged. First, individuals with different routine health behaviours may differ in their coping strategies. Second, health behaviours may be used as coping strategies (e.g., Roskies, 1991). Third, stressors may cause health behaviours, and coping strategies may moderate this effect (e.g., Cooper, Sloan, & Williams, 1988). Fourth, health behaviour change may be a stressor requiring coping strategies (e.g., M. P. Carey, Snel, K. B. Carey, & Richards, 1989). Only the first of these perspectives will be addressed in this chapter; the second is dealt with in Chapter 3. For completeness, it can also be noted that stressors may cause ill-health (e.g., physical symptoms), and coping strategies may moderate this effect, making the coping strategies by definition health behaviours in the sense that they have health consequences. This is the subject of Chapter 4.

Previous research into whether individuals with different routine health behaviours differ in their coping strategies has been limited. There has been some research on clinical populations, for example, comparing problem and non-problem drinkers (R. H. Moos, Brennan, Fondacora, & B. S. Moos, 1990). Some other areas of research may be relevant; for example, learned resourcefulness, which can be viewed as a repertoire of coping skills, has been found to be associated with health behaviours (Rosenbaum, 1990b), though not consistently (M. P. Carey, K. B. Carey, Carnrike, & Meisler, 1990).

Research Questions

Two studies are reported in this chapter. In Study 1, the dimensionality of coping strategies was examined. Specifically, Carver et al.'s (1989) COPE questionnaire scales were subjected to confirmatory factor analysis. The results provided some insight into the structure of coping. In addition, the results were used to reduce the number of coping variables, prior to studying: the relationships between coping strategies and routine health behaviours (in Study 2); the relationship between health behaviours used as ways of coping and other coping strategies (Chapter 3); and the stress moderating role of coping strategies (Chapter 4).

In Study 2, the dimensionality of health behaviours was explored using latent class analysis. Then the relationships between key coping dimensions (identified in Study 1) and health behaviour dimensions (identified in Study 2) were investigated.

Study 1: Dimensionality of coping strategies

Method

Subjects. Three separate data sets were used for this study. The first data set was from the staff (excluding doctors) of a large British psychiatric hospital which was in the process of closing, Hospital X (HX). Out of approximately 600 such employees, 110 were volunteers in a longitudinal study. Usable data was obtained from 109 subjects, of which 69 were female, and 40 were male. The mean age was 36.1 (*SD* = 10.2) years. Ages ranged from 18 to 62, median 37 years. Subjects were predominantly from nursing and administrative jobs.

The second data set was from the staff (excluding doctors) of a large British general hospital, Hospital Y (HY). Out of approximately 1300 employees sent a questionnaire, 268 returned it via the internal mail. Usable data was obtained from 255 subjects, of which 201 were female, 52 male and 2 of unknown sex. The mean age was 33.9 (*SD* = 9.9) years. Ages ranged from 19 to 60 years, median 33.0 years. The specific occupations of these staff were not known.

The third data set was the correlation matrix reported by Carver et al. (1989) (CSW) for 978 subjects, sexes and ages not reported, all undergraduate students.

Measures. HX and HY subjects completed the COPE (coping strategies) questionnaire as devised by Carver et al. (1989, and personal communication). The trait version was used. Subjects were asked to think about the past three months, and about life in general, not just work. The full COPE questionnaire comprises 60 items, four items for each of 15 scales. For HX, all scales were administered. For HY, the Alcohol/Drug Use scale was not administered, because for HX scores on this scale had been highly skewed. In addition, for HY, the COPE items were intermingled with some new coping items, the analysis of which is reported elsewhere (Chapter 3). For CSW, the Alcohol/Drug Use and Humour scales were not used, because these were added by Carver and associates after their 1989 paper.

Procedure. For each of the data sets, the COPE scales' means, standard deviations, skewnesses and alpha reliabilities (Cronbach, 1951) were calculated. For the reliabilities, and throughout the analyses reported in this chapter, listwise rather than pairwise deletion for missing data was used.

LISREL version 7.16 (Jöreskog & Sörbom, 1989) was used for the factor analyses. In the LISREL analyses, the covariance rather than the correlation matrix was analysed, and Maximum Likelihood estimation was used. Fit was assessed by the criteria detailed by Jöreskog and Sörbom (1989; Jöreskog, 1993), bearing in mind the maxim that no single measure of fit should be relied on exclusively (Bollen & Long, 1993).

In the output from LISREL, chi² is a measure of the overall discrepancy between the sample covariance matrix and the fitted covariance matrix. It is a badness of fit measure in the sense that large chi² (judged against degrees of freedom) corresponds to bad fit. The probability value reported is the probability, given that the model is correct, of obtaining a chi² larger that the value actually obtained. Typically, a probability value of at least 0.05 is sought. Differences in chi² when judged against differences in degrees of freedom can be used to compare two models provided one model is a nested (more restricted) version of the other. Related to this, for each restriction in a model, LISREL will compute a Modification Index, the predicted decrease in chi² if the restriction were to be relaxed. In modifying models on the basis of such Modification Indices, one must of course be wary of the danger of capitalising on chance (MacCallum, Roznowski, & Necowitz, 1992).

There is a problem with chi² as a measure of overall fit. Being N-1 times the minimum value of the fit function, it tends to be large in large samples. The Goodness of Fit Index (GFI) does not depend on sample size explicitly in its calculation (although its sampling distribution does). The GFI compares the fit of the model with the fit of a fully saturated model. The Adjusted Goodness of Fit Index (AGFI) is adjusted for degrees of freedom. The GFI and AGFI values vary from 0 to 1 (perfect fit). In this research values of at least 0.90 for GFI and at least 0.85 for AGFI were sought.

The Root Mean Square Residual (RMSR) is a measure of the average of the fitted residuals. Its absolute size can only be interpreted in the context of the size of the observed variances and covariances, but it can be used to compare the fit of two different models for the same data.

In factor analysing the COPE data, it was necessary to decide whether to use the COPE item scores or the COPE scale scores as the observed variables. The answer to this was in part practical, in that large models can exceed the workspace limit of LISREL 7.16 (although there is an extended version 7.20). More importantly, it was felt wise to limit the number of parameters being estimated, given the sample size. Given that Carver et al.'s (1989) scales do have some reliability and validity data on them, it seemed reasonable to use these as the observed variables.

In factor analysing the COPE scale scores, guidance was sought from the literature on the structure of coping strategies. As noted, Cox and Ferguson (1991) discuss four dimensions: problem-focused, reappraisal, emotion-focused, and avoidance. Carver et al. (1989) report briefly that they did an exploratory factor analysis of the COPE scale scores. They report four factors: one comprised of Active Coping, Planning, and Suppression of Competing Activities; one comprised of Acceptance, Restraint Coping, and Positive Reinterpretation and Growth; one comprised of Focus on and Venting of Emotion, and the two Social Support scales; and one comprised of Denial, and the two Disengagement scales. The highest loading of Turning to Religion (.23) was on the Acceptance factor. There thus seems to be support for a four-factor model for coping strategies.

Results

Table 1 lists the COPE scales, with their alpha reliabilities, means, standard deviations and skewnesses. It is notable that the alphas are on the low side for Mental Disengagement (a somewhat diverse set of coping strategies). The means are on the low side for Turning to Religion, Denial, and Alcohol/Drug Use; these low means are accompanied by high positive skewnesses. The three data sets are broadly comparable.

The solution reported by Carver et al. (1989) was used to specify a LISREL model. In this Model A, there were four

Table 1

Descriptive Statistics and Alpha Reliabilities of the COPE Scales in Three Different Data Sets

Scale and data set	M^a	SD	Skewness[b]	α^c
Positive Reinterpretation and Growth				
HX	12.01	2.16	-0.52	.64
HY	11.70	2.23	-0.27	.58
CSW	12.40	2.42	-	.68
Active Coping				
HX	11.96	2.09	-0.47	.62
HY	11.60	2.35	0.05	.68
CSW	11.89	2.26	-	.62
Planning				
HX	12.67	2.22	-0.30	.76
HY	11.61	2.60	-0.20	.75
CSW	12.58	2.66	-	.80
Seeking Social Support, Emotional				
HX	11.18	3.15	-0.08	.87
HY	10.45	3.36	-0.06	.86
CSW	11.01	3.46	-	.85
Seeking Social Support, Instrumental				
HX	11.74	2.50	-0.42	.77
HY	10.80	3.00	-0.13	.81
CSW	11.50	2.88	-	.75
Suppression of Competing Activities				
HX	9.20	2.31	-0.34	.65
HY	9.09	2.36	0.15	.61
CSW	9.92	2.42	-	.68
Turning to Religion				
HX	5.28	2.62	2.40	.95
HY	6.97	3.85	1.08	.95
CSW	8.82	4.10	-	.92

(table continues)

Scale and data set	M[a]	SD	Skewness[b]	α[c]
Acceptance				
HX	11.66	2.43	-0.23	.95
HY	11.68	2.34	-0.02	.57
CSW	11.84	2.56	-	.65
Mental Disengagement				
HX	8.19	2.31	0.25	.40
HY	8.76	2.32	0.22	.36
CSW	9.66	2.46	-	.45
Focus on and Venting of Emotions				
HX	9.67	3.13	0.11	.85
HY	9.42	3.17	0.34	.83
CSW	10.17	3.08	-	.77
Behavioral Disengagement				
HX	6.68	2.17	0.72	.64
HY	6.74	2.29	0.61	.65
CSW	6.11	2.07	-	.63
Denial				
HX	5.49	1.81	1.23	.59
HY	6.09	2.03	1.13	.59
CSW	6.07	2.37	-	.71
Restraint Coping				
HX	10.69	2.25	-0.03	.70
HY	9.96	2.32	0.16	.59
CSW	10.28	2.53	-	.72
Alcohol/Drug Use[d]				
HX	5.13	2.17	2.33	.94
HY	-	-	-	-
CSW	-	-	-	-
Humour[e]				
HX	8.02	3.05	0.63	.91
HY	8.14	2.99	0.53	.87
CSW	-	-	-	-

(*table continues*)

Note. HX = Hospital X; HY = Hospital Y; CSW = Carver, Scheier, and Weintraub's (1989) data.

[a]When computing scale scores: for HX, N = 109; for HY, N = 254; for CSW, N = 1030; the minimum possible scale score is 4, the maximum 16; a missing score for an item was replaced with the mean score for the other items comprising that scale; such missing items were rare, as indicated by N for alpha (see below). [b]Carver, Scheier, and Weintraub (1989) do not report skewnesses. [c]When computing alphas: for HX, N = 104 (listwise deletion); for HY, N = 239 (listwise deletion); for CSW, N = 978. [d]The Alcohol/Drug Use scale was not used with the HY or the CSW subjects. [e]The Humour scale was not used with the CSW subjects.

factors. Active Coping, Planning, and Suppression of Competing Activities were free to load on Factor 1; Acceptance, Restraint Coping, Positive Reinterpretation and Growth, Turning to Religion, and Humour were free to load on Factor 2; Seeking Social Support (both scales) and Focus on and Venting of Emotion were free to load on Factor 3; and Denial and both Mental and Behavioral Disengagement were free to load on Factor 4. Alcohol/Drug Use was omitted entirely (this was only available for HX, where it was in any case highly skewed). The diagonal elements of the phi matrix were fixed to one, thereby providing scales for the latent variables. The off-diagonal elements of the phi matrix were free to be estimated, that is to say an oblique solution was specified. The theta-delta matrix was specified as diagonal and free, so that error variances were free to be estimated but error covariances were fixed to zero. However, when this model was applied to the HX data, there was a warning that the theta-delta matrix was not positive definite. This was traced to the error variance of Seeking Social Support for Emotional Reasons (SSSE) being estimated as negative. In order to get around this problem, the error variance of SSSE was fixed at a value determined as follows. The best estimate of the reliability of SSSE was taken to be the mean of the three alphas in Table 1. The error variance of SSSE was then set to the observed variance multiplied by one minus the reliability. This turned out to be a recurrent problem, so this solution was applied for all HX and HY models. Because models were to be modified, it was also necessary to specify that theta-delta for SSSE should never be freed. Although fixing error variance was used here as a means of circumventing a specific problem, it is a procedure that has been used in its own right (Jöreskog and Sörbom, 1982, 1989) and even advocated (Hayduk, 1987).

When Model A was applied to the HX data, the fit was not good: see Model A-HX in Table 2. LISREL's Automatic Modification facility was used, with the significance level set to 5%. Automatic modification (actually the penultimate modification, because the last modification resulted in theta-

Table 2

LISREL Measures of Fit for Various Models Applied to the Three Data Sets

Model[a]	Chi²	*df*	*p*	GFI	AGFI	RMSR
A-HX	134.79	72	.000	.858	.793	.614
A-HX-M[b]	89.81	67	.033	.905	.851	.376
A-HY	250.65	72	.000	.873	.815	.665
A-HY-M[c]	111.65	66	.000	.940	.905	.361
A-CSW	504.92	59	.000	.924	.883	.076
A-CSW-M[d]	124.51	45	.000	.981	.961	.025
B-HX	140.78	75	.000	.850	.790	.627
B-HX-M	97.02	69	.015	.895	.841	.373
B-HY	268.26	75	.000	.863	.808	.683
B-HY-M	134.98	69	.000	.929	.893	.423
B-CSW	617.4	62	.000	.908	.866	.081
B-CSW-M	293.76	52	.000	.952	.916	.042

Note. GFI = Goodness of Fit Index; AGFI = Adjusted Goodness of Fit Index; RMSR = Root Mean Square Residual.

[a]Key: A = Four-factor specification derived from Carver, Scheier and Weintraub (1989); B = Three-factor specification; HX = Hospital X data (*N* = 109); HY = Hospital Y data (*N* = 254); CSW = Carver et al.'s data (*N* = 978); M = model after automatic modification. [b]See Table 3 for factor loadings and correlations. [c]See Table 4 for factor loadings and correlations. [d]See Table 5 for factor loadings and correlations.

delta being not positive definite) resulted in Model A-HX-M. The fit, as shown in Table 2, was considered acceptable. The factor pattern matrix and factor correlation matrix are shown in Table 3. Because of uncertainties about *t* values (de Pijper & Saris, 1982), these are not reported.

The same Model A was applied to the HY data. The fit was not good: see Model A-HY in Table 2. Automatic modification produced Model A-HY-M. The fit, as shown in Table 2, was considered acceptable, with more weight being given to goodness of fit indices than to the probability of chi^2, because the latter is so greatly affected by sample size. The factor pattern matrix and factor correlation matrix are shown in Table 4.

Finally, Model A (excluding Humour) was applied to Carver et al.'s (1989) own data set (the correlation matrix for the scale scores as reported in their 1989 article). The fit was not good: see Model A-CSW-M in Table 2. The fact that a model suggested by exploratory factor analysis (that is to say as reported by Carver et al.) did not fit neatly in confirmatory factor analysis on the same data is not in itself cause for concern. Exploratory factor analysis produces the best solution it can, and this is not necessarily a good solution. Furthermore, an exploratory solution may include many small item-factor loadings which in a confirmatory model may well be fixed to zero, so that strictly speaking like is not being compared with like. Automatic modification resulted in Model A-CSW-M. The fit, as shown in Table 2, was considered acceptable, again based more on the goodness of fit indices than the probability of chi^2. The factor pattern matrix and factor correlation matrix are shown in Table 5.

Examination of Tables 3 to 5 suggests that, overall, a four-factor model is appropriate, although the factor pattern is by no means entirely consistent. The factors appear to be appropriately labelled Problem-Focused Coping (Factor 1), Reappraisal (Factor 2), Emotion-Focused Coping (Factor 3), and Avoidance (Factor 4). However, the correlation between the Problem-Focused Coping and Reappraisal factors might be a cause for some concern. It was decided, therefore, to try a

Table 3

Standardised Solution for Model A-HX-M

Variable	Factor 1	2	3	4
	Item-factor loadings			
Active Coping	.86	.00	.00	.00
Planning	.87	.00	.00	.00
Suppression of Competing Activities	.50	.00	.00	.33
Acceptance	.00	.41	.00	.00
Restraint Coping	.00	.54	.00	.00
Positive Reinterpretation and Growth	.00	.73	.00	.00
Turning to Religion	.00	.09	.00	.27
Humour	.00	.17	.00	.00
Seeking Social Support, Emotional	.41	.00	.77	.00
Seeking Social Support, Instrumental	.00	.57	.37	.00
Focus on and Venting of Emotions	.00	.00	.55	.00
Denial	.00	.00	.00	.56
Mental Disengagement	.00	.39	.00	.52
Behavioral Disengagement	.00	.00	.00	.67
	Factor-factor correlations			
Factor 1	-			
Factor 2	.81	-		
Factor 3	-.04	.09	-	
Factor 4	-.38	-.22	.38	-

Note. See Table 2 for measures of fit.

Table 4

Standardised Solution for Model A-HY-M

Variable	Factor 1	2	3	4
	Item-factor loadings			
Active Coping	.89	.00	.00	.00
Planning	.80	.00	.00	.00
Suppression of Competing Activities	.64	.00	.00	.37
Acceptance	.00	.45	.00	.00
Restraint Coping	.00	.59	.00	.00
Positive Reinterpretation and Growth	.49	.22	.00	.00
Turning to Religion	.00	.34	.00	.00
Humour	.00	.07	.00	.00
Seeking Social Support, Emotional	.00	.00	.86	.00
Seeking Social Support, Instrumental	.31	.00	.68	.00
Focus on and Venting of Emotions	.00	-.15	.59	.43
Denial	.00	.00	-.15	.64
Mental Disengagement	.00	.00	.00	.39
Behavioral Disengagement	.00	.00	.00	.72
	Factor-factor correlations			
Factor 1	-			
Factor 2	.44	-		
Factor 3	.32	.20	-	
Factor 4	-.33	.30	.11	-

Note. See Table 2 for measures of fit.

Table 5

Standardised Solution for Model A-CSW-M

Variable	Factor 1	2	3	4
	Item-factor loadings			
Active Coping	.81	.00	.00	.00
Planning	.83	.00	.00	.00
Suppression of Competing Activities	.74	.00	.00	.34
Acceptance	-.24	.52	.00	-.41
Restraint Coping	.24	.46	-.16	.00
Positive Reinterpretation and Growth	.00	.56	.00	-.45
Turning to Religion	.00	.36	.00	.00
Seeking Social Support, Emotional	.00	.00	.96	.00
Seeking Social Support, Instrumental	.22	.10	.63	.00
Focus on and Venting of Emotions	.11	.00	.56	.26
Denial	.34	.00	.00	.80
Mental Disengagement	.00	.28	.14	.34
Behavioral Disengagement	.00	.21	.00	.71
	Factor-factor correlations			
Factor 1	-			
Factor 2	.47	-		
Factor 3	.24	.32	-	
Factor 4	-.62	-.02	-.03	-

Note. See Table 2 for measures of fit.

three-factor model, in which items that in Model A had been free to load on either Factor 1 or on Factor 2 were now instead all free to load on one factor, giving Model B. This was then applied to the HX, HY, and CSW data, producing Models B-HY, B-HY-M, B-HX, B-HX-M, B-CSW and B-CSW-M, with measures of fit as in Table 2. As can be seen from these measures of fit, there is no reason to reject the A models in favour of the B models.

As noted previously, the purpose of analysing the COPE data was not only to study the structure of coping strategies per se, but also to reduce the number of coping variables to be used in subsequent analyses. In so doing there were three possibilities. The one chosen was to look for good indices for the factors, and use these indices as the coping variables in subsequent studies. Tables 3 to 5 were examined to identify COPE scales that (as far as possible) unequivocally represented the four factors. These were selected as: Active Coping (representing Problem-Focused Coping); Acceptance (representing Reappraisal); Seeking Social Support for Emotional Reasons, hereafter known as Seeking Emotional Support (representing Emotion-Focused Coping); and Behavioural Disengagement (representing Avoidance). An alternative approach would have been to use saved factor scores as the coping variables in subsequent studies (LISREL will save a factor scores regression matrix which can then be used to compute factor scores). This approach appeared inelegant, given that the subsequent studies involved two different data sets. Yet another approach might have been to include all the COPE scales in the subsequent analyses, and use LISREL to examine the (canonical) relationships between coping latent variables and other latent variables. The reasons for preferring the two-stage approach (first reducing the number of coping variables, and then examining their relationship with other variables) were: (a) it was desired to examine the structure of coping per se; (b) it was desired to limit the size of models; (c) LISREL was not the optimum tool to use for the subsequent analyses, because of categorical data (Study 2 in this chapter), or lack of firm hypotheses (Chapter 3), or the presence of a large number of interactive terms (Chapter 4). Even within LISREL, there is much to be said for a two-stage approach, sorting out measurement models before studying structural relationships (Anderson & Gerbing, 1988; Jöreskog, 1993).

Discussion

The use of LISREL reported here was somewhat unorthodox. LISREL's strength lies in its confirmatory nature. This strength was exploited here in so much as the basic model was specified from theory and previous research. However, full use was then made of LISREL's exploratory capabilities, with all the attendant problems, especially that of capitalising on chance. The samples were analysed separately, and the solutions examined for common patterns. (Had Model A fitted any of the data sets well, it would have been appropriate to use LISREL's multi-sample analysis facility, but this was not the case). Certain coping strategies, which appeared as consistent indicators of the factors, were highlighted for future use. It was felt that this approach was justified, if, as Cox and Ferguson (1991) suggest, "any one coping function option or strategy may perform more than one function and may perform different functions for different individuals in the same situation, or different functions for the same individual over time" (p. 22). This implies that even if there is some stability at the latent variable level, there will be instability at the observed variable level. It makes sense then not to place too much weight on any one factor analytical solution, but to look for common patterns across solutions, and to try and identify observed variables which are consistent indicators of the latent variables.

Overall, the results are consistent with previous literature as reviewed by Cox and Ferguson (1991), supporting a four-dimensional model of coping: problem-focused coping, reappraisal, emotion-focused coping, and avoidance. (It should be noted, however, that Cox and Ferguson themselves go on to describe emotion-focused coping as having a special status as an overarching function of coping).

Study 2: Dimensionality of health behaviour, and relationships between health behaviours and coping strategies

Method

Subjects. The data set used here was that from HX. Some results from HY are also reported.

Measures. Subjects, on the same occasion that they completed the COPE questionnaire, also completed a number of health behaviour questions. The behaviours relevant to these analyses were exercising, drinking alcohol, sleeping, eating and smoking. These behaviours were selected as having demonstrated some longitudinal association with mortality (Hamburg, Elliot, & Parron, 1982; Berkman & Breslow, 1983).

Exercise was measured by a single item enquiring about the frequency of vigorous exercise on a 7-point scale ranging from *not at all* to *three or more times a week*; a definition of vigorous exercise was provided. Sleeping was measured by a single item, enquiring about hours of sleep per night, or day if night staff. Drinking alcohol was measured by two items. The first item enquired about frequency of drinking, on a 7-point scale ranging from *never* to *every day of the week*. The second item (for drinkers) enquired about number of units drunk in a typical seven day week including the weekend; a definition of a unit of alcohol was provided. Eating was measured by four items. One of these items enquired about frequency of adding sugar to hot drinks, on a 4-point scale ranging from *never* to *always*. Another enquired about type of milk usually drunk: whole, semi-skimmed, skimmed; or none at all (treated as missing data). Another enquired about frequency of adding salt to meals at table, on a 4-point scale ranging from *never* to *always*. Another enquired about type of bread eaten most often: white, wholemeal, other brown; or none at all (treated as missing data). Smoking was measured by a single item, enquiring about smoking status: daily, occasional, ex-daily, ex-occasional, never smoked. The exercise item was adopted from Gionet and Godin (1989). The remaining items were adapted from those used in population surveys, in particular the Welsh Heart Program (Nutbeam & Catford, 1987), and the Health and Lifestyle Survey (Blaxter, 1990). In answering the questions, subjects were asked to think about the past three months.

Subjects also, on the same occasion, completed the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975) Neuroticism and Lie scales.

Procedure. In the first instance, the health behaviours were not measured at the same level. Exercising was an ordinal variable. Drinking status was a nominal variable (drinker or non-drinker); and for drinkers amount drunk was a ratio variable. Sleeping was a ratio variable. Smoking status was a nominal variable, perhaps ordinal (current regular smoker, current occasional smoker or current non-smoker). Sugar consumption was an ordinal variable. Milk consumption was a nominal variable, or, as an indicator of fat consumption, an ordinal variable. Salt consumption was an ordinal variable. Bread consumption was a nominal variable, or, as an indicator of fibre consumption, an ordinal variable.

It was decided to dichotomise all the behaviours, the split to be at the point which best represented contemporary public health advice. The justification for doing this was that much public health advice is dichotomous in nature, even when the epidemiological dose-response relationship is not truly step-like. Such advice is often all that the public have available to them. Conformity to such advice can be seen as a (far from ideal) indicator of health-directed behaviour (as distinct from behaviour which happens to have health consequences but is not health-directed). Hence, although reducing data to a lower level is normally to be avoided, in this case it makes some sense to do so. There is also, of course, the danger of social desirability bias.

In the case of exercising the division might have been made between exercising vigorously two to three times a week versus not so doing. However, the response options for the Gionet and Godin (1989) item went from *two or three times a month* to *one to two times a week* to *three or more times a week.* It was decided to err on the side of moderation, since the drift of current public health advice is away from rigid prescriptions: "The public health message should be 'Doing some physical activity is better than doing none at all'" (Blair, Kohl, Gordon, & Paffenbarger, 1992). Therefore, the division was made between exercising less than once a week versus exercising at least once a week. In the case of drinking the division was made between 21 or fewer units of alcohol per week if male, or 14 or fewer units if female, versus more than this (Royal College of Psychiatrists, 1986). In the case of sleeping the categories were more than six but less than nine hours a night versus less than or more than this (Berkman & Breslow, 1983). In the case of smoking the categories were smoking at all currently versus not smoking at all currently. Sugar consumption was split into adding sugar never or occasionally versus adding it usually or always; milk consumption into drinking skimmed or semi-skimmed versus drinking whole milk (with not drinking milk at all coded as missing data); salt consumption into never or occasionally adding salt versus usually or always adding it; bread consumption into eating wholemeal or other brown bread versus white bread (with not eating bread at all coded as missing data).

The structure of the health behaviours was examined using latent class analysis, which permits the testing of models in which discrete latent variables underlie discrete observed variables, and can be seen as a categorical data analogue of factor analysis (McCutcheon, 1987). The rationale was that there might well be health behaviour types underlying the health behaviour data. In latent class analysis the input is the crosstabulation of the observed variables. The output includes: the number of latent classes; the latent class probabilities, that is to say, the probability of being a member of a particular latent class, or more simply the proportional size of the class; the conditional probabilities, that is to say the probability, given membership of a particular latent class, of appearing in a particular category of a particular observed variable (analogous to factor loadings); and a measure of fit.

The relationship between the health behaviours and the four key coping strategies identified in Study 1 (Active

Coping, Acceptance, Seeking Emotional Support, and Behavioral Disengagement) was examined using MANOVA (multivariate analysis of variance). Before so doing, several possible confounding variables were considered: sex; age; negative affectivity (Watson & Pennebaker, 1989), as indicated by the Eysenck Personality Questionnaire Neuroticism scale; and social desirability, as indicated by the Lie scale. SPSSPC+ 4.0 (Norusis, 1990a, 1990b, 1990c) was used for all these analyses.

Results

Latent class analysis was first applied to the eating items, on the hypothesis that there might be eating types, for example healthy eaters versus non-healthy eaters. The MLLSA (Maximum Likelihood Latent Structure Analysis) programme was used (Clogg, 1977; see also McCutcheon, 1987). MLLSA requires that the number of latent classes, and starting values for the latent class and conditional probabilities, are specified. It also permits restrictions on the final values of the latent class and conditional probabilities, but this facility was not used. The fit of the independence model was not good, $chi^2(15, N = 106) = 26.47$, $p < .05$*. The fit of a two-class model was good, $chi^2(6, N = 106) = 4.32$, $p > .50$. The fit of a three-class model was also good, $chi^2(2, N = 106) = 1.35$, $p > .50$. However, in the three-class solution, one of the final latent class probabilities was very small, 0.05, otherwise the solution was similar to the two-class solution. Furthermore, a model comprising four dichotomous observed variables and one trichotomous latent variable is a special case that in theory should not be identified (Goodman, 1974). The fact that in practice it was identified was presumably because one of the conditional probabilities happened to be estimated as being zero (see McCutcheon, 1987). Therefore, the two-class model was adopted. Table 6 shows the final latent class probabilities and conditional probabilities for the two-class

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*In this thesis, *p* values are rounded to two decimal places, and this rounded value is reported exactly, with the following exceptions: a rounded value of .00, whilst reported as such in the tables, is reported as < .01 in the text; in goodness of fit statistics, *p* may be reported as an inequality. All tests of significance are two-tailed.

Table 6

Latent Class Analysis Solution for Two Class Model Applied to Eating Items

		Latent class	
Variable	Category	1	2
		Conditional probabilities	
Sugar	Healthy	.87	.41
Sugar	Other	.13	.59
Milk	Healthy	.94	.39
Milk	Other	.06	.61
Salt	Healthy	.79	.53
Salt	Other	.21	.47
Bread	Healthy	.82	.43
Bread	Other	.18	.57
		Latent class probabilities	
		.59	.41

Note. Pearson $chi^2(6, N = 106) = 4.32$, $p > .50$. Percent correctly allocated to latent classes = 85.49. Lambda = .64.

model. The conditional probabilities suggest that the classes were healthy eaters (latent class probability .59) versus other, more mixed, eaters (latent class probability .40). Subjects were assigned to classes (by MLLSA on the basis of modal probabilities); the percentage that would be correctly allocated being 85%. In this way, a single dichotomous eating variable was constructed. The healthy eating group comprised those who behaved healthily on all four aspects of diet, plus those who behaved healthily except on sugar, plus those who behaved healthily except on salt, plus those who behaved healthily except on bread, plus those who behaved healthily except on both salt and bread. The other group comprised everyone else; this included those who behaved healthily except on milk.

This meant that there were now five dichotomous health behaviour variables: eating, exercising, drinking, sleeping, smoking. It was desired to apply latent class analysis to these behaviours, on the hypothesis that there might be healthy behaviour types. However, it was not possible to include all five behaviours; given the sample size, five dichotomous variables would have meant unacceptably low expected values in cross tabulations. It was therefore decided to include four variables only: eating, exercising, drinking, and smoking. Sleeping (amount of sleep) was omitted because it was considered to be the least like a behaviour, and because it is something on which public health advice is not so clear. The fit of a two-class model was good, $chi^2(6, N = 106) = 1.97, p > .90$. The fit of the independence model appeared adequate, $chi^2(15, N = 106) = 20.41, p > .10$. It was decided, nevertheless, to proceed with the two-class model. This was because the fact that N was modest would in itself deflate chi^2, making one stricter about what might constitute adequate fit. Furthermore, the two-class model made some sense and was parsimonious. Table 7 shows the final latent class probabilities and conditional probabilities for the two-class model. The conditional probabilities suggest that the classes were healthy behaviour (latent class probability .67) versus other, more mixed, behaviour (latent class probability

Table 7

Latent Class Analysis Solution for Two Class Model Applied to Health Behaviour Items

Variable	Category	Latent class 1	Latent class 2
		Conditional probabilities	
Diet	Healthy	.38	.74
Diet	Other	.62	.26
Exercise	Healthy	.46	.63
Exercise	Other	.54	.37
Alcohol	Healthy	.70	.99
Alcohol	Other	.30	.01
Smoking	Healthy	.26	.87
Smoking	Other	.74	.13
		Latent class probabilities	
		.33	.67

Note. Pearson $chi^2(6, N = 106) = 1.97$, $p > .90$. Percent correctly allocated to latent classes = 85.98. Lambda = .58.

.33). Subjects were assigned to classes; the percentage that would be correctly allocated being 86%. In this way a single dichotomous variable representing overall health behaviour was constructed. The healthy group comprised those who behaved healthily on all four aspects of lifestyle, plus those who behaved healthily except on smoking, plus those who behaved healthily except on eating, plus those who behaved healthily except on exercise, plus those who behaved healthily except on both eating and exercise. The other group comprised everyone else; this included those who behaved healthily except on drinking.

For the health behaviour variables, the frequencies were as follows: 62% were healthy eaters, 56% were high exercisers, 90% were safe drinkers, 75% were good sleepers, 66% were non-smokers, 71% were overall healthy behavers. It should perhaps be re-emphasised at this point that those who were classified as overall healthy behavers were not all healthy on all four behaviours.

The potential confounding variables were sex, age, negative affectivity (as measured by the EPQ Neuroticism scale) and social desirability (as measured by the EPQ Lie scale). The Lie scale was not significantly associated with the other confounding variables, nor with any of the health behaviours, nor with any of the coping strategies, and is not discussed further here.

The associations between the potential confounding variables were as follows. On age, women (M = 34.1, SD = 9.8) were significantly younger than men (mean age 39.6, SD = 10.1), $t(107) = -2.80$, $p < .01$. On Neuroticism, women (M = 12.2, SD = 5.3) were higher than men (mean 8.5, SD = 5.1), $t(107) = 3.55$, $p < .01$. Age and Neuroticism were not significantly correlated.

The associations between sex and health behaviours, and between sex and coping strategies, were examined. Sex was not significantly associated with overall health behaviour, $chi^2(1, N = 106) = .33$, $p = .57$. Nor was sex significantly associated with any of the individual health behaviours. [Drinking behaviour was, as noted, dichotomised around (sex-specific) safe drinking levels. When drinking behaviour was dichotomised into drinkers versus total abstainers, or dichotomised around the (whole sample) median amount drunk, it was still the case that sex was not significantly associated with drinking behaviour]. MANOVA indicated that sex was significantly associated with the coping strategies, approximate $F(4, 104) = 5.52$, $p < .01$. Follow-up discriminant function analysis highlighted Seeking Emotional Support, on which women ($M = 12.13$, $SD = 2.95$) were higher than men ($M = 9.55$, $SD = 2.81$): see Table 8.

The associations between age and health behaviours, and between age and coping strategies, were examined. Age was not significantly associated with overall health behaviour, $t(104) = -.97$, $p = .33$. Age was significantly associated with exercising: high exercisers ($M = 33.97$, $SD = 10.07$) were significantly younger than low exercisers ($M = 38.77$, $SD = 9.86$), $t(107) = 2.49$, $p < .01$. Age was not significantly associated with any other individual health behaviours. Age was not significantly correlated with any of the coping strategies.

The associations between Neuroticism and health behaviours, and between Neuroticism and coping strategies, were examined. Neuroticism was not significantly associated with overall health behaviour, $t(104) = -1.47$, $p = .14$. Neuroticism was significantly associated with sleeping: good sleepers ($M = 9.75$, $SD = 5.38$) were significantly lower on Neuroticism than poor sleepers ($M = 14.00$, $SD = 4.86$), $t(105) = 3.63$, $p < .01$. (Note that the Neuroticism scale actually includes an item on sleeplessness and an item on tiredness.) Neuroticism was not significantly associated with any other individual health behaviour. Neuroticism was significantly associated with Active Coping ($r = -.27$, $N = 104$, $p < 0.01$) and with Behavioral Disengagement ($r = .23$, $N = 104$, $p = .02$), but not with the other coping strategies.

The bivariate relationships between the individual health behaviours were examined. The only significant relationships were between smoking and eating, and smoking and drinking. 69% (49 out of 71) of non-smokers, and 49% (17 out of 35) of

Table 8

Multivariate Analysis Comparing Men and Women on Coping Dimensions for HX data

Dimension	*M* (*SD*) Men	*M* (*SD*) Women	Standardised structure coefficient
Active Coping	11.92 (1.93)	11.99 (2.19)	.03
Acceptance	11.57 (2.59)	11.71 (2.36)	.06
Seeking Emotional Support	9.55 (2.81)	12.13 (2.95)	.94
Behavioral Disengagement	6.57 (2.29)	6.74 (2.11)	.08

Note. N = 109 for whole sample, n = 40 for men, n = 69 for women. Wilks' lambda = .82, approximate $F(4, 104) = 5.52$, $p < .01$.

smokers, were healthy eaters, $chi^2(1, N = 106) = 4.17, p = .04$. 4% (3 out of 72) of non-smokers, and 22% (8 out of 37) of smokers, were unsafe drinkers, Fisher's exact test, $p < .01$.

Within the coping strategies, the only significant relationships were between Active Coping and Acceptance ($r = .26, N = 109, p < .01$), and Active Coping and Seeking Emotional Support ($r = -.33, N = 109, p < .01$).

Finally (the ultimate purpose of the study), MANOVA indicated that overall health behaviour was not significantly associated with the four key coping variables, approximate $F(4, 101) = .31, p = .87$. MANOVAs also indicated that each individual health behaviour was not significantly associated with these coping variables.

In the HY data set, that is to say the other data set, there were measures of age, sex, drinking status (drinker versus teetotaller) and smoking status (smoker versus non-smoker) as well as coping strategies. Sex was not significantly associated with drinking status, Fisher's exact test, $p = .18$; nor with smoking status, $chi^2(1, N = 253) = 1.90, p = .17$. MANOVA indicated that sex was significantly associated with the coping strategies, approximate $F(4, 248) = 6.55, p < .01$. Once again, Seeking Emotional Support was the prominent variable: see Table 9. MANOVA indicated that drinkers and non-drinkers did not differ significantly on the four key coping variables, approximate $F(4, 250) = 0.87, p = .48$. Similarly, smokers and non-smokers did not differ significantly on these coping variables, approximate $F(4, 250) = 1.09, p = .36$.

Discussion

It is of interest to know how the prevalences of health behaviours in this study compare with those in other surveys. The closest comparison is with the Heart Beat Wales surveys (Health Promotion Authority for Wales, 1992). In 1990 in Wales, among 18 to 64 year olds, the percentage reporting moderate or strenuous physical activity in their leisure time on 2 or more occasions per week was 33.8%. The percentage drinking above recommended limits was 20.0%. The percentage

Table 9

Multivariate Analysis Comparing Men and Women on Coping Dimensions for HY data

Dimension	M (SD) Men	M (SD) Women	Standardised structure coefficient
Active Coping	11.50 (2.18)	11.63 (2.40)	.07
Acceptance	12.00 (2.63)	11.59 (2.27)	-.22
Seeking Emotional Support	8.52 (2.84)	10.95 (3.33)	.94
Behavioral Disengagement	6.80 (2.19)	6.74 (2.32)	-.04

Note. N = 253 for whole sample, n = 52 for men, n = 201 for women. Wilks' lambda = .90, approximate $F(4, 248) = 6.55$, $p < .01$.

eating wholemeal bread most often was 35.9%; the percentage normally drinking skimmed or semi-skimmed milk in the home was 44.1%; the percent adding salt to their meals almost always before tasting was 33.8%. The percentage smoking at least occasionally was 31.7%. Thus the greatest discrepancies between the current study and Heart Beat Wales appear to be for physical activity and drinking. As regards physical activity, as previously noted, the criterion for healthy exercise in the current study was rather lenient. A better comparison is perhaps with the National Fitness Survey (Allied Dunbar National Fitness Survey, 1992) where the proportion performing at activity level 2 (up to 11 occasions of a mix of moderate or vigorous activity in the past four weeks) or above was 67% for men and 66% for women. As regards drinking, there is no readily apparent explanation for the apparently high prevalence of safe drinking in the current study, other than the general observation that the group was self-selected and occupationally fairly homogeneous.

Latent class analysis proved a suitable means for investigating the dimensionality of health behaviour. It must be emphasised again that this would only be appropriate where a categorical latent variable is hypothesised. In such situations, it appears more efficient than the approach adopted by Blaxter (1990) to handling similar data; she did not look for latent variables, rather she created various groupings based on the observed variables (e.g., all four health behaviours "good", all four health behaviours "bad", all behaviours good except for poor diet, etc.).

The absence of any significant sex differences on the health behaviours is contrary to much other research in which the general pattern has been that men report more health damaging and less health promoting behaviour, with the exception of physical activity (Dean, 1989; Reddy, Fleming, & Adesso, 1992). However, in a survey of British students, Wardle and Steptoe (1991) found that whilst women reported healthier behaviour in terms of diet, and men reported healthier behaviour in terms of exercise, there were no significant differences on drinking or smoking variables.

Certainly, there is increasing evidence in anglophone cultures for similarity between the sexes for smoking (Blaxter, 1990; Cox, Huppert, & Whichelow, 1993; Gregory, Foster, Tyler, & Wiseman, 1990; Health Promotion Authority for Wales, 1992; Lader & Matheson, 1991; Smyth & Browne, 1992; Uitenbroek & McQueen, 1993; Waldron, 1991; White, Nicolaas, Foster, Browne, & Carey, 1993). The same cannot be said for drinking, although there are some tentative suggestions of convergence (e.g., Mercer & Khavari, 1990). Again, it is worth noting the occupational homogeneity of the sample. Many of the subjects in this study were nurses, who, given their professional status and possible exemplar role, may be a study population in their own right (e.g., Adriaanse, van Reek, Zandbelt, & Evers, 1991). More specifically, the nurses in this sample were psychiatric nurses. It has been reported that psychiatric nurses as a professional group may be more prone to drinking and smoking than general nurses (e.g., Plant, Plant, & Foster, 1991). It has to be said that in the current study, the evidence pointed to levels being comparable with the general population.

Sex differences on coping strategies were found in this study in two separate, albeit similar, samples. Previous literature on differences in coping strategies, including the specific issue as to whether men and women differ on problem- versus emotion-focused coping has been inconsistent (Baum & Grunberg, 1991, Jenkins, 1991, Ratliff-Crain & Baum, 1990); no doubt some of this is due to different measuring instruments and populations.

Given that much (though not all) of this study reports the absence of significant associations, the question must be asked as to whether the analyses were powerful enough. J. Cohen (1992) indicates that for alpha at .05 and power at .80: chi^2 with one degree of freedom would necessitate a sample size of 26 for a large effect size, 87 for a medium effect size, and 785 for a small effect size; product moment correlation would necessitate a sample size of 28 for a large effect size, 85 for a medium effect size, and 783 for a small effect size; *t* test would necessitate a sample size of 26 per group for a large effect size, 64 for a medium effect size, and 393 for a small effect size. Thus, at least in the case of the simpler analyses, the sample sizes were adequate for medium effect sizes.

Conclusion

The evidence for a four dimensional model of coping, whilst of interest, is mainly confirmatory, helping to consolidate previous research in this area. The evidence, less strong, for a typology of health behaviours is more challenging, and merits further research on larger databases, of the kind already mentioned in this chapter (Blaxter, 1990; Nutbeam & Catford, 1987; Wardle & Steptoe, 1991; White et al., 1993).

There was no evidence from this research that individuals with different routine health behaviours differed in their coping strategies. Thus, how one behaves in terms of one's routine health behaviours says little about how one will behave in terms of coping strategies.

Ultimately, this research relates to the perennial question as to whether one way of coping is any better than another. This is usually addressed by asking whether one way of coping is any more adaptive than another as judged by their effect on well-being. The evidence to date on this is equivocal (Conway & Terry, 1992; Forsythe & Compas, 1987; Roth & Cohen, 1986; Suls & Fletcher, 1985; Vitaliano, Dewolfe, Maiuro, Russo, & Katon, 1990); see also Chapters 3 and 4. However, one way of coping could be better or worse than another if it were somehow inextricably linked with behaviour that is health promoting or health damaging in its own right. The evidence herewith does not support such a link, at least for routine health behaviours. Hence, one need not be concerned about the (theoretical) possibility of double jeopardy, that is to say the individual suffering twice because some health damaging behaviour is inextricably linked with some maladaptive coping strategy. Equally, one cannot be encouraged by the (theoretical) possibility of double benefit, that is to say some health promoting behaviour being inextricably linked with some adaptive coping strategy. Nor can one be reassured by the (theoretical) possibility of compensation, that is to say some health damaging behaviour being inextricably linked with some adaptive coping strategy, or some maladaptive coping strategy with some health promoting behaviour. The lack of evidence for a simple association between routine health behaviours and coping strategies counts against all these theoretical possibilities.

The possibility remains that coping strategies and health behaviours are related in other ways, as outlined in the introduction to this chapter. In particular, it seems worth pursuing the possibility that individuals use health behaviours as ways of coping. In executing the research reported here, it became apparent that currently available coping inventories do not systematically incorporate health behaviours as ways of coping. (For example, Carver et al., 1989, have an Alcohol and Drug Use scale that includes smoking, and a single sleep item as an indicator of Mental Disengagement, but nothing for example on exercising or eating.) This, then, became a line of further investigation (Chapter 3).

CHAPTER 3

HEALTH BEHAVIOURS AS COPING STRATEGIES: AN EMPIRICAL EXPLORATION*

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Abstract

The use of health behaviours as ways of coping is not well documented. The objectives of the current study were to: establish whether subjects do acknowledge using health behaviours as ways of coping; explore the dimensions of such health behaviours; and examine the relationship between these dimensions and other, more documented, ways of coping.

Items reflecting the use of health behaviours as ways of coping were devised and piloted. These were intermingled with the COPE inventory (Carver, Scheier, & Weintraub, 1989), and administered to health workers. Analyses were conducted separately for the whole sample (N = 255), for drinkers who were non-smokers, and for drinkers who were smokers. In each set of analyses, health behaviour items that were highly skewed were eliminated. The remaining health behaviour items were factor analysed. The saved factor scores were used as dependent variables in regression analyses, the independent variables being four COPE scales which confirmatory factor analyses had suggested were good indicators of problem-focused coping, reappraisal, emotion-focused coping, and avoidance.

For the whole sample, four health behaviour factors, accounting for 52.4% of the variance, were extracted, and labelled Relaxation, Exercising, Eating and Self-Care. The four COPE scales together explained 9% of the variance in Relaxation, 4% of the variance in Exercising, 11% of Eating, and 9% of Self-Care. These results, taken with those from the subsamples, suggest that individuals acknowledge using some health behaviours as ways of coping, but that, generally, the use of such behaviours is only weakly predicted by other, more documented, coping strategies. However, there was a specific finding that avoidance coping was a modestly good predictor of the use of negative health behaviours: eating more than usual (and, perhaps related to this, weight-watching), and smoking. Problem-focused coping was a predictor, albeit weak, of the use of relaxation (in the active sense) and self-care.

The results are discussed in terms of the perennial question of whether one way of coping can be said to be better than another.

Introduction

Cox and Ferguson (1991) and Parker and Endler (1992) review the measurement and dimensionality of coping. See also F. Cohen (1987), Costa and McCrae (1989), Edwards (1988), Latack and Havlovic (1992), Stone, Helder, and Schneider (1988). This literature is by no means consistent regarding the number and nature of coping strategies. It is perhaps more consistent when the diverse coping strategies are reduced to a smaller number of what are often called coping functions (i.e., what is achieved by the coping strategies). According to Cox and Ferguson (1991), in addition to the conventional dichotomy of problem- and emotion-focused coping, two other dimensions might be considered, one concerned with reappraisal and the other with avoidance. Parker and Endler (1992) settle for three basic dimensions: emotion-focused, problem-focused and avoidance.

The idea that health behaviours are used as ways of coping with stressful situations appears frequently in the literature. (Note that health behaviour is taken to be any behaviour having health consequences, not the more specific, goal-directed, behaviour described by Kasl and Cobb, 1966). For example, Roskies (1991) discusses both smoking and exercise as coping behaviours. Wills (1990) reviews the literature on stress and substance abuse, and suggests two possible models: substance abuse could serve to regulate affect in stressful situations; or substance abuse could appear when there is a breakdown of self-control in stressful situations. In other words, substance abuse could be a coping strategy, or substance abuse could be a by-product of the failure of other coping strategies. Long (1993) discusses how exercise could fit into the Lazarus and Folkman (1984) model, as an emotion-focused coping response, or as a preventive coping resource influencing primary and secondary appraisal.

Currently available coping inventories include some items representing health behaviours as ways of coping. For example, the Ways of Coping Questionnaire (Folkman & Lazarus, 1988; see also Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986) includes *I slept more than usual* (measuring

Escape-Avoidance), *I tried to make myself feel better by eating, drinking, smoking, using drugs, or medications, etc.* (measuring Escape-Avoidance), and *I jogged or exercised* (scale not reported). Amirkhan (1990) includes *Slept more than usual?* (measuring Avoidance). Endler and Parker (1990) include *Try to go to sleep, Treat myself to a favorite food or snack, Go out for a snack or meal*, and *Go for a walk* (all as measures of Avoidance-Oriented Coping). Carver et al. (1989) have an Alcohol and Drug Use (including smoking) scale, and a single item *I sleep more than usual* (as an indicator of Mental Disengagement). However, none of these authors have systematically assessed health behaviours as ways of coping. Furthermore, there seems to be a bias towards negative (likely to be detrimental to health) rather than positive (likely to be conducive towards health) health behaviours, and a predilection to view the behaviours as serving an avoidance function.

The objectives of the current study were to: establish whether subjects do acknowledge using health behaviours (positive and negative) as ways of coping; explore the dimensions of such health behaviours; and examine the relationship between these dimensions and other, more documented, ways of coping. The aim was not to develop a new questionnaire as such, although that could be a next step.

Method

Subjects

Subjects were from the staff (excluding doctors) of a large British acute hospital. All staff (approximately 1300) were sent a questionnaire, and 268 replied. Usable data was obtained from 255 subjects, of whom 201 were female, 52 male and 2 of unknown sex. The mean age was 33.9 (*SD* = 9.9) years. Ages ranged from 19 to 60 years, median 33.0 years.

Measures

Items referring to the use of health behaviours as ways of coping with stressful situations were generated. The behaviours covered were relaxation, eating, weight control, preventive medicine, exercise, safety, sleep, legal drug use, use of caffeine, alcohol use, and smoking. Thus both positive and negative behaviours were included. In addition, as far as possible, items were included for the performance and the non-performance of behaviours. For example both *I am especially careful to watch my weight* and *I deliberately give up any attempt to control my weight* were included.

The items were piloted on 4 experts and 28 lay people, who were asked to criticise the items (on the grounds of duplication, ambiguity, irrelevance, absurdity, or offensiveness), and to suggest other possible items. The researchers also considered the items from the point of view of four hypothetical individuals: a careful individual who remains careful under stress, a reckless individual who remains reckless under stress, a careful individual who becomes reckless under stress, and a reckless individual who becomes careful under stress. Items were eliminated, amended, or added accordingly, leaving a total of 35 items, as listed in Appendix C.

These 35 health behaviour items were added to the Carver et al. (1989) COPE items. The COPE Alcohol and Drug Use items were omitted on the grounds that scores on this scale had been highly skewed in a similar sample (see Chapter 2). Instead, alcohol and smoking items were included amongst the new health behaviour items.

The health behaviour items and the COPE items were intermingled, except that there was a distinct section for the alcohol items and a distinct section for the smoking items, with instructions that complete non-smokers should skip the smoking section, and complete abstainers should skip the alcohol section. The rationale for this was as follows. A non-drinker would respond to a question such as *I drink alcohol to help me cope* by indicating that they do not do this. However, the same non-drinker could respond to a question such as *I take special care not to drink too much alcohol* either by indicating that they do this (because they never drink) or that they do not do this (because there is no need for them to be careful since they never drink). In other words any question about monitoring or moderating drinking would be ambiguous to a non-drinker. The same problem would arise if non-smokers were to be asked about monitoring or moderating smoking. Anyone who did not complete the drinking section was coded as a non-drinker; anyone who did not complete the smoking section was coded as a non-smoker. The questionnaire also asked about age and sex. Otherwise, the questionnaires were anonymous.

The questionnaire instructions were taken from Carver et al. (1989), as were the response options (*I usually don't do this at all, I usually do this a little bit, I usually do this a medium amount, I usually do this a lot*). A covering letter explained that the project was "looking at the different ways people cope with stressful events in their lives", that participation was voluntary and confidential, and that this was a University (not a management) project. The questionnaire was included with wage slips and was to be returned to the mail room for collection by the researchers.

The intention was, as far as possible, without labouring the point, to place the emphasis on health behaviours as ways of coping (what one does to cope). One possible misinterpretation would be if the items were read as enquiring about health behaviours per se (what one does habitually). Another possible misinterpretation would be if the items were read as enquiring about the consequences of stressful situations (what one does when one fails to cope). However, it was felt that these possible misinterpretations were minimised by the covering letter, by the questionnaire instructions, by the context provided by the COPE items, by the use in many items of words that imply change or intentionality (e.g., *special effort, careful to, deliberately*), and by the specific use in some items of the word *cope* or *coping*.

Procedure

Using the COPE items, scores were computed for Active Coping, Acceptance, Seeking Social Support for Emotional Reasons (known hereafter as Seeking Emotional Support), and Behavioral Disengagement. Confirmatory factor analysis had suggested (see Chapter 2) that these four scales were good indicators of the four basic coping dimensions discussed by

Cox and Ferguson (1991). Specifically, Active Coping was taken to be an indicator of problem-focused coping, Acceptance an indicator of reappraisal, Seeking Emotional Support an indicator of emotion-focused coping, and Behavioral Disengagement an indicator of avoidance.

The new health behaviour items were examined for skewness. Items with skewness of 1.0 or greater (a fairly conservative criterion) were rejected. The rationale for this was two-fold. First, the fact that these variables were positively skewed meant that large proportions of subjects were not acknowledging them as ways of coping. Second, including skewed variables would mean that the data could not be multivariate normal. The factor structure of the health behaviours was examined using exploratory factor analysis (Maximum Likelihood extraction with oblique rotation), and factor scores were saved. Confirmatory factor analysis was not used because strong hypotheses from previous literature were not available.

Age differences on coping dimensions were explored using correlations. Sex differences on coping dimensions were examined using MANOVA. The relationship between the health behaviour factor scores and the COPE scale scores was examined using correlations and regression analysis. Listwise deletion for missing data was used throughout this study.

The above analyses were conducted, separately: for all subjects omitting the drinking and smoking items; for drinkers who were non-smokers, omitting the smoking items; and for drinkers who were smokers, using all items. There were only a small number (26) of non-drinkers, so analyses for non-drinkers who were non-smokers and non-drinkers who were smokers were not conducted.

The possibility of substituting a score of *do not do this at all* for all non-drinkers on all drinking items, and all non-smokers on all smoking items, was considered. In this way it would have been possible to conduct an analysis of all subjects on all items. However, to make such substitutions would have resulted in some highly skewed items (there being a lot of non-smokers). More importantly, to make such a substitution might have been appropriate in the case of the items referring to drinking or smoking as a way of coping. But to make such a substitution would have been entirely inappropriate in the case of the items referring to monitoring or moderating drinking or smoking as a way of coping, since on these items a non-drinker or non-smoker would have ended up with the same score as a drinker or smoker who made no attempt to monitor or moderate their behaviour. Therefore, this possibility was not pursued.

Results

Age, Sex, Drinking Status, and Smoking Status

The sexes did not differ in mean age, $t(249) = 1.47$, $p = 0.14$. There was a significant association between drinking status and smoking status, $\chi^2(1, N = 255) = 5.64$, $p = 0.02$. Of non-smokers 87% (150/173) were drinkers, whereas of smokers 96% (79/82) were drinkers.

There was no significant association between smoking status and sex, $\chi^2(1) = 1.90$, $p = 0.17$. Nor was there a significant association between drinking status and sex, Fisher's exact test, $p = 0.18$. There was no significant difference in the mean ages of non-drinkers ($M = 33.70$, $SD = 10.16$) and drinkers ($M = 33.93$, $SD = 9.87$), $t(249) = -0.11$, $p = 0.91$. However the mean age of smokers ($M = 32.78$, $SD = 9.64$) was significantly lower than that of non-smokers ($M = 36.23$, $SD = 10.02$), $t(249) = -2.63$, $p = 0.01$.

Analyses for Whole Sample

By the skewness criterion, the items referring to treatment-like behaviour (getting health checked, taking extra vitamins, taking tranquillising drugs, using specific stress management techniques, using alternative medicine) were rejected. Items relating to eating unhealthy food (junk food, food not really good for me) were rejected, although items relating to eating more food (a lot of snacks, more than normally) were retained. Items relating to change in amount of exercise (increase, decrease) were rejected, although items relating to maintenance of exercise (take time to exercise, do some specific physical activity, keep physically fit) were retained.

Exploratory factor analysis, using Maximum Likelihood estimation and oblique rotation, gave a three factor solution, but the fit was not good, $chi^2(52) = 84.91$, $p < 0.01$. Therefore, a four factor solution was specified. This gave a fit that was acceptable given the exploratory nature of the study, $chi^2(41) = 57.77$, $p = 0.04$. The four factors accounted for a total of 52.4% of the variance. The items, the factor pattern matrix and factor correlation matrix are shown in Table 10. Factor 1, having only one high loading item, referring to doing refreshing, calming or relaxing things, was labelled Relaxation. Factor 2, having high loadings for the items relating to exercise maintenance and the item relating to leisure, was labelled Exercising. Factor 3, having high loadings for the items relating to eating more, was labelled Eating. Factor 4, having high loadings for several items, was labelled Self-Care. Notably, Exercise and Self-Care correlated .47.

Of the coping dimensions (the four COPE scales and the four saved factor scores), those that correlated significantly with age were Active Coping ($r = 0.14$, $p = 0.03$), and Acceptance ($r = 0.15$, $p = 0.01$). These correlations can only be described as low. MANOVA did indicate a significant sex difference on the coping dimensions, approximate $F(8, 243) = 4.65$, $p < 0.01$. Follow-up discriminant function analysis suggested that salient variables were Seeking Emotional Support (on which females were higher) and to a lesser extent Eating (females higher). See Table 11.

MANOVA indicated no significant difference between non-drinkers and drinkers on the coping dimensions, approximate $F(8, 245) = 1.30$, $p = 0.25$, nor between non-smokers and smokers, approximate $F(8, 245) = 1.32$, $p = 0.23$.

Correlations between the coping dimensions are shown in Table 12. Correlations between COPE scales and saved factor scores were significant at the .01 level for Active Coping with Relaxation ($r = .28$), Active Coping with Self-Care ($r = .25$), Seeking Social Support with Self-Care ($r = .18$), and Behavioral Disengagement with Eating ($r = .29$).

Table 10

Exploratory Factor Analysis of Health Behaviour Items for Whole Sample

Variable[a]	Factor 1	2	3	4
	Item-factor loadings			
1. Take time to exercise	-.05	.96	.01	-.11
2. Eat regular meals	-.07	.10	-.03	.62
3. Watch weight	-.12	.21	.10	.38
4. Drink a lot of caffeine	.08	.00	.34	.00
6. Keep up leisure activities	.14	.51	-.11	.12
7. Look after self	.09	.08	-.08	.65
9. Eat a lot of snacks	-.05	-.02	.84	-.02
10. Careful to avoid accidents	.06	-.08	.06	.54
13. Eat more than normally	-.07	-.03	.73	.03
15. Get regular sleep	.03	-.12	-.05	.69
16. Do some specific physical activity	.07	.81	.02	-.01
17. Eat healthily	.10	.22	.07	.53
19. Do things refreshing, calming or relaxing	.93	.13	.06	.07
20. Keep physically fit	.08	.65	-.06	.22
	Factor-factor correlations			
Factor 1 (labelled Relaxation)	-			
Factor 2 (labelled Exercise)	.27	-		
Factor 3 (labelled Eating)	.02	-.06	-	
Factor 4 (labelled Self-Care)	.30	.47	.09	-

Note. N = 254. Goodness of fit $\chi^2(41) = 57.77$, $p = .04$. Total variance explained 52.4%.

[a]See Appendix for verbatim items.

Table 11

Multivariate Analyses Comparing Men and Women on Coping Dimensions for Whole Sample

Dimension	M (SD) Men	M (SD) Women	Standardised structure coefficient
Active Coping	11.50 (2.18)	11.63 (2.41)	.06
Acceptance	12.00 (2.63)	11.58 (2.28)	-.18
Seeking Emotional Support	8.52 (2.84)	10.97 (3.32)	.79
Behavioral Disengagement	6.80 (2.19)	6.74 (2.32)	-.03
Relaxation	0.09 (1.01)	-0.01 (0.99)	-.11
Exercise	0.17 (0.97)	-0.04 (0.95)	-.23
Eating	-0.33 (0.78)	0.09 (0.90)	.50
Self-Care	0.02 (1.06)	-0.01 (0.86)	-.04

Note. N = 252, of which men 52, women 200. Wilks' lambda = .87, approximate $F(8, 243) = 4.65$, $p < .01$.

Table 12

Correlations between Coping Dimensions for Whole Sample

Dimension	1	2	3	4	5	6	7
1. Active Coping	-						
2. Acceptance	.25**	-					
3. Seeking Emotional Support	.24**	.09	-				
4. Behavioral Disengagement	-.23**	.02	.01	-			
5. Relaxation	.28**	.16*	.07	-.11	-		
6. Exercise	.15*	-.01	.05	-.15*	.29**	-	
7. Eating	-.11	.00	.15*	.29**	.04	-.07	-
8. Self-Care	.25**	.11	.18**	.01	.36**	.54**	.10

Note. *N* = 254.

* $p < .05$. ** $p < .01$.

Regression analyses are shown in Table 13. In each regression analysis, one of the health behaviour factor scores was the dependent variable, and the four COPE scales were the independent variables. The effect of removing variables from the full equation was examined, removing the COPE scales individually, and removing the four COPE scales jointly. The direction of a relationship was determined from the sign of the standardised regression coefficient in the full equation. The significance level was set at .05 (whilst acknowledging that multiple tests were being conducted). For Relaxation as the dependent variable, the four COPE scales together explained 9% of the variance; Active Coping uniquely explained 5%, the association being positive. For Exercising, the COPE scales together explained 4% of the variance. For Eating, the COPE scales together explained 11% of the variance; Seeking Emotional Support uniquely explained 3%, the association being positive; and Behavioral Disengagement uniquely explained 6%, the association being positive. For Self-Care, the COPE scales together explained 9% of the variance; Active Coping uniquely explained 4%, the association being positive.

Since MANOVA had indicated that women were higher than men on both Seeking Emotional Support and Eating, it was thought necessary to repeat the regression analysis for Eating, including sex as an independent variable. Hence, for Eating, sex plus the COPE variables together explained 14% of the variance; sex uniquely explained 2% of the variance, the association (femaleness with Eating) being positive; the four COPE variables together uniquely explained 10%; Seeking Emotional Support did not uniquely explain a significant percentage of the variance; Behavioral Disengagement uniquely explained 6% of the variance, the association being positive. Thus, with sex in the equation, Seeking Emotional Support was not significantly associated with Eating.

Analyses for Drinkers who were Non-Smokers

This analysis was limited to those who completed the drinking section but skipped the smoking section. The skewness criterion was again applied. The items retained were the same as those retained in the previously described whole-

Table 13

Regression Analyses of Coping Dimensions for Whole Sample

Equation[a]	δR^2 [b]	F	df[c]	p(F)	β[d]	t	p(t)
Relaxation/							
+ All variables below	.09	6.30	4	.00			
- Active Coping	.05	14.03	1	.00	.25	3.75	.00
- Acceptance	.01	2.54	1	.11	.10	1.59	.11
- Seeking Emotional Support	.00	0.00	1	.97	-.00	-0.03	.97
- Behavioral Disengagement	.00	0.62	1	.43	-.05	-0.79	.43
Exercise/							
+ All variables below	.04	2.54	4	.04			
- Active Coping	.01	3.75	1	.05	.13	1.94	.05
- Acceptance	.00	0.39	1	.53	-.04	-0.63	.53
- Seeking Emotional Support	.00	0.11	1	.74	.02	0.33	.74
- Behavioral Disengagement	.01	3.35	1	.07	-.12	-1.83	.07
Eating/							
+ All variables below	.11	7.83	4	.00			
- Active Coping	.01	1.98	1	.16	.09	-1.41	.16
- Acceptance	.00	0.01	1	.93	.01	0.09	.93
- Seeking Emotional Support	.03	7.75	1	.01	.17	2.78	.01
- Behavioral Disengagement	.06	18.07	1	.00	.26	4.25	.00
Self-Care/							
+ All variables below	.09	5.79	4	.00			
- Active Coping	.04	12.03	1	.00	.23	3.47	.00
- Acceptance	.00	0.43	1	.51	.04	0.65	.51
- Seeking Emotional Support	.01	3.59	1	.06	.12	1.89	.06
- Behavioral Disengagement	.00	1.12	1	.29	.07	1.06	.29

[a]The dependent variable precedes the slash. The plus sign indicates entry of variables. The minus sign signifies removal of the variable from the equation containing all variables. [b]Stepwise change in R^2. [c]Total df = 253. [d]Standardised regression coefficient in the equation containing all variables.

sample analysis, with the addition of three items, relating to increase in amount of exercise, not drinking too much caffeine, and not drinking too much alcohol. Note that the other alcohol items, relating to keeping off alcohol, drinking to cope, getting drunk, and drinking more than normally, were not retained. Factor analysis gave a four-factor solution, but the fit was not good, $chi^2(74) = 105.92$, $p = 0.01$. Therefore a five factor solution was specified, giving an acceptable fit, $chi^2(61) = 76.06$, $p = 0.09$. These five factors accounted for a total of 58.9% of the variance. The factor pattern matrix and factor correlation matrix are shown in Table 14. Factor 1, having one high loading item, was labelled Weight-Watching. Factor 2, having one high loading item, was labelled Caffeine-Watching. Factor 3, having high loadings for the items relating to exercise, fitness and leisure, was labelled Exercise. Factor 4, having high loadings for the items relating to eating, was labelled Eating. Factor 5, having high loadings for several items, including not drinking too much alcohol, was labelled Self-Care. Notably, Exercise and Self-Care correlated .37.

Of the coping dimensions (the four COPE scales and the five saved factor scores), the only one that correlated significantly with age was Acceptance, $r = .23$, $p < 0.01$. MANOVA indicated a significant sex difference on the coping dimensions, approximate $F(9, 137) = 2.91$, $p < .01$. Follow-up discriminant function analysis suggested that salient variables were Seeking Emotional Support (on which females were higher), and to a lesser extent Acceptance (males higher), Exercising (males higher) and Eating (females higher). See Table 15.

Correlations between coping dimensions are shown in Table 16. Correlations between COPE scales and saved factor scores were significant at the .01 level for Active Coping with Self-Care (.28), Seeking Emotional Support with Self-Care (.25), and Behavioral Disengagement with Eating (.35). Regression analyses are shown in Table 17. For Weight-Watching as the dependent variable, the COPE scales together explained 14% of the variance; Acceptance uniquely explained 3%, the

Table 14

Exploratory Factor Analysis of Health Behaviour Items for Drinkers who Were Non-Smokers

Variable[a]	1	2	3	4	5
	Factor				
	Item-factor loadings				
1. Take time to exercise	.01	-.06	.93	-.07	-.11
2. Eat regular meals	.09	.11	.15	-.03	.45
3. Watch weight	1.00	.03	-.02	.02	-.01
4. Drink a lot of caffeine	.04	-.29	.05	.44	.17
6. Keep up leisure activities	-.01	-.09	.64	-.03	.17
7. Look after self	.14	-.14	.07	-.06	.74
8. Increase amount of exercise	.09	.04	.80	.06	-.12
9. Eat a lot of snacks	-.07	.05	-.05	.90	-.04
10. Careful to avoid accidents	.14	.11	-.01	.07	.55
12. Not drink too much caffeine	.07	.85	.06	.05	.28
13. Eat more than normally	.07	.09	-.03	.75	-.09
15. Get regular sleep	-.06	-.02	-.09	.00	.73
16. Do some specific physical activity	-.10	.14	.89	.03	-.01
17. Eat healthily	.05	.15	.35	.11	.42
19. Do things refreshing, calming or relaxing	-.08	-.10	.32	.06	.47
20. Keep physically fit	.16	-.06	.68	-.13	.13
31. Not drink too much alcohol	-.07	.15	-.07	-.03	.48
	Factor-factor correlations				
Factor 1 (labelled Weight-Watching)	-				
Factor 2 (labelled Caffeine-Watching)	.03	-			
Factor 3 (labelled Exercise)	.28	-.04	-		
Factor 4 (labelled Eating)	.17	-.07	-.01	-	
Factor 5 (labelled Self-Care)	.17	.20	.37	.12	-

Note. N = 147. Goodness of fit $chi^2(61) = 76.06$, p = .09. Total variance explained 58.9%.

[a]See Appendix for verbatim items.

Table 15

Multivariate Analyses Comparing Men and Women on Coping Dimensions for Drinkers who Were Non-Smokers

Dimension	*M* (*SD*) Men	Women	Standardised structure coefficient
Active Coping	11.55 (2.05)	11.67 (2.38)	0.05
Acceptance	12.52 (2.20)	11.78 (2.26)	-0.30
Seeking Emotional Support	8.48 (3.10)	11.04 (3.43)	0.70
Behavioral Disengagement	6.65 (2.29)	6.58 (2.35)	-0.03
Weight-watching	-0.02 (0.98)	0.00 (1.01)	0.02
Caffeine-watching	-0.07 (0.77)	0.02 (0.99)	0.09
Exercise	0.28 (1.01)	-0.07 (0.94)	-0.34
Eating	-0.36 (0.86)	0.09 (0.92)	0.45
Self-Care	0.00 (1.05)	0.00 (0.88)	-0.00

Note. N = 147, of which men 29, women 118. Wilks' lambda = .84, approximate $F(9, 137) = 2.91$, $p < .01$.

Table 16

Correlations between Coping Dimensions for Drinkers who Were Non-Smokers

Dimension	1	2	3	4	5	6	7	8
1. Active Coping	-							
2. Acceptance	.31**	-						
3. Seeking Emotional Support	.34**	.10	-					
4. Behavioral Disengagement	-.18*	.00	-.02	-				
5. Weight-watching	-.05	-.15	-.04	.33**	-			
6. Caffeine-watching	.12	-.02	-.00	.13	.04	-		
7. Exercise	.16	.00	.06	-.02	.29**	-.04	-	
8. Eating	-.07	-.04	.21*	.35**	.19*	-.06	-.01	-
9. Self-Care	.28**	.15	.25**	.11	.19*	.27**	.41**	.13

Note. N = 147.

*p < .05. **p < .01.

Table 17

Regression Analyses of Coping Dimensions for Drinkers who Were Non-Smokers

Equation[a]	δR^2 [b]	F	df[c]	$p(F)$	β[d]	t	$p(t)$
Weight-Watching/							
+ All variables below	.14	5.64	4	.00			
- Active Coping	.00	0.76	1	.39	.08	0.87	.39
- Acceptance	.03	4.40	1	.04	-.17	-2.10	.04
- Seeking Emotional Support	.00	0.18	1	.67	-.04	-0.43	.67
- Behavioral Disengagement	.11	18.70	1	.00	.34	4.32	.00
Caffeine-Watching/							
+ All variables below	.05	1.79	4	.13			
- Active Coping	.03	4.53	1	.04	.20	2.13	.04
- Acceptance	.00	0.72	1	.40	-.07	-0.85	.40
- Seeking Emotional Support	.00	0.42	1	.52	-.06	-0.65	.52
- Behavioral Disengagement	.03	3.99	1	.05	.17	2.00	.05
Exercise/							
+ All variables below	.03	0.97	4	.43			
- Active Coping	.02	3.29	1	.07	.17	1.81	.07
- Acceptance	.00	0.32	1	.57	-.05	-0.57	.57
- Seeking Emotional Support	.00	0.01	1	.91	.01	0.11	.91
- Behavioral Disengagement	.00	0.04	1	.85	.02	0.19	.85
Eating/							
+ All variables below	.18	7.80	4	.00			
- Active Coping	.00	0.75	1	.39	-.07	-0.87	.39
- Acceptance	.00	0.28	1	.60	-.04	-0.53	.60
- Seeking Emotional Support	.05	9.13	1	.00	.24	3.02	.00
- Behavioral Disengagement	.12	19.98	1	.00	.35	4.47	.00
Self-Care/							
+ All variables below	.13	5.49	4	.00			
- Active Coping	.04	7.04	1	.01	.23	2.65	.01
- Acceptance	.00	0.55	1	.46	.06	0.74	.46
- Seeking Emotional Support	.03	4.10	1	.04	.17	2.02	.04
- Behavioral Disengagement	.02	3.67	1	.06	.15	1.92	.06

(table continues)

[a]The dependent variable precedes the slash. The plus sign indicates entry of variables. The minus sign signifies removal of the variable from the equation containing all variables. [b]Stepwise change in R^2. [c]Total df = 146. [d]Standardised regression coefficient in the equation containing all variables.

association being negative; Behavioral Disengagement uniquely explained 11%, the association being positive. For Caffeine-watching, the COPE scales together explained 5% of the variance; Active Coping uniquely explained 3%, the association being positive. For Exercise, the COPE scales together did not explain a significant percentage of the variance. For Eating, the COPE scales together explained 18% of variance; Seeking Emotional Support uniquely explained 5%, the association being positive; Behavioral Disengagement uniquely explained 12%, the association being positive. For Self-Care, the COPE scales together explained 13% of the variance, Active Coping uniquely explained 4%, the association being positive; Seeking Emotional Support uniquely explained 3%, the association being positive.

Since MANOVA had indicated that women were higher than men on both Seeking Emotional Support and Eating, it was again thought worthwhile to repeat the regression analysis for Eating, including sex as an independent variable. Hence, for Eating, sex plus the COPE variables together explained 20% of the variance; the four COPE variables together uniquely explained 16%; Seeking Emotional Support uniquely explained 3%; Behavioral Disengagement uniquely explained 12%; but sex did not uniquely explain a significant percentage of the variance. It thus appears that with sex in the equation, Seeking Emotional Support was still significantly (albeit weakly) associated with Eating.

Analyses for Drinkers who were Smokers

This analysis was limited to those who completed the drinking section and the smoking section. The skewness criterion was again applied. The items retained were the same as those retained in the previously described whole-sample analysis, with the addition of the item relating to using specific stress management techniques, the item relating to not drinking too much alcohol, the items relating to smoking (smoke, smoke more, give up attempt to control smoking), but not the item relating to smoking restraint.

Factor analysis gave a six-factor solution, with an acceptable fit, $chi^2(72) = 63.5$, $p = 0.75$. The factors accounted for a total of 55.5% of the variance. The factor pattern matrix and factor correlation matrix are shown in Table 18. Note that *N* was on the low side at 78. The factors were labelled Exercise, Sleep, Smoking, Eating, Relaxation, and Self-Care. Exercise and Smoking were negatively correlated (r = -.37), Exercise and Self-Care were positively correlated (r = .33).

Of the coping dimensions (the four COPE scales and the saved factor scores), the only one that correlated significantly with age was Seeking Emotional Support, r = -.23, p = 0.04. MANOVA indicated no significant sex difference on the coping dimensions, approximate $F(10, 68) = 1.52$, p = .15. See Table 19.

Correlations between coping dimensions are shown in Table 20. Correlations between COPE scales and saved factor scores were significant at the .01 level for Active Coping with Self-Care (.33), Behavioral Disengagement with Smoking (.39), and Behavioural Disengagement with Eating (.32). Regression analyses are shown in Table 21. For Exercise and for Sleep, R^2 changes were not significant. For Smoking: the COPE variables together explained 19% of the variance; Behavioral Disengagement uniquely explained 14% of the variance, the association being positive. For Eating: the COPE variables together explained 12% of the variance; Behavioral Disengagement uniquely explained 7% of the variance, the association being positive. For Relaxation: Active Coping uniquely explained 7% of the variance. For Self-Care: the COPE variables together explained 13% of the variance; Active Coping uniquely explained 6% of the variance, the association being positive.

Discussion

As noted, it was decided to first factor analyse the health behaviours and then examine their relationship with other coping strategies. An alternative approach might have been to factor analyse the COPE scales and the health behaviour items together. However, the special interest was in health behaviours as ways of coping, and it was deemed

Table 18

Exploratory Factor Analysis of Health Behaviour Items for Drinkers who Were Smokers

Variable[a]	Factor 1	2	3	4	5	6
	Item-factor loadings					
1. Take time to exercise	1.02	.12	.08	.07	-.28	.03
2. Eat regular meals	-.03	-.02	-.11	-.16	-.07	.72
3. Watch weight	.22	-.03	-.15	.00	-.07	.41
4. Drink a lot of caffeine	-.03	.26	.33	.05	-.15	.13
6. Keep up leisure activities	.36	-.01	-.11	-.26	.07	.07
7. Look after self	.12	-.16	-.06	-.12	.01	.46
9. Eat a lot of snacks	.08	.08	-.19	.53	-.10	.01
10. Careful to avoid accidents	-.05	-.02	-.06	.08	-.07	.57
13. Eat more than normally	-.03	-.12	.11	.90	.10	.06
15. Get regular sleep	-.03	-.97	.02	.05	-.19	.15
16. Do some specific physical activity	.73	-.11	-.07	.02	.18	-.10
17. Eat healthily	.11	-.20	.04	.11	.17	.61
19. Do things refreshing, calming or relaxing	.12	-.03	.04	-.14	.51	.34
20. Keep physically fit	.52	-.17	-.09	.11	.35	.18
23. Use specific stress management techniques	-.04	.06	-.04	.01	.57	-.02
31. Not drink too much alcohol	-.03	.03	.08	.12	.14	.58
32. Smoke	-.00	.02	.87	-.09	-.12	-.03
33. Smoke more than normally	-.03	-.13	.97	-.08	-.03	-.07
35. Give up any attempt to control smoking	-.01	.07	.45	.06	.12	-.07
	Factor-factor correlations					
Factor 1 (labelled Exercise)	-					
Factor 2 (labelled Sleep)	-.21	-				
Factor 3 (labelled Smoking)	-.37	.30	-			
Factor 4 (labelled Eating)	-.06	.11	.02	-		
Factor 5 (labelled Relaxation)	.12	-.16	-.07	-.06	-	
Factor 6 (labelled Self-Care)	.33	-.32	-.21	.06	.14	-

Note. *N* = 79. Goodness of fit $chi^2(72) = 63.52$, $p = .75$. Total variance explained 55.5%.

[a]See Appendix for verbatim items.

Table 19

Multivariate Analyses Comparing Men and Women on Coping Dimensions for Drinkers who Were Smokers

Dimension	M (SD) Men	M (SD) Women	Standardised structure coefficient
Active Coping	11.38 (2.31)	11.74 (2.36)	-
Acceptance	11.05 (2.97)	11.34 (2.29)	-
Seeking Emotional Support	8.91 (2.36)	11.22 (3.15)	-
Behavioral Disengagement	6.60 (1.62)	7.00 (2.25)	-
Exercise	0.11 (1.03)	-0.04 (0.98)	-
Sleep	-0.01 (1.05)	0.00 (0.98)	-
Smoking	-0.30 (1.05)	0.11 (0.93)	-
Eating	-0.30 (0.80)	0.11 (0.94)	-
Relaxation	0.19 (0.78)	-0.07 (0.90)	-
Self-Care	0.08 (0.92)	-0.03 (0.90)	-

Note. N = 79, of which men 21, women 58. Wilks' lambda = .82, approximate $F(10, 68) = 1.52$, $p = .15$.

Table 20

Correlations between Coping Dimensions for Drinkers who Were Smokers

Dimension	1	2	3	4	5	6	7	8	9
1. Active Coping	-								
2. Acceptance	.17	-							
3. Seeking Emotional Support	.02	.23*	-						
4. Behavioral Disengagement	-.32**	.09	.11	-					
5. Exercise	.15	-.06	-.01	-.27*	-				
6. Sleep	-.20	-.21	-.19	.06	-.20	-			
7. Smoking	-.08	-.08	.17	.39**	-.38**	.31**	-		
8. Eating	-.18	-.03	.14	.32**	-.04	.11	.02	-	
9. Relaxation	.29*	.01	-.09	-.14	.06	-.13	-.09	-.05	-
10. Self-Care	.33**	.18	.02	-.19	.38**	-.40**	-.26*	.07	.20

Note. *N* = 79.

*$p < .05$. **$p < .01$.

Table 21

Regression Analyses of Coping Dimensions for Drinkers who Were Smokers

Equation[a]	δR^2[b]	F	df[c]	p(F)	β[d]	t	p(t)
Exercise/							
+ All variables below	.08	1.63	4	.17			
- Active Coping	.01	0.48	1	.49	.08	0.70	.50
- Acceptance	.00	0.31	1	.58	-.07	-0.56	.58
- Seeking Emotional Support	.00	0.08	1	.78	.03	0.28	.78
- Behavioral Disengagement	.05	4.05	1	.05	-.24	-2.01	.05
Sleep/							
+ All variables below	.10	1.94	4	.11			
- Active Coping	.02	1.72	1	.19	-.16	-1.31	.19
- Acceptance	.02	1.70	1	.20	-.15	-1.30	.20
- Seeking Emotional Support	.02	1.88	1	.17	-.16	-1.37	.17
- Behavioral Disengagement	.00	0.12	1	.73	.04	0.35	.73
Smoking/							
+ All variables below	.19	4.39	4	.00			
- Active Coping	.00	0.39	1	.53	.07	0.63	.53
- Acceptance	.02	2.20	1	.14	-.16	-1.48	.14
- Seeking Emotional Support	.02	2.25	1	.14	.16	1.50	.14
- Behavioral Disengagement	.14	13.13	1	.00	.41	3.62	.00
Eating/							
+ All variables below	.12	2.62	4	.04			
- Active Coping	.00	0.40	1	.53	-.07	-0.63	.53
- Acceptance	.01	0.44	1	.51	-.08	-0.67	.51
- Seeking Emotional Support	.02	1.30	1	.26	.13	1.14	.26
- Behavioral Disengagement	.07	6.01	1	.02	.29	2.45	.02
Relaxation/							
+ All variables below	.10	1.99	4	.10			
- Active Coping	.07	5.72	1	.02	.29	2.39	.02
- Acceptance	.00	0.01	1	.91	-.01	-0.12	.91
- Seeking Emotional Support	.01	0.63	1	.43	-.09	-0.79	.43
- Behavioral Disengagement	.00	0.11	1	.74	-.04	-0.33	.74

(table continues)

Equation[a]	δR^2[b]	F	df[c]	p(F)	β[d]	t	p(t)
Self-Care/							
+ All variables below	.13	2.85	4	.03			
- Active Coping	.06	5.16	1	.03	.27	2.27	.03
- Acceptance	.02	1.62	1	.21	.14	1.27	.21
- Seeking Emotional Support	.00	0.00	1	.99	-.00	-0.01	.99
- Behavioral Disengagement	.01	0.96	1	.33	-.11	-0.98	.33

[a]The dependent variable precedes the slash. The plus sign indicates entry of variables. The minus sign signifies removal of the variable from the equation containing all variables. [b]Stepwise change in R^2. [c]Total df = 78. [d]Standardised regression coefficient in the equation containing all variables.

desirable to clarify the structure of these behaviours before considering their relationship with other behaviours.

In the regression analyses, the health behaviour variables were treated as dependent variables, with the COPE variables serving as the independent variables. This was a conservative approach, looking at the extent to which "old" (well documented) coping dimensions predicted "new" (not so well documented) coping dimensions. A more radical approach might have been to treat the health behaviour dimensions as the independent variables. As noted earlier, Long (1993) discusses how exercise can be seen as an emotion-focused coping response or as a preventive coping resource. Depending upon the model, health behaviours as coping strategies could be seen as causing, being caused by, or having the same cause as, other coping strategies. Exploration of alternative causal models is clearly a desirable future step.

As noted, it was decided to conduct separate analyses for the whole sample, for drinkers who were non-smokers and for drinkers who were smokers. This was deemed to be the best solution to the problem raised by drinking and smoking items being inapplicable for teetotallers and non-smokers. Ben-Porath, Waller, and Butcher (1991) have discussed the problem of inapplicable items in coping inventories; such inapplicable items can obfuscate data analyses, and lead to over- or mis-identification of situational effects on coping.

Overall, it seems that individuals do acknowledge that they use health behaviours as ways of coping. However, several of the original health behaviour items were not acknowledged to any great extent as coping behaviours. Notably, drinking alcohol was not acknowledged to any great extent as a way of coping. Whether this reflects reality, or an unwillingness to acknowledge reality, is a moot point. Social desirability was not measured in this study; however, in a similar sample, there did not seem to be any social desirability bias in COPE scale scores (see Chapter 2). Perhaps other, more sensitive, items need to be developed.

To some extent, the use of health behaviours as coping behaviours was predictable from the other, more documented, coping strategies. In particular, Behavioral Disengagement, an indicator of avoidance, was a modestly good predictor of the use of negative health behaviours as ways of coping: Eating, in the sense of eating more than usual (and, perhaps related to this, Weight-Watching), and Smoking. This is consistent with the previous literature, where such behaviours tend to be used as indicators of avoidance (e.g., Amirkhan, 1990; Carver et al., 1989; Endler & Parker, 1990; Folkman & Lazarus, 1988). Active Coping, an indicator of problem-focused coping, was a predictor, albeit weak, of the use of Relaxation (in the active sense) and Self-Care. However, this still leaves much of the variance in the use of health behaviours as ways of coping left to be explained. Exercise (specifically exercise maintenance) as a way of coping remains to be explained.

Ultimately, the special interest in health behaviours as ways of coping relates to the perennial question of whether one way of coping is any better than another. Roth and Cohen (1986) discuss the merits and demerits of approach and avoidance coping. Suls and Fletcher (1985) conducted a meta-analysis of what they term avoidant and non-avoidant coping. They concluded that avoidance might be superior in the short-term, and non-avoidance in the long-term. It has to be said, however, that this conclusion is based on a comparisons between cross-sectional, predominantly laboratory, short-term studies and cross-sectional, predominantly field, longer-term studies, not on comparisons between different phases of the same studies. It has been suggested that perceived controllability of the stressor must also be considered. Hence the goodness of fit hypothesis (see Folkman 1991), which predicts that mental health will be better when there is a good fit between coping strategy and perceived controllability of the stressor; a good fit would be problem-focused coping with perceived controllability, or emotion-focused coping with perceived uncontrollability. There is qualified empirical support for this (Conway & Terry, 1992; Forsythe & Compas, 1987; Vitaliano, Dewolfe, Maiuro, Russo, & Katon, 1990).

However, there is another, simple, sense in which some ways of coping are better than others. Some ways of coping (e.g., exercising) are (within limits) health promoting in their own right, and some ways of coping (e.g., smoking) are (taken to excess) health damaging in their own right, regardless of any stress moderating role. The particular contribution of this study is to better understand how health behaviours used as ways of coping tie into individuals' coping repertoires. This could be particularly useful when advising individuals about coping. For example, it seems that one could advise individuals to exercise as a way of coping without worrying unduly about disrupting their general coping repertoire. However, if one were to advise individuals against smoking as a way of coping, then one would need to take into account the fact that smoking might be serving an avoidance function, which in some contexts might be adaptive. However, such conclusions are provisional, and contingent upon further research into the use of health-related behaviours as ways of coping.

CHAPTER 4

STRESS, RESOURCES, COPING, AND WELL-BEING: MEDIATION, MODERATION, AND NEGATIVE AFFECTIVITY*

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Abstract

The aim of this study was to establish whether particular resources and particular coping strategies moderate the effect of stressors on well-being, and whether the influence of the resources on well-being is mediated by the coping strategies. Efforts were made to avoid some of the shortcomings of previous research in this field, by employing appropriate analyses, and by controlling for negative affectivity bias.

Subjects were staff of a mental hospital in the process of closing down. In Year 1, 109 subjects completed questionnaire measures of stressors (Occupational Stress Indicator), well-being (Brief Symptom Inventory and Satisfaction With Life Scale), coping (selected COPE scales), resources (Spheres of Control scales, Self Control Schedule, and Interpersonal Support Evaluation List), and negative affectivity (Eysenck Personality Questionnaire Neuroticism scale). In Year 2, 102 of the same subjects completed the stressors, well-being, and coping measures only. The main analytical technique was hierarchical linear regression analysis with cross-product terms.

Negative affectivity acted as a general confound, and was controlled for. Analysis of the Year 1 data indicated the following. There were main effects of stressors on well-being, and main effects of coping on well-being (avoidance coping on symptoms, and emotion-focused coping on satisfaction), but no main effects of resources on well-being, and no interactive effects (except for perceived self-control slightly buffering the effect of stressors on symptoms). There were main and interactive effects of stressors and resources on coping: internal control predisposed to problem-focused coping; social support predisposed to emotion-focused coping; stressors acted to increase avoidance coping, but resources buffered this effect to some extent. However, the evidence did not extend to coping mediating between resources and well-being.

There was an overall improvement in well-being (mainly attributable to a decline in symptoms) from Year 1 to Year 2. Analysis of the Year 2 data (with control for Year 1 well-

being) again pointed to stressors acting to increase symptoms, avoidance coping acting to increase symptoms, and emotion-focused coping acting to increase life satisfaction. Cross-lagged correlation analyses suggested that the causal link is more likely from avoidance coping to symptoms than vice versa, but did not elucidate the association between emotion-focused coping and satisfaction.

The results regarding the effect of stressors and resources on coping lead to the suggestion of a model. Under stress, individuals tend to avoid the issue unless they have the means to deal with it. If they have the means to deal with it, then the way they deal with it is coloured by the particular means at their disposal. If they have a high sense of personal control, then they tend to address the problem. If they have a high sense of social support, then they tend to address the emotional sequelae.

Introduction

Stress Buffering

An influential paper by Rabkin and Struening (1976) observed that reported correlations between life events and illness were typically low, less than .30. Rabkin and Struening discussed, inter alia, "those characteristics of the stressful event, of the individual, and of his social support system that influence his perception of or sensitivity to stressors" (p. 1014). Much subsequent research has focused on such moderators or buffers of the stressor-symptoms relationship.

Cohen and Edwards (1989) review research into the role of personal resources in stress buffering (although, as Steptoe, 1991, notes, they do not include the psychophysiological literature). They are highly critical of the design of much of this research. They dismiss studies which do not include both high and low stressor conditions, since there is then no possibility of detecting an interactive effect of stressor and resource on symptoms. They criticise studies that use stressor-symptom correlations to compare low and high resource groups, arguing that one should use stressor-symptom regression slopes. They criticise studies that report the presence of an interaction, but not the specific form of the interaction. In the light of these and other criticisms, they conclude that "as a whole, only the work on locus of control provides even tentative evidence for stress buffering, and even these effects are not entirely consistent and are primarily limited to control as conceptualized by the Rotter scale" (p. 270).

Personal Resources

Hence, locus of control is the one personal resource that comes out at all well from Cohen and Edwards' (1989) review. Focusing predominantly but not entirely on the occupational literature, Payne (1988) also concludes that there is "sufficient evidence that locus of control moderates the relationship between stressors and strains, at least when the stressors and strains are measured by self-report" (p. 226). Also focusing on the occupational literature, Hurrell and

Murphy (1991) are more circumspect, pointing to conflicting findings as well as methodological problems. Locus of control also features prominently as a dimension of hardiness (Kobasa, 1979), although no firm conclusion can be reached about hardiness as a stress buffer, not least because of methodological problems (Cohen & Edwards, 1989; Funk 1992; Hull, Van Treuren, & Virnelli, 1987; see also Carver, 1989). Personal control is a prevalent notion in health-related research (e.g., Steptoe & Appels, 1989) especially in an occupational context (e.g., Ganster & Fusilier, 1989; Sauter, Hurrell, & Cooper, 1989). Personal control also appears as a candidate to explain all stress-buffering effects, the other candidate being self-efficacy, but neither candidate being very successful (Litt, 1988). However, it is important to precisely locate the locus of control construct within wider or vaguer notions of control. First, it is important to differentiate between control as a characteristic of the situation (whether objective or subjective) and control as a dimension of individual difference (Parkes, 1989). Locus of control is an individual difference variable. Thus, Parkes (1991) is able to add locus of control to Karasek's (1979) demand-discretion model. Second, it is important to recognise that locus of control may have many dimensions. For example, Paulhus and Christie (1981) argue that it is possible to distinguish conceptually between different sources of control (self, others, chance), targets of control (self, others), spheres of activity (achievement, interpersonal, sociopolitical) and valences of outcome (success, failure). Third, it is important to distinguish locus of control from other constructs such as self-efficacy (Palenzuela, 1988). For all these reasons, when using the locus of control construct, care is required in its conceptualisation and operationalisation.

Social Resources

Cohen and Edwards (1989)'s review is limited to the literature on personal resources as stress buffers, but their caveats can be extended to the literature on *social* resources as stress buffers. Specifically with reference to the social support literature, Veiel (1992) offers further cautionary notes; almost any violation of the assumptions of linear regression analysis could result in a statistical interaction appearing when there is in fact no buffering, or not appearing when there is in fact buffering. Longitudinal studies support a link between social integration (measured by an index of social ties) and mortality, after controlling for baseline health and other risk factors (e.g., House, Landis, & Umberson, 1988). Cohen and Wills' (1985) review of the literature on stress, social support and well-being concludes that: "Evidence for a buffering model is found when the social support measure assesses interpersonal resources that are responsive to the needs elicited by stressful events. Evidence for a main effect model is found when the support measure assesses a person's degree of integration in a large community social network" (pp. 347-348). However, Barrera (1988) argues that the data are not so clearcut; see also Ganster and Victor (1988) on the occupational literature. Cohen and Wills' review is of the literature on well-being (typically some measure of mental or physical symptoms); they are careful not to extrapolate to, or speculate about, the links to serious physical health outcomes. S. Cohen (1988) however, does speculate. He distinguishes between stress-centered and main-effect models; between behavioural or biological (or both) mechanisms; and between information-based models, identity and self-esteem models, social influence models, and tangible-resource models. See also, for example, Barrera (1988) and Schwarzer and Leppin (1991). It appears that there is little hard evidence on such elaborated mechanisms. There is also considerable diversity in conceptualisation of social support, reflected in a plethora of measuring instruments, reviewed by, amongst others, Heitzmann and Kaplan (1988), House and Kahn (1985), Payne and Jones (1987), and Vaux (1992).

Coping Strategies

Cohen and Edwards (1989) review the literature on coping styles (traits), again claiming that few studies include the necessary low-stressor control required for a test of the buffering hypothesis. They do not review the literature on episodic coping in the sense of "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141). Presumably, even for episodic coping, it would still be argued that both low and high stressor conditions are necessary for a test of the buffering hypothesis. However, there is a difficulty with this argument. Stressors can be said to cause coping (no stressor, no need to cope), and this would confound any simple test of whether coping moderates the effect of stressors on well-being. (See also Veiel, 1992, on the subject of stressors leading to a mobilisation or suppression of social support). This makes it seem reasonable that studies of coping and well-being often standardise the stressor (for example, a common event, or each individuals' subjectively most important stressor) and then simply test whether one way of coping is better than another as judged by level of well-being.

Suls and Fletcher (1985) conducted a meta-analysis of what they term avoidant and nonavoidant coping. They concluded, inter alia, that avoidance might be superior in the short-term, and nonavoidance in the long-term, although, in reaching this conclusion, they compared short-term studies predominantly from the laboratory with longer-term studies predominantly from the field. Aldwin and Revenson (1987) find that the literature on the relative merits of emotion- versus problem-focused coping is inconsistent. Others have suggested that perceived controllability of the stressor must also be considered. Hence the goodness of fit hypothesis (see Folkman, 1991), predicting that the outcome will be better when there is a good fit between coping behaviour and perceived controllability, specifically problem-focused coping with perceived controllability, emotion-focused coping with perceived uncontrollability. There is qualified empirical support for this (Conway & Terry, 1992; Forsythe & Compas, 1987; Vitaliano, Dewolfe, Maiuro, Russo, & Katon, 1990). Note, incidentally, that this might suggest that Karasek's

(1979) demand-discretion model could usefully incorporate actual coping behaviour as an additional variable. General problems in the conceptualisation and measurement of coping have been extensively reviewed (e.g., Cohen, 1987; Cox & Ferguson, 1991; Latack & Havlovic, 1992; Parker & Endler, 1992; Stone, Helder, & Schneider, 1988). A recent specific concern has been the problems posed by inapplicable items in situation-specific coping questionnaires (Ben-Porath, Waller, & Butcher, 1991; Stone, Greenberg, Kennedy-Moore, & Newman, 1991).

Mediation

In their review of personal resources as stress buffers, Cohen and Edwards (1989) note that although authors often hypothesise that these personal resources exert their effect via an influence on coping, none of the studies reviewed directly examined coping activities. Furthermore, they argue, a useful distinction can be made between resources affecting appraisal and resources affecting post-appraisal coping processes. Thoits (1986) also argues that social support can be viewed as coping assistance, social support affecting health via an effect on coping; Cutrona and Russell (1990) argue that uncontrollable events require social support that fosters emotion-focused coping whereas controllable events require social support that fosters problem-focused coping. Again, in order to test the hypothesis that the effect of social support is mediated by coping, it is necessary to measure coping.

Negative Affectivity

Martin (1989) provides a general overview of measurement and design issues in stress research. See also, for example, L. H. Cohen (1988), Frese and Zapf (1988), Hurrell, Murphy, Sauter, and Cooper (1988), Kaplan (1990), Kasl and Cooper (1987), Lazarus (1990a, b), Schafer and Fals-Stewart (1991). A recurring issue is the use of self-report measures. In some theories, including the transactional models of the Lazarus and Folkman (1984) mould, individuals' perceptions are substantively important. In other research, self-report measures, rather than objective measures, are used for reasons of feasibility or convenience. However, the use of self-report measures raises the specific risk of negative affectivity (NA) bias.

Watson and Pennebaker (1989) review evidence suggesting that "because self-report measures of stress and health both contain a significant NA component, correlations between such measures likely overestimate the true association between stress and health" (p. 234). See also Watson (1990); Clark and Watson (1991). Costa and McCrae (1990) similarly argue that correlations between variables in stress research may be due in whole or in part to individual differences in neuroticism, which they equate with negative affectivity. See also McCrae (1990); McCrae and Costa (1991). Hence, it is argued strongly that negative affectivity should be taken into account in stress research (e.g., Payne, 1988). It may bias reports not only of stressors and symptoms, but also of the putative moderators (McCrae, 1990; Payne, 1988; Schaubroeck & Ganster, 1991a). However, Kasl and Rapp (1991) plead against a new generation of studies where the only innovation is the inclusion of some measure of negative affectivity. Among their suggestions are that studies should examine the presumed or postulated role of negative affectivity. See also Schaubroeck and Ganster (1991b); Schaubroeck, Ganster and Fox (1992); Burke, Brief and George (1993). Thus, negative affectivity can be treated simply as a nuisance factor that must be eliminated from consideration before other causal relationships are examined, but it may be more productive to examine the causal role of negative affectivity. For example, it might be that high NA individuals do not merely report more problems but actually generate them (McCrae & Costa, 1991; Watson, 1990). There is some evidence that negative affectivity may also be a stress potentiator (reverse buffer) (Parkes, 1990).

Research Questions

It thus seems that, on the one hand, the observed correlations between stressors and symptoms may underestimate the true effect of stressors on symptoms, because of moderating variables. On the other hand, the observed correlations between stressors and symptoms may overestimate the true effect of stressors on symptoms because of negative affectivity bias. This study is an attempt to test the following hypotheses, using appropriate analyses, and controlling for negative affectivity. Stressors have an effect on well-being. Coping strategies moderate this effect. Personal resources also moderate this effect, but via an effect on coping strategies. In addition, some attempt is made to test the hypothesis that perceived controllability of the stressor moderates the effect of coping strategies.

Method

Subjects

Subjects were from the staff (excluding doctors) of a large British mental hospital which was in the process of closing. Out of approximately 600 such employees, 110 volunteered for a longitudinal study. At Year 1, usable data was obtained from 109 subjects, of whom 69 were women and 40 were men. The mean age was 36.1 (*SD* = 10.2) years. Subjects were predominantly from nursing and administrative jobs. At Year 2, one year later, data was obtained from 102 of the original subjects, 63 women and 39 men.

Measures

Overview. The variables of interest were age and sex, stressors, coping strategies, resources, and well-being. In the analyses reported below (except for alpha reliability), the score for a missing item on a scale was replaced with the mean score for the other items comprising the scale.

Means, standard deviations, skewnesses, and alpha reliabilities of key measures are shown in Table 22. The fact than *N* for alpha was always greater than 100 indicates that the actual prevalence of missing items was not great.

It was necessary to consider ways in which the number of variables could be reduced, so as to have models of reasonable size. This was especially necessary as interactions were to be considered. Besides which, as shown in Tables 23 to 26, there were some high intercorrelations within groups of variables, predisposing to collinearity problems.

Table 22

Descriptive Statistics and Alpha Reliabilities of the Measures

Variable	M	SD	Skewness	α	N for α
Occupational Stress Indicator[a]					
Factors Intrinsic to the Job	24.10	6.78	0.05	.76	101
Managerial Role	29.77	9.07	0.00	.83	101
Relationships With Other People	25.65	7.64	-0.14	.80	101
Career and Achievement	25.40	8.18	0.21	.80	101
Organisational Structure and Climate	33.29	9.58	0.05	.86	101
Home/Work Interface	24.99	9.34	0.35	.84	101
Concern About the Future	21.21	6.98	-0.13	.90	101
Total of above scales	184.43	46.45	-0.04		
COPE[b]					
Positive Reinterpretation and Growth	12.01	2.16	-.52	.63	104
Active Coping	11.96	2.09	-.47	.62	104
Planning	12.68	2.22	-.30	.76	104
Seeking Emotional Support	11.18	3.15	-.08	.87	104
Seeking Instrumental Support	11.74	2.50	-.42	.77	104
Suppression of Competing Activities	9.20	2.31	-.34	.65	104
Turning to Religion	5.28	2.62	2.40	.95	104
Acceptance	11.66	2.44	-.23	.71	104
Mental Disengagement	8.19	2.31	.25	.40	104
Focus on and Venting of Emotions	9.67	3.13	.12	.85	104
Behavioral Disengagement	6.68	2.17	.72	.64	104
Denial	5.49	1.81	1.23	.59	104
Restraint Coping	10.69	2.25	-.03	.70	104
Alcohol/Drug Use	5.13	2.17	2.33	.94	104
Humour	8.02	3.05	.63	.91	104

(table continues)

Variable	M	SD	Skewness	α	N for α
Brief Symptom Inventory[c]					
Somatization	0.41	0.47	1.78	.64	104
Obsessive Compulsive	1.00	0.76	0.94	.82	104
Interpersonal Sensitivity	1.05	0.83	0.70	.82	104
Depression	0.63	0.60	1.02	.80	104
Anxiety	0.75	0.62	1.47	.75	104
Hostility	0.75	0.66	1.36	.80	104
Phobic Anxiety	0.31	0.43	2.37	.62	104
Paranoid Ideation	0.80	0.61	0.72	.63	104
Psychoticism	0.32	0.44	1.66	.59	104
Global Symptom Index	0.65	0.44	1.14	.94	104
Brief Symptom Inventory, transformed[d]					
Somatization	0.30	0.29	1.07		
Obsessive Compulsive	0.63	0.36	0.16		
Interpersonal Sensitivity	0.63	0.41	-0.01		
Depression	0.43	0.34	0.46		
Anxiety	0.50	0.33	0.34		
Hostility	0.50	0.34	0.62		
Phobic Anxiety	0.23	0.27	1.30		
Paranoid Ideation	0.53	0.33	0.14		
Psychoticism	0.24	0.28	1.13		
Global Symptom Index	0.47	0.25	0.40		
Physical Symptoms Index[e]	1.96	0.57	1.12	.81	108
Perceived Health[f]	3.09	0.54	0.08	-	
Job Satisfaction[g]	5.07	1.32	-1.26	-	
Career Satisfaction[h]	4.47	1.30	-0.59	-	
Happiness[i]	2.28	0.53	0.17	-	
Satisfaction With Life Scale[j]	23.87	6.36	-0.66	.88	107
Spheres of Control Scales[k]					
Personal Efficacy	48.20	7.40	0.18	.67	106
Interpersonal Control	46.42	8.49	-0.03	.77	106
Sociopolitical Control	37.62	8.85	-0.26	.76	106

(table continues)

Variable	M	SD	Skewness	α	N for α
Self-Control Schedule[l]	31.21	21.12	-0.51	.78	106
Interpersonal Support Evaluation List[m]					
Appraisal	7.98	1.97	-1.61	.74	106
Belonging	8.51	2.18	-1.81	.82	106
Tangible	9.43	1.10	-2.84	.62	106
Self-Esteem	7.98	1.74	-1.14	.66	106
Total of the above	33.91	5.88	-1.89	.90	106
Interpersonal Support Evaluation List, transformed[n]					
Appraisal	1.26	0.39	-0.93		
Belonging	1.39	0.44	-1.35		
Tangible	1.58	0.25	-2.40		
Self-Esteem	1.25	0.36	-0.72		
Total	32.59	12.88	-0.67		
Health Value Scale[o]	19.17	4.70	-0.05	.63	109
Eysenck Personality Questionnaire[p]					
Neuroticism	10.83	5.50	0.01	.88	109
Lie	6.33	3.82	0.69	.79	109

(table continues)

Note. Year 1 data. N = 109.

[a]From Cooper, Sloan, and Williams (1989), except for Concern About the Future which was ad hoc. For Factors Intrinsic to the Job, and Career and Achievement, the range of possible scores was 9 to 54; for Relationships With Other People, 10 to 60; for Managerial Role, Organisational Structure and Climate, and Home/Work Interface, 11 to 66; for Concern About the Future, 4 to 16. [b]From Carver, Scheier and Weintraub (1989). For each scale, the range of possible scores was 4 to 16. [c]From Derogatis and Spencer (1982). For each scale, and for the Global Symptom Index, the range of possible scores was 0 to 4. [d]Transformed scale score was $\log_e(1 + s)$ where s is the scale score. [e]One item, relevant only to women, was excluded from the calculation of alpha. It was included in the calculation of scale scores (that is to say the number of items averaged was different for men and women). The range of possible scores was 1 to 6. [f]From Kaplan and Camacho (1983). The range of possible scores was 1 to 4. [g]From Warr, Cook and Wall (1979). The range of possible scores was 1 to 7. [h]This item was ad hoc, but using the same format as the preceding item. [i]From Warr, Cook and Wall (1979). The range of possible scores was 1 to 4. [j]From Diener, Emmons, Larsen, and Griffin (1985). The range of possible scores was 5 to 35. [k]From Paulhus (1983). For each scale, the range of possible scores was 10 to 70. [l]From Rosenbaum (1989). The range of possible scores was -108 to 108. [m]From Cohen, Mermelstein, Kamarck, and Hoberman (1985). For each subscale, the range of possible scores was from 0 to 10; for the total, it was from 0 to 40. [n]Transformed scale score was $e^{0.1s} - 1$ where s is the scale score. [o]From Lau, Hartman, and Ware (1986). The range of possible scores was from 4 to 28. [p]From Eysenck and Eysenck (1975). For Neuroticism, the range of possible scores was from 0 to 23; for the Lie scale, it was 0 to 23.

Table 23

Correlations Between Occupational Stress Indicator Sources of Pressure in Your Job Scales

Scale	1	2	3	4	5	6
1. Factors Intrinsic to the Job	-					
2. Managerial Role	.76**	-				
3. Relationships With Other People	.82**	.83**	-			
4. Career and Achievement	.59**	.64**	.60**	-		
5. Organisational Structure and Climate	.63**	.79**	.77**	.63**	-	
6. Home/Work Interface	.71**	.55**	.58**	.46**	.47**	-
7. Concern About the Future[a]	.38**	.42**	.39**	.62**	.42**	.31**

Note. *N* = 109.

[a]Ad hoc scale.

*$p < .01$. **$p < .001$.

Table 24

Correlations Between COPE Scales

Scale	1	2	3	4	5	6	7
1. Positive Reinterpretation and Growth	-						
2. Active Coping	.50**	-					
3. Planning	.50**	.76**	-				
4. Seeking Emotional Support	.33**	.33**	.33**	-			
5. Seeking Instrumental Support	.50**	.41**	.35**	.55**	-		
6. Suppression of Competing Activities	.36**	.29*	.34**	.23	.19	-	
7. Turning to Religion	-.02	.05	-.00	.13	.01	.06	-
8. Acceptance	.33**	.26*	.22	.11	.13	.08	.05
9. Mental Disengagement	.19	.09	.06	.14	.24	.18	.15
10. Focus on and Venting of Emotions	.07	-.01	-.04	.44**	.09	.29*	.16
11. Behavioral Disengagement	-.21	-.22	-.27*	.11	-.01	.09	.22
12. Denial	-.05	-.09	-.16	.04	.01	.11	.10
13. Restraint Coping	.27*	.48**	.40**	.20	.30*	.32**	-.00
14. Alcohol/Drug Use	-.02	.00	.05	.22	.09	.25*	.05
15. Humour	.17	.13	.02	.08	.04	-.01	.10

(table continues)

Scale	8	9	10	11	12	13	14
8. Acceptance	-						
9. Mental Disengagement	.12	-					
10. Focus on and Venting of Emotions	.02	.23	-				
11. Behavioral Disengagement	-.09	.22	.21	-			
12. Denial	-.18	.35**	.13	.37**	-		
13. Restraint Coping	.38**	.24	.00	.03	-.01	-	
14. Alcohol/Drug Use	-.03	.09	.15	.13	.26*	.04	-
15. Humour	.17	.12	-.01	-.06	-.07	.06	.03

Note. N = 109.

*p < .01. **p < .001.

Table 25

Correlations Between Health and Well-Being Measures

Scale	1	2	3	4	5	6	7
1. BSI Somatization	-						
2. BSI Obsessive Compulsive	.39**	-					
3. BSI Interpersonal Sensitivity	.26*	.66**	-				
4. BSI Depression	.34**	.57**	.63**	-			
5. BSI Anxiety	.43**	.71**	.65**	.61**	-		
6. BSI Hostility	.26*	.48**	.49**	.54**	.52**	-	
7. BSI Phobic Anxiety	.38**	.39**	.52**	.39**	.49**	.27*	-
8. BSI Paranoid Ideation	.17	.49**	.53**	.57**	.61**	.50**	.25*
9. BSI Psychoticism	.32**	.48**	.62**	.77**	.59**	.47**	.32**
10. BSI Global Symptom Index							
11. Physical Symptoms Index	.57**	.60**	.53**	.53**	.60**	.33**	.35**
12. Perceived Health	-.20	-.18	-.23	-.24	-.26*	-.22	-.05
13. Job Satisfaction	-.14	-.34**	-.27*	-.40**	-.42**	-.27*	-.17
14. Career Satisfaction	-.08	-.21	-.25	-.40**	-.24	-.12	-.12
15. Happiness	-.27*	-.32**	-.33**	-.40**	-.31**	-.29*	-.32**
16. Satisfaction With Life Scale	-.17	-.15	-.20	-.42**	-.22	-.23	-.08

(table continues)

Scale	8	9	10	11	12	13	14	15
8. BSI Paranoid Ideation	-							
9. BSI Psychoticism	.57**	-						
10. BSI Global Symptom Index			-					
11. Physical Symptoms Index	.47**	.45**	.68**	-				
12. Perceived Health	-.25*	-.26*	-.28*	-.19	-			
13. Job Satisfaction	-.36**	-.37**	-.42**	-.36**	.13	-		
14. Career Satisfaction	-.29*	-.33**	-.31*	-.37**	.12	.52**	-	
15. Happiness	-.27*	-.41**	-.44**	-.36**	.17	.38**	.42**	-
16. Satisfaction With Life Scale	-.27*	-.49**	-.33**	-.21	.23	.29*	.40**	.56**

Note. *N* = 109. BSI = Brief Symptom Index.

*p < .01. **p < .001.

Table 26

Correlations Between Resource Measures

Scale	1	2	3	4	5	6	7	8	9
1. SOC Personal Efficacy	-								
2. SOC Interpersonal Control	.40**	-							
3. SOC Sociopolitical Control	.14	.16	-						
4. SCS	.40**	.41**	.07	-					
5. ISEL Appraisal	.16	.40**	.04	.27*	-				
6. ISEL Belonging	.13	.43**	-.04	.29*	.60**	-			
7. ISEL Tangible	.24	.28*	.12	.22	.51**	.59**	-		
8. ISEL Self-Esteem	.24	.49**	-.04	.36**	.57**	.66**	.41**	-	
9. ISEL Total	.21	.51**	-.02	.38**	.83**	.86**	.62**	.83**	-
10. HVS	.03	.03	.03	.03	.08	.10	.10	.08	.11

Note. *N* = 109. SOC = Spheres of Control. SCS = Self-Control Schedule. ISEL = Interpersonal Support Evaluation List. HVS = Health Value Scale.

*$p < .01$. **$p < .001$.

Stressors. Stressors were measured using the Sources of Pressure in Your Job questionnaire from Cooper, Sloan and Williams' (1988) Occupational Stress Indicator. This has scales for Factors Intrinsic to the Job, Managerial Role, Relationships with Other People, Career and Achievement, Organisational Structure and Climate, and Home/Work Interface. In addition, because in this study the workplace was being closed down, items specifically focusing on Concern about the Future were added. These were *Major changes in what the organisation seems to have planned for me*, *Not knowing what work I will be doing in the future*, *Uncertainty about my future*, and *Major changes in what I think I will be doing in the future*. When answering these questions about stressors, subjects were asked to think about the past three months.

The scale scores were highly intercorrelated: see Table 23. However, confirmatory factor analysis using LISREL 7 (Jöreskog & Sörbom, 1989) indicated that a one-factor model did not give a good fit, $chi^2(14, N = 102) = 67.33$, $p < .01$, Goodness of Fit Index = .85, Adjusted Goodness of Fit Index = .70, Root Mean Square Residual = 4.18. With such a one-factor model, LISREL's modification indices are not directly helpful. The only restrictions that could be relaxed would be the off-diagonal theta-deltas (error covariances), but one would not actually do this under normal circumstances. Nevertheless, there were clues to a better fitting model, provided by the standardised residuals and the modification indices. In the one-factor solution, there was one large negative (less than -2.58) standardised residual; namely that for the covariance of Factors Intrinsic to the Job with Organisational Structure and Climate. That is to say, the model led to an overestimation of this covariance. There were two large positive (greater than 2.58) standardised residuals, that for Factors Intrinsic to the Job with Home/Work Interface, and that for Concern About the Future with Career and Achievement. That is to say, the model led to an underestimation of these covariances. There were three large (significant at around the .01 level) modification indices for theta-deltas: for Factors Intrinsic to the Job with Organisational Structure and

Climate, the estimated change in theta-delta being negative; for Factors Intrinsic to the Job with Home/Work Interface, the estimated change in theta-delta being positive; and for Concern About the Future with Career and Achievement, the estimated change in theta-delta being positive. All in all, the clues from the standardised residuals and the modification indices were consistent, hinting that a better model would be one which accommodated a closer relationship between Home/Work Interface and Factors Intrinsic to the Job, a closer relationship between Concern about the Future and Career and Achievement, and a more distant relationship between Factors Intrinsic to the Job and Organisational Structure and Climate.

This led to a three factor model which fitted well enough, $chi^2(11, N = 102) = 18.62$, $p = .07$, Goodness of Fit Index = .95, Adjusted Goodness of Fit Index = .88, Root Mean Square Residual = 1.87. On Factor 1, Managerial Role loaded .91, Relationships with Other People .92, and Organisational Structure and Climate .84. On Factor 2, Career and Achievement loaded .98, Concern About the Future .63. On Factor 3, Factors Intrinsic to the Job loaded .99, Home/Work Interface .72. However, Factors 1 and 2 correlated .71, Factors 1 and 3 correlated .85, and Factors 2 and 3 correlated .61.

Because of these high intercorrelations between factors, it was decided, eventually, to add together the Sources of Pressure scales to produce one total score. Note that this total score, computed solely for the purpose of this study, includes the Concern About the Future scale, which was added for the current study. Note also that in the Sources of Pressure questionnaire, each scale score is the sum of its item scores, and different scales are of different length. Therefore, scale scores cannot be directly compared with each other, and the total score is influenced more by the longer scales. Note also that the Sources of Pressure questionnaire is a measure of workplace stressors (including the interface between work and home), rather than stressors from life in general, so it may miss important stressors for some people. The total score will be referred to hereafter as Pressure.

Coping strategies. Coping strategies were measured using Carver, Scheier, and Weintraub's (1989) COPE inventory. The trait version was used. Subjects were asked to focus on the past three months, and on life in general, not just work. The COPE questionnaire comprises 60 items, four items for each of 15 scales. The correlations between scales ranged from low to high: see Table 24. Guided by the results of a confirmatory factor analysis (see Chapter 2), selected scales were used as indicators of the four basic coping dimensions discussed by Cox and Ferguson (1991). Specifically, Active Coping was used as an indicator of problem-focused coping, Acceptance as an indicator of reappraisal, Seeking Emotional Support as an indicator of emotion-focused coping, and Behavioral Disengagement as an indicator of avoidance.

Resources. Paulhus and Christie's Spheres of Control instrument (Paulhus, 1983) was included. This comprises three scales, Personal Efficacy, Interpersonal Control, and Sociopolitical Control. Paulhus and van Selst (1990) have renamed Personal Efficacy as Personal Control, but the original name is used here to avoid confusion with Self-Control (see below). Personal Efficacy refers to perceived control in situations of personal achievement that do not involve other people. Interpersonal Control refers to perceived control in dyadic and group situations. Sociopolitical Control refers to perceived control in situations involving political and social systems. Note that these scales were originally put forward as measures of locus of control, differentiating between spheres of activity. However, Paulhus and van Selst (1990) have adopted Palenzuela's (1987) doubts, suggesting that the Spheres of Control scales may actually be measuring self-efficacy. Paulhus and van Selst (1990) accordingly suggest some minor revisions, but as noted, the Paulhus (1983) version was used in this study. The Locus of Control scale of Cooper et al.'s (1988) Occupational Stress Indicator was also administered, but confirmatory factor analysis suggested that this instrument is in need of refinement (Ingledew, Hardy, & Cooper, 1992), and it was not included in these analyses.

Rosenbaum's Self-Control Schedule (SCS) (Rosenbaum, 1990a) was included as a measure of self-control. "The SCS is a self-report instrument directed at assessing individual tendencies to apply self-control methods to the solution of behavioral problems. It covers the following content areas: (a) use of cognitions and self-instructions to cope with emotional and physiological responses, (b) application of problem-solving strategies (e.g., planning, problem definition, evaluating alternatives, and anticipation of consequences), (c) ability to delay immediate gratification, and (d) a general belief in one's ability to self-regulate internal events" (Rosenbaum, 1990b, p. 15). The total score was computed, this being the only one offered by Rosenbaum. However, from Rosenbaum's (1988, 1989, 1990b, 1993) writings, it appears that self-control is a multidimensional construct, of the kind that Carver (1989) thinks is not best measured by simple addition. Furthermore, Gruber and Wildman (1987), and Rude (1989) report multi-factor solutions. Note that Paulhus and Christie (1981) did not find a self-control factor, but that could of course, hinge upon their initial item pool. Palenzuela (1988) notes that self-control is conceptually different from locus of control. However, as already noted, the Spheres of Control scales may not be measuring locus of control. Therefore, there is room for further discussion as to what exactly these scales are measuring.

Social support was measured by the Interpersonal Support Evaluation List of Cohen, Mermelstein, Kamarck, and Hoberman (1985). It comprises Appraisal, Belonging, Tangible, and Self-Esteem scales, and also gives a total score. It is clearly a measure of perceived support, or what Veiel and Baumann (1992) prefer to call "believed support". It stood up reasonably well to Heitzmann and Kaplan (1988)'s criteria for reliability and validity. As can be seen from Table 22, the scales and the total suffered from high positive skewness. Therefore, the scores were transformed, by dividing by 10, taking the exponential, and subtracting one (so that the new minimum was still zero). As can be seen (Table 22), these transformed scores were more acceptable, although skewness was still high for the Tangible scale. The correlations between the (transformed) scales are shown in Table 26. Because of the high intercorrelations, it was decided to use only the (transformed) total score. This total score will be referred to hereafter as Interpersonal Support.

Health Value was measured using Lau, Hartman, and Ware's (1986) Health Value Scale. This produces a single score. It was included in the present study for other purposes, but is considered in the analyses in a spirit of exploration.

Well-being. Mental symptoms were measured using the Brief Symptom Inventory (Derogatis & Melisaratos, 1982) which has scales for Somatization, Obsessive Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, Psychoticism, and gives an overall Global Symptom Index. Subjects were asked to think about the past three months, and about life in general, not just work. The Brief Symptom Inventory was chosen in preference to other instruments such as the General Health Questionnaire (Goldberg, Williams, & Institute of Psychiatry, 1988), or the Crown Crisp Experiential Index (Crown & Crisp, 1979). Unlike the Brief Symptom Inventory, these other instruments do not incorporate hostility or anger, which would seem to be likely reactions to the closure of the hospital.

In the Brief Symptom Inventory, each subscale score is the mean of its item scores, and the Global Symptom Index is the mean of all item scores. Hence subscale scores are comparable with each other. However, because the subscales are of different length, and because four additional items are included in the Global Symptom Index calculation, the Global Symptom Index is not strictly the average of the subscale scores, rather it will be influenced more by some dimensions of mental health than others. As can be seen from Table 22, some of the Brief Symptom Inventory scales suffered from high positive skewness, perhaps accounted for by the measure being used with a working rather than a patient population. For this reason, it was decided to transform the subscale and Global Symptom Index scores. Specifically, it was decided to take the natural logarithm of the score, having first added one to it (so that the new minimum was still zero). As can be seen, these transformed scores were more acceptable. The correlations between the (transformed) scales are shown in Table 25, there being a marked pattern of positive intercorrelations. However, a confirmatory factor analysis using LISREL 7 did not indicate a good fit for a single factor model, $chi^2(27, N = 109) = 71.28$, $p < .01$, Goodness of Fit Index =.87, Adjusted Goodness of Fit Index = .79, Root Mean Square Residual = .006). The standardised residuals of the covariances and the modification indices for the theta-deltas indicated that a better fit might involve a closer relationship between Depression and Psychoticism. A two factor model gave a better if not ideal fit, $chi^2(26, N = 109) = 46.92$, $p = .01$, Goodness of Fit Index = .92, Adjusted Goodness of Fit Index = .86, Root Mean Square Residual = .005). On one factor, Somatisation loaded .44, Obsessive Compulsive .79, Interpersonal Sensitivity .80, Anxiety .85, Hostility .63, Phobic Anxiety .54, and Paranoia .68. On the other factor, Depression loaded .91, and Psychoticism .85. However, the two factors correlated .84. It was decided, therefore, to use only the Global Symptom Index. It can be noted that the dimensionality of the parent inventory of the Brief Symptom Inventory has also been questioned; it too may best be used as a measure of general distress (e.g., Cyr, Doxey, & Vigna, 1988; Cyr, McKenna-Foley, & Peacock, 1985).

Physical symptoms were measured using a checklist of 20 items, plus 1 extra item for women only, taken from Cox et al. (1987). A physical symptoms index was calculated as the mean of the item scores. As can be seen from Table 25, this index had a high positive correlation with the Brief Symptom Inventory Global Symptom Index. It also had a significant positive correlation with each of the Brief Symptom Inventory subscales, often a high correlation. Thus this physical symptoms index was not well enough differentiated from indices of mental symptoms to merit retention in the analysis.

Life satisfaction was measured using the Satisfaction With Life Scale of Diener, Emmons, Larsen, and Griffin (1985). This correlated significantly (negatively) with three of the

Brief Symptom Inventory subscales, two at a fairly high level, these being Depression and Psychoticism, the two that stood out in the confirmatory factor analysis. The Satisfaction With Life Scale was retained in the analysis.

Perceived health, job satisfaction, career satisfaction, and happiness were all measured by single items. The perceived health item was taken from Kaplan and Camacho (1983). The job satisfaction item was taken from Warr, Cook and Wall (1979). The career satisfaction item was a variant of this. The happiness item was also taken from Warr et al. Such single items are prone to problems of reliability and validity. They were therefore not retained in the analysis, but certain observations can be made about their relationships with other scales (see Table 25). The correlations of the perceived health item with other measures were mostly not significant. The job satisfaction, career satisfaction, and happiness items intercorrelated positively, and each correlated positively with the Satisfaction With Life Scale. The job satisfaction and the happiness item tended to correlate negatively with the Brief Symptom Inventory scales. The correlations of the career satisfaction item with the Brief Symptom Inventory scales were similar to those of the Satisfaction With Life Scale with the same Brief Symptom Inventory scales. It may be that the career satisfaction item and the Satisfaction With Life Scale are distinguished from the other measures in that they have a longer-term perspective.

The Global Symptom Index (transformed) will be referred to hereafter as Symptoms, and the Satisfaction with Life Scale as Satisfaction.

Negative affectivity and social desirability. The Eysenck Personality Questionnaire Neuroticism and Lie scales (Eysenck & Eysenck, 1975) were included as indicators of negative affectivity (Watson & Pennebaker, 1989) and social desirability, respectively.

Analyses

Testing for moderation and mediation. It is important to clarify the distinction between mediator and moderator variables (Baron & Kenny, 1986; Cox & Ferguson, 1991). A mediator variable is one that transmits an effect. If A causes B and B causes C, then B is mediating the relationship between A and C. A moderator variable is one that alters an effect. If A causes C contingent upon the level of B, then B is moderating the relationship between A and C.

To test whether B mediates between A and C using regression analysis, one should check that: A affects B; B affects C; A affects C; A does not affect C after controlling for B (full mediation) or the effect is less (partial mediation).

To test whether B moderates between A and C, the appropriate analysis depends inter alia on whether A and B are categorical or continuous. If both A and B are categorical, then analysis of variance is appropriate. If A is continuous but B is categorical, then regressing C on A for each category of B and comparing regression slopes may be appropriate and is common practice. Note that comparing correlations (variance explained), although a common practice, is not the same as comparing regression slopes (Cohen & Edwards, 1989; Jaccard, Turrisi, & Wan, 1990). If both A and B are continuous, then hierarchical linear regression analysis incorporating cross-product terms would be preferred to either of the previous approaches, provided the assumptions are met, since in this way the maximum amount of information is retained.

Jaccard et al. (1990) deal in detail with the study of interaction through product terms, and emphasise that, to reduce potential problems of multicollinearity, the independent variables should be centred prior to the formation of product terms. In the analyses reported here, all variables were first standardised (thereby of course, also centring them), product terms were then computed, and the unstandardised solution was examined. If this procedure is followed, Y, X_1 and X_2 result in a regression equation in which Y^s is predicted by $X_1{}^s$, $X_2{}^s$ and $X_1{}^sX_2{}^s$ (the superscript representing standardisation), with regression coefficients b_1, b_2 and b_3. The regression coefficients are interpreted as follows: Y is predicted to change by b_1 standard scores as X_1

increases by one standard score when X_2 is at its mean; Y is predicted to change by b_2 standard scores as X_2 increases by one standard score when X_1 is at its mean; the slope of Y^s against $X_1{}^s$ is predicted to change b_3 units when X_2 increases by one standard score. Thus the meaning of the regression coefficients is reasonably clear, justifying this approach.

Consideration was given to the possibility of using structural equation modelling with latent variables for these analyses; LISREL 7 (Jöreskog & Sörbom, 1989) was available at the time. In theory, LISREL has advantages. It can estimate structural parameters whilst taking into account measurement errors; and it can estimate all the structural parameters in a causal network simultaneously; it can do both these things simultaneously. It might be argued that, in this study, there is only one indicator (the scale score) per latent variable, and that LISREL requires more than this for identification purposes. (See, for example, Bollen, 1989, for identification rules, one of which is that in a one-factor model it is sufficient to have at least three indicators with nonzero loadings and theta-delta diagonal). However, one could get around this by using all the scale's items as observed variables, loading on one latent variable (perhaps also fixing the factor loadings to be equal because it is an additive scale). Hence the 36 items in Rosenbaum's (1990a) Self-Control Scale could serve as observed variables for one latent variable. This approach might be cumbersome, and exceed LISREL's workspace limitation. A compromise might be to divide the 36 items into say 3 groups of 12 and sum each group thereby creating three observed variables for one latent variable. Another compromise might be to use the total scale score as the observed variable, but fixing the error variance at a value derived from the scale's known reliability (see Jöreskog & Sörbom, 1982, 1989, and Hayduk, 1987). This would at least be better than fixing the error variance to zero, that is to say ignoring it (as conventional regression analysis does). However, it would be dispensing with one of LISREL's strengths, the ability to estimate error variance.

LISREL might be used to model interactions by splitting the sample on the moderator variable and conducting a multi-sample analysis. However, this requires a larger sample. LISREL might be used to model interactions by including product terms. The problem is that complex error terms are generated, and the solution is to use phantom variables: see for example Kenny and Judd (1984), Rindskopf (1984) and Hayduk (1987). However, even for a single interaction, such models are quite complex, and would probably require a larger sample size. LISREL might be used with product terms but without measurement error. However, there is an additional problem, in that Maximum Likelihood estimation assumes multivariate normality, but the products of multinormally distributed variables cannot themselves be multinormally distributed. Maximum Likelihood estimation is reasonably robust against moderate deviations from this assumption (Bollen, 1989; Boomsma, 1987; Cuttance, 1987), and Hayduk (1987) demonstrates that this could extend to product terms. An alternative would be to use estimation procedures that do not assume multivariate normality, such as Weighted Least Squares, but this would require a larger sample size.

Consideration of the possibility of using LISREL finally lead to the following thoughts. One might build a model with stressors, coping strategies and products causing symptoms (to study whether coping moderates between stressor and symptoms). One might extend the model to have resources causing coping (to study whether coping mediates between resources and symptoms). One might extend the model to include negative affectivity causing symptoms and stressors and also perhaps coping and resources (to study a possible confound). But, in such an extended model, how exactly do the product variables fit in? Should negative affectivity cause these products? Should resources cause coping products, should resource products cause coping, should resource products cause coping products? There is no obvious answer to these questions. If the approach was taken of splitting the sample on the stressor variable and conducting a multi-sample analysis, the questions would not apply, but as noted, this would certainly require a larger sample size. It was therefore, finally decided to use conventional regression analysis with cross-product terms (although it may be that, in so doing, one is simply glossing over the problems). The effect of ignoring random measurement error in the dependent variable is that parameter estimates are unbiased but less efficient, and R^2 is attenuated. The effect of ignoring random measurement error in the independent variables is that parameter estimates are biased in a direction that is not readily predictable except in the bivariate case where the bias is towards a smaller value than the true population value (Berry, 1993).

As well as arguments against using LISREL, there is a specific advantage to using something like the regression procedure in SPSS (Norusis, 1990b). The regression procedure in SPSS offers residuals (disturbance terms) for cases; these are diagnostically useful.

Controlling for negative affectivity. It was decided to control for negative affectivity by entering Neuroticism as the first step in the regression analysis. Whilst confident that this was a simple but adequate procedure for dealing with a potential confound, there were other, subtly different, possibilities. One might instead remove the effect of Neuroticism from the dependent variable, save the residual, and use that as the new dependent variable. Alternatively, or additionally, one might remove the effect of Neuroticism from the independent variable, save the residual and use that as the new independent variable.

Absolute versus relative scores. Consideration was given to the question of whether to use absolute or relative coping scores, the latter being advocated by Vitaliano, Maiuro, Russo, and Becker (1987). Thus, the score of an individual on a particular coping strategy could be their scale score (absolute score), or their scale score divided by their total for all strategies (relative score). Relative scores might be advocated for two reasons. First, relative scores might be a means of controlling for the general tendency to employ (or report) coping strategies. However, one would more effectively achieve such control, in regression analysis, by partialling out the effect of total coping prior to considering the effect of specific coping on well-being. Second, relative scores might be advocated as a means of handling an interaction between specific and total coping. (Dividing by the total score is not a simple transformation involving division of one variable by a constant, rather it is division of one variable by another variable). However, one would normally handle this, in regression analysis, by entering product terms after entering both main terms. (These arguments are additional to the general problem that, in computing the relative score, the absolute score appears as the numerator and also contributes to the denominator; one can of course use the remainder rather than the total as the denominator).

Relative scores might alternatively be defined as the ratio of one specific coping strategy to another specific coping strategy (rather than total coping). This, again, might be advocated as a way of testing an interaction. Again, one would better handle this by hierarchical linear regression analysis with cross-product terms (or some alternative).

The same kind of arguments could be applied to the use of relative mental health scores. The score of an individual on a particular aspect of mental ill-health could be their scale score (absolute score), or their scale score divided by their total score for all aspects of mental ill-health (relative score). Such relative scores might be a means of controlling for the general tendency to experience (or report) symptoms. However, one would more effectively achieve such control, in regression analysis, by partialling out the effect of total symptoms prior to considering other relationships.

As regards the current data set, there was no evidence for a general factor underlying the coping strategies (see Chapter 2). It was not therefore thought necessary to control for a general tendency to employ (or report) coping. Some specific hypotheses were made concerning interactions between coping variables (see below). It was thought necessary to control for a general tendency to report symptoms, that is to say negative affectivity (see above). The control was to enter Neuroticism into the regression equation.

Goodness of fit hypothesis. The goodness of fit hypothesis posits that the effect of a stressor on well-being is moderated by an interactive effect of perceived controllability of the stressor and coping strategy. This amounts to a three-way interaction between stressor, perceived controllability and coping strategy.

In order to test such a hypothesis, one needs measures of the stressor, perceived controllability of the stressor, coping strategy, and symptoms. In this research, there was a measure of perceived level of stressor, a measure of coping strategies, and a measure of symptoms (although the stressor measure was work-specific but the coping and symptoms measures were more general).

However, there was no measure of perceived controllability of the stressor. The ad hoc nature of controllability measures is a major weakness of previous goodness of fit studies (Conway & Terry, 1992; Forsythe & Compas, 1987; Vitaliano, Dewolfe, Maiuro, Russo, & Katon, 1990). There were two possible candidates as a proxy for perceived controllability of the stressor. The first was the Acceptance scale of COPE (Carver et al., 1989). Examination of the items (*I get used to the idea that it happened, I accept that this has happened and that it can't be changed, I accept the reality of the fact that it happened, I learn to live with it*) suggests a mixture of perceived non-controllability, non-denial, and non-action. The other possible proxy for perceived controllability might be one of the Spheres of Control or Self-Control scales. Given the general uncertainty as to what exactly these scales measure, it is not entirely implausible that they in part reflect a generalised belief in the personal controllability of events. It was decided, therefore, to conduct tests of the goodness of fit hypothesis using these variables (Acceptance, Spheres of Control, and Self-Control scales) and as proxies for perceived controllability of the stressor.

Year 2 data. As noted, subjects were interviewed at two points in time, Year 1 and Year 2, making the study nominally a prospective panel design (Menard, 1991). At year 2, measures were repeated for stressors, coping strategies, and health and well-being variables, but not for resource variables nor the Neuroticism or Lie scales.

Those who were successfully followed up (N = 102) were compared with those who were not (N = 7), by examining differences in means on key variables at Year 1. For those who were successfully followed up, Year 2 scores were compared with Year 1 scores on the stressor, coping and well-being variables, to check whether there had been changes in the mean levels of these key variables over time.

In discussing causal analysis of longitudinal data, Menard (1991) distinguishes between four types of model: "(a) the value of the dependent variable(s) is expressed as a function of the value(s) of the independent variable(s); (b) the value of the dependent variable(s) is expressed as a function of the change in the independent variable(s); (c) the change in the dependent variables is expressed as a function of the value of the independent variable(s); and (d) the change in the dependent variable(s) is expressed as a function of the change in the independent variable(s)" (p. 59). In this instance, the third type of model was of interest: does a particular coping strategy cause a change in symptoms?

The approach taken was to use the lagged endogenous variable as the dependent variable. Logically (with Y as the dependent variable and X the independent variable), using a gain score as the dependent variable ($Y_2 - Y_1 = a + bX$) is the same as using a lagged endogenous variable ($Y_2 = a + bX + cY_1$), except that in the former case the regression coefficient associated with Y_1 is constrained to be one. Markus (1979) suggests that there is nothing to be gained from this additional constraint. Note that gain scores, whether raw gain scores or residual gain scores, are particularly prone to be unreliable (Cronbach & Furby, 1970; Plewis, 1985).

Consideration was then given to the appropriate means of controlling for negative affectivity. McCrae (1990) argues that longitudinal designs, where the individual is used as his or her own control, are a form of control for neuroticism: "If an individual is more depressed after losing a job than before, we can be fairly confident in attributing the depression to unemployment rather than a depressive disposition" (p. 240). However, it could be argued that negative affectivity might well influence reported *change* in symptoms (those high on negative affectivity being more likely to report that things have got worse). It was decided, therefore, that the appropriate way to proceed was to first enter the baseline symptoms measure, then the negative affectivity measure, then the stressor and coping variables.

However, it was decided to concentrate on the effect of Year 2, rather than Year 1, variables on change in well-being from Year 1 to Year 2. Thus, it was decided to concentrate on the question "Do the stressors you are currently experiencing and the ways you are currently coping affect whether you feel better this year than you did last year?" rather than the question "Do the stressors you experienced last year and the ways you coped last year affect whether you feel better this year than you did last year?". By concentrating on the first question, one is looking at fairly immediate rather than delayed effects of stressors and coping. It might seem that if one addressed the second question, one would be in a position to claim causality through temporal precedence. However, such a claim would be somewhat spurious if there was a degree of consistency over time in stressor and coping (which there was, as reported below).

Results

Age and Sex

The associations of age and sex with key variables (Neuroticism, the two well-being variables, the four coping variables, and the six resource variables) were as follows. Age correlated significantly (at the .05 level) only with Personal Efficacy (r = -.20, N = 109, p = .04) and Interpersonal Support (r = -.20, N = 109, p = .04). It was decided, therefore, to drop age from further consideration. On Neuroticism, women (M = 12.2, SD = 5.3) were higher than men (M = 8.5, SD = 5.1), $t(107) = 3.55$, $p < .01$. MANOVA indicated that sex was significantly associated with the coping variables, approximate $F(4, 104) = 5.52$, $p < .01$, and follow-up discriminant function analysis indicated that the crucial variable was Seeking Emotional Support, on which women scored higher than men (see Chapter 2). MANOVA indicated that sex was significantly associated with the well-being variables, approximate $F(2, 106) = 4.47$, $p = .01$. Follow-up discriminant function analysis indicated that the crucial variable was Symptoms (standardised structure coefficient = .79, women's M = .51 and SD = .24, men's M = .40 and SD = .26), rather than Satisfaction (standardised structure coefficient .29, women's M = 24.3 and SD = 6.1, men's M = 23.2 and SD = 6.8). MANOVA indicated that sex was not significantly associated with the resource variables, approximate $F(6, 102) = 1.91$, $p = .09$. It was decided that sex could not be excluded from consideration. However, it was decided, rather than including it routinely in all analyses, to include it in some post hoc analyses.

The Eysenck Personality Questionnaire Lie scale (the indicator of social desirability) did not correlate significantly with any other variable whatsoever. It was, therefore, dropped from consideration.

Effect of Stressor and Resources on Coping Strategies

In these regression analyses, the aim was to establish whether stressor and resources had effects on coping strategies, having first controlled for the effect of negative affectivity on coping strategies. The dependent variables were in turn, Active Coping, Acceptance, Seeking Emotional Support, and Behavioral Disengagement.

Consider Active Coping as the dependent variable. First Neuroticism was entered, then Pressure, then Personal Efficacy, then Personal Efficacy's product. (These entries were cumulative; when entering a variable, previously entered variables were not removed. *Product* means the product with Pressure). This was repeated for each of the resource variables in turn: Personal Efficacy, Interpersonal Control, Sociopolitical Control, Self-Control, Interpersonal Support, and Health Value. As shown in Table 27, F-changes significant at the .05 level were apparent when entering Neuroticism (R^2 change = .08) but not when then entering Pressure. Beyond that, F-changes were significant when entering Personal Efficacy (R^2 change = .07, regression coefficient positive), Interpersonal Control (R^2 change = .05, regression coefficient positive), and Self-Control (R^2 change = .15, regression coefficient positive). (By regression coefficient is meant the coefficient in the final equation containing Neuroticism, Pressure, the resource variable and its product.) Then an omnibus equation was created, containing Neuroticism, Pressure, all resource variables, and all products (that is to say all products of Pressure with resources). Subsets of variables were removed. Note that whenever Pressure or resource variables were removed their products were also removed, whereas products could be removed without their multiplicands. Removal was not cumulative; in effect, prior to removing a subset, the previously removed subset was re-entered. If the F-change for a subset of variables was significant, this was an indication that the subset made a contribution to explaining the variance in Symptoms that was unique (in the sense of not being explained by the other variables in the equation). As shown in Table 27, for the omnibus equation, R^2 was .32, and significant changes were apparent when removing all resources with their products (R^2 change = .23), Self-Control with its product (R^2 change = .10), and Self-Control's product alone (R^2 change = .04). In addition (not shown in Table 27), sex was added to the omnibus equation, and subsets of variables again removed. With sex added to the omnibus equation, R^2 was .32, and significant changes were apparent when removing all resources with their products (R^2 change = .22), Self-Control with its product (R^2 change = .10), and Self-Control's product alone (R^2 change = .04), but not when removing sex. That is to say, sex made little difference of any kind.

For Acceptance as the dependent variable, no significant changes were apparent when entering variables or removing variables, and sex made little difference of any kind.

Table 27

Regression Analyses of Year 1 Data

Equation[a]	δR^2 [b]	F	df [c]	$p(F)$	b [d]	t	$p(t)$	r [e]
Active Coping/								
+ Neuroticism	.08	9.68	1	.00	-.23	-2.45	.02	-.29
+ Pressure	.00	.29	1	.59	-.03	-.32	.75	-.13
+ Personal Efficacy	.07	8.45	1	.00	.27	2.89	.00	.31
+ Pressure x Personal Efficacy	.00	.01	1	.93	.01	.08	.93	.03
Active Coping/								
+ Neuroticism	.08	9.68	1	.00	-.17	-1.70	.09	-.29
+ Pressure	.00	.29	1	.59	-.05	-.52	.60	-.13
+ Interpersonal Control	.05	6.49	1	.01	.24	2.42	.02	.33
+ Pressure x Interpersonal Control	.00	.35	1	.55	-.05	-.59	.55	-.08
Active Coping/								
+ Neuroticism	.08	9.68	1	.00	-.28	-2.82	.01	-.29
+ Pressure	.00	.29	1	.59	-.06	-.62	.53	-.13
+ Sociopolitical Control	.00	.51	1	.48	.07	.80	.43	.09
+ Pressure x Sociopolitical Control	.01	1.27	1	.26	.11	1.13	.26	.06
Active Coping/								
+ Neuroticism	.08	9.68	1	.00	-.14	-1.55	.12	-.29
+ Pressure	.00	.29	1	.59	-.05	-.55	.58	-.13
+ Self-Control	.15	20.11	1	.00	.37	3.96	.00	.46
+ Pressure x Self-Control	.02	3.40	1	.07	-.13	-1.84	.07	-.23
Active Coping/								
+ Neuroticism	.08	9.68	1	.00	-.22	-2.23	.03	-.29
+ Pressure	.00	.29	1	.59	-.07	-.68	.50	-.13
+ Interpersonal Support	.03	3.28	1	.07	.18	1.86	.07	.25
+ Pressure x Interpersonal Support	.01	1.18	1	.28	-.10	-1.09	.28	-.05
Active Coping/								
+ Neuroticism	.08	9.68	1	.00	-.29	-2.89	.00	-.29
+ Pressure	.00	.29	1	.59	-.03	-.30	.77	-.13
+ Health Value	.00	.00	1	.98	-.01	-.06	.95	.00
+ Pressure x Health Value	.01	.70	1	.40	-.08	-.84	.40	-.07

(table continues)

Equation[a]	δR^2 [b]	F	df [c]	$p(F)$	b [d]	t	$p(t)$	r [e]
Active Coping/								
+ All variables below	.32	3.12	14	.00				
- Neuroticism	.01	1.70	1	.20				
- Pressure & all products	.06	1.18	7	.32				
- All resources & all products	.23	2.66	12	.00				
- Personal Efficacy & its product	.02	1.68	2	.19				
- Interpersonal Control & its product	.01	.83	2	.44				
- Sociopolitical Control & its product	.02	1.14	2	.32				
- Self-Control & its product	.10	7.20	2	.00				
- Interpersonal Support & its product	.01	.42	2	.66				
- Health Value & its product	.01	.54	2	.58				
- All products	.06	1.37	6	.23				
- Personal Efficacy's product	.01	1.53	1	.22				
- Interpersonal Control's product	.01	1.08	1	.30				
- Sociopolitical Control's product	.01	2.02	1	.16				
- Self-Control's product	.04	5.72	1	.02				
- Interpersonal Support's product	.00	.65	1	.42				
- Health Value's product	.01	.95	1	.33				
Acceptance/								
+ Neuroticism	.00	.10	1	.76	-.00	-.03	.98	-.03
+ Pressure	.01	1.29	1	.26	-.10	-1.01	.32	-.11
+ Personal Efficacy	.00	.25	1	.62	-.05	-.50	.62	-.03
+ Pressure x Personal Efficacy	.01	.87	1	.35	.09	.93	.35	.11
Acceptance/								
+ Neuroticism	.00	.10	1	.76	.02	.15	.88	-.03
+ Pressure	.01	1.29	1	.26	-.09	-.91	.36	-.11
+ Interpersonal Control	.00	.10	1	.75	.05	.44	.66	.05
+ Pressure x Interpersonal Control	.01	.63	1	.43	.07	.79	.43	.09
Acceptance/								
+ Neuroticism	.00	.10	1	.76	.01	.07	.95	-.03
+ Pressure	.01	1.29	1	.26	-.11	-1.09	.28	-.11
+ Sociopolitical Control	.00	.03	1	.86	-.02	-.22	.83	-.02
+ Pressure x Sociopolitical Control	.00	.34	1	.56	-.06	-.58	.56	-.06

(table continues)

Equation[a]	δR^2 [b]	F	df[c]	p(F)	b[d]	t	p(t)	r[e]
Acceptance/								
+ Neuroticism	.00	.10	1	.76	.00	.04	.97	-.03
+ Pressure	.01	1.29	1	.26	-.13	-1.24	.22	-.11
+ Self-Control	.00	.02	1	.89	-.01	-.05	.96	.03
+ Pressure x Self-Control	.01	.59	1	.45	-.06	-.77	.45	-.06
Acceptance/								
+ Neuroticism	.00	.10	1	.76	.01	.13	.89	-.03
+ Pressure	.01	1.29	1	.26	-.13	-1.25	.21	-.11
+ Interpersonal Support	.00	.25	1	.62	.06	.55	.59	.06
+ Pressure x Interpersonal Support	.01	.83	1	.37	-.09	-.91	.36	-.06
Acceptance/								
+ Neuroticism	.00	.10	1	.76	.01	.05	.96	-.03
+ Pressure	.01	1.29	1	.26	-.12	-1.12	.27	-.11
+ Health Value	.00	.00	1	.99	.00	.01	.99	.00
+ Pressure x Health Value	.00	.02	1	.90	.01	.12	.90	-.02
Acceptance/								
+ All variables below	.07	.48	14	.94				
- Neuroticism	.00	.04	1	.83				
- Pressure & all products	.06	.86	7	.54				
- All resources & all products	.05	.46	12	.93				
- Personal Efficacy & its product	.01	.51	2	.60				
- Interpersonal Control & its product	.02	.92	2	.40				
- Sociopolitical Control & its product	.00	.21	2	.81				
- Self-Control & its product	.00	.13	2	.88				
- Interpersonal Support & its product	.02	1.01	2	.37				
- Health Value & its product	.00	.21	2	.81				
- All products	.05	.80	6	.57				
- Personal Efficacy's product	.00	.35	1	.55				
- Interpersonal Control's product	.02	1.77	1	.19				
- Sociopolitical Control's product	.00	.42	1	.52				
- Self-Control's product	.00	.24	1	.62				
- Interpersonal Support's product	.02	1.98	1	.16				
- Health Value's product	.00	.40	1	.53				

(table continues)

Equation[a]	δR^2[b]	F	df[c]	$p(F)$	b[d]	t	$p(t)$	r[e]
Seeking Emotional Support/								
+ Neuroticism	.01	.82	1	.37	.12	1.18	.24	.09
+ Pressure	.00	.00	1	.99	.04	.45	.66	.03
+ Personal Efficacy	.04	3.99	1	.05	.20	2.04	.04	.17
+ Pressure x Personal Efficacy	.03	3.28	1	.07	.17	1.81	.07	.16
Seeking Emotional Support/								
+ Neuroticism	.01	.82	1	.37	.16	1.53	.13	.09
+ Pressure	.00	.00	1	.99	.05	.49	.63	.03
+ Interpersonal Control	.03	3.55	1	.06	.22	2.14	.03	.13
+ Pressure x Interpersonal Control	.03	2.87	1	.09	.16	1.70	.09	.13
Seeking Emotional Support/								
+ Neuroticism	.01	.82	1	.37	.10	.94	.35	.09
+ Pressure	.00	.00	1	.99	.00	.05	.96	.03
+ Sociopolitical Control	.00	.06	1	.80	.02	.19	.85	.02
+ Pressure x Sociopolitical Control	.01	.60	1	.44	-.08	-.78	.44	-.07
Seeking Emotional Support/								
+ Neuroticism	.01	.82	1	.37	.14	1.29	.20	.09
+ Pressure	.00	.00	1	.99	-.01	-.13	.89	.03
+ Self-Control	.02	2.70	1	.10	.13	1.24	.22	.12
+ Pressure x Self-Control	.02	2.34	1	.13	-.13	1.53	.13	-.18
Seeking Emotional Support/								
+ Neuroticism	.01	.82	1	.37	.21	2.16	.03	.09
+ Pressure	.00	.00	1	.99	.02	.16	.87	.03
+ Interpersonal Support	.15	18.11	1	.00	.40	4.22	.00	.33
+ Pressure x Interpersonal Support	.00	.04	1	.84	.02	.21	.83	.02
Seeking Emotional Support/								
+ Neuroticism	.01	.82	1	.37	.08	.75	.45	.09
+ Pressure	.00	.00	1	.99	.02	.21	.83	.03
+ Health Value	.01	.73	1	.39	.08	.83	.41	.08
+ Pressure x Health Value	.00	.42	1	.52	-.06	-.65	.52	-.07

(table continues)

Equation[a]	δR^2[b]	F	df[c]	$p(F)$	b[d]	t	$p(t)$	r[e]
Seeking Emotional Support/								
+ All variables below	.27	2.51	14	.00				
- Neuroticism	.03	3.98	1	.05				
- Pressure & all products	.10	1.82	7	.09				
- All resources & all products	.26	2.84	12	.00				
- Personal Efficacy & its product	.05	3.24	2	.04				
- Interpersonal Control & its product	.00	.14	2	.87				
- Sociopolitical Control & its product	.00	.30	2	.74				
- Self-Control & its product	.06	3.82	2	.03				
- Interpersonal Support & its product	.10	6.47	2	.00				
- Health Value & its product	.01	.37	2	.69				
- All products	.10	2.11	6	.06				
- Personal Efficacy's product	.04	5.12	1	.03				
- Interpersonal Control's product	.00	.00	1	.97				
- Sociopolitical Control's product	.00	.24	1	.62				
- Self-Control's product	.06	7.58	1	.01				
- Interpersonal Support's product	.00	.63	1	.43				
- Health Value's product	.00	.60	1	.44				
Behavioral Disengagement/								
+ Neuroticism	.06	6.82	1	.01	.13	1.48	.14	.24
+ Pressure	.05	5.90	1	.02	.17	1.92	.06	.28
+ Personal Efficacy	.07	8.86	1	.00	-.27	-3.09	.00	-.32
+ Pressure x Personal Efficacy	.05	7.21	1	.01	-.23	-2.69	.01	-.27
Behavioral Disengagement/								
+ Neuroticism	.06	6.82	1	.01	.02	.26	.80	.24
+ Pressure	.05	5.90	1	.02	.14	1.62	.11	.28
+ Interpersonal Control	.13	17.96	1	.00	-.45	-5.08	.00	-.44
+ Pressure x Interpersonal Control	.10	15.63	1	.00	-.31	-3.95	.00	-.30
Behavioral Disengagement/								
+ Neuroticism	.06	6.82	1	.01	.18	1.84	.07	.24
+ Pressure	.05	5.90	1	.02	.23	2.42	.02	.28
+ Sociopolitical Control	.00	.01	1	.92	-.01	-.13	.90	-.02
+ Pressure x Sociopolitical Control	.00	.12	1	.73	-.03	-.35	.73	.01

(table continues)

Equation[a]	δR^2 [b]	F	df [c]	$p(F)$	b [d]	t	$p(t)$	r [e]
Behavioral Disengagement/								
+ Neuroticism	.06	6.82	1	.01	.12	1.18	.24	.24
+ Pressure	.05	5.90	1	.02	.17	1.83	.07	.28
+ Self-Control	.02	2.42	1	.12	-.21	-2.19	.03	-.24
+ Pressure x Self-Control	.05	6.94	1	.01	-.20	-2.63	.01	-.23
Behavioral Disengagement/								
+ Neuroticism	.06	6.82	1	.01	.11	1.12	.27	.24
+ Pressure	.05	5.90	1	.02	.19	2.05	.04	.28
+ Interpersonal Support	.03	3.51	1	.06	-.17	-1.80	.07	-.24
+ Pressure x Interpersonal Support	.04	4.62	1	.03	-.19	-2.15	.03	-.26
Behavioral Disengagement/								
+ Neuroticism	.06	6.82	1	.01	.19	1.93	.06	.24
+ Pressure	.05	5.90	1	.02	.21	2.13	.04	.28
+ Health Value	.00	.00	1	.97	.01	.07	.94	-.01
+ Pressure x Health Value	.01	.60	1	.44	.07	.77	.44	.11
Behavioral Disengagement/								
+ All variables below	.37	3.94	14	.00				
- Neuroticism	.00	.11	1	.74				
- Pressure & all products	.14	3.05	7	.01				
- All resources & all products	.26	3.24	12	.00				
- Personal Efficacy & its product	.01	.81	2	.45				
- Interpersonal Control & its product	.09	6.84	2	.00				
- Sociopolitical Control & its product	.00	.25	2	.78				
- Self-Control & its product	.01	.76	2	.47				
- Interpersonal Support & its product	.00	.13	2	.88				
- Health Value & its product	.00	.02	2	.98				
- All products	.11	2.66	6	.02				
- Personal Efficacy's product	.00	.20	1	.65				
- Interpersonal Control's product	.03	4.53	1	.04				
- Sociopolitical Control's product	.00	.00	1	.97				
- Self-Control's product	.01	1.51	1	.22				
- Interpersonal Support's product	.00	.04	1	.84				
- Health Value's product	.00	.02	1	.89				

(table continues)

Equation[a]	δR^2[b]	F	df[c]	p(F)	b[d]	t	p(t)	r[e]
Symptoms/								
+ Neuroticism	.48	97.90	1	.00	.61	8.51	.00	.69
+ Pressure	.07	16.00	1	.00	.27	3.96	.00	.45
+ Active Coping	.00	.03	1	.87	-.00	-.02	.98	-.22
+ Pressure x Active Coping	.00	.10	1	.75	.02	.32	.75	.07
Symptoms/								
+ Neuroticism	.48	97.90	1	.00	.61	8.79	.00	.69
+ Pressure	.07	16.00	1	.00	.27	3.90	.00	.45
+ Acceptance	.00	.17	1	.68	-.03	-.38	.70	-.08
+ Pressure x Acceptance	.00	.10	1	.75	.02	.32	.75	.03
Symptoms/								
+ Neuroticism	.48	97.90	1	.00	.61	8.79	.00	.69
+ Pressure	.07	16.00	1	.00	.27	3.88	.00	.45
+ Seeking Emotional Support	.00	.58	1	.45	.05	.76	.45	.11
+ Pressure x Seeking Emotional Support	.00	.06	1	.80	.02	.25	.80	.08
Symptoms/								
+ Neuroticism	.48	97.90	1	.00	.58	8.45	.00	.69
+ Pressure	.07	16.00	1	.00	.23	3.28	.00	.45
+ Behavioral Disengagement	.03	7.56	1	.01	.18	2.57	.01	.39
+ Pressure x Behavioral Disengagement	.00	.08	1	.77	.02	.29	.77	.27
Symptoms/								
+ All variables below	.58	13.79	10	.00				
- Neuroticism	.25	59.06	1	.00				
- Pressure & all products	.05	2.42	5	.04				
- All coping strategies & all products	.04	1.13	8	.35				
- Active Coping & its product	.00	.08	2	.92				
- Acceptance & its product	.00	.36	2	.70				
- Seeking Emotional Support & its product	.00	.18	2	.83				
- Behavioral Disengagement & its product	.03	3.93	2	.02				
- All products	.01	.36	4	.83				
- Active Coping's product	.00	.11	1	.74				
- Acceptance's product	.00	.66	1	.42				
- Seeking Emotional Support's product	.00	.12	1	.73				
- Behavioral Disengagement's product	.00	.15	1	.70				

(table continues)

Equation[a]	δR^2[b]	F	df[c]	$p(F)$	b[d]	t	$p(t)$	r[e]
Symptoms/								
+ Neuroticism	.48	97.90	1	.00	.60	8.66	.00	.69
+ Pressure	.07	16.00	1	.00	.27	3.86	.00	.45
+ Personal Efficacy	.01	1.57	1	.21	-.08	-1.25	.22	-.22
+ Pressure X Personal Efficacy	.00	.02	1	.89	.01	.14	.89	-.07
Symptoms/								
+ Neuroticism	.48	97.90	1	.00	.56	7.64	.00	.69
+ Pressure	.07	16.00	1	.00	.27	3.82	.00	.45
+ Interpersonal Control	.01	3.43	1	.07	-.13	-1.83	.07	-.40
+ Pressure x Interpersonal Control	.00	.00	1	.97	-.00	-.04	.97	-.04
Symptoms/								
+ Neuroticism	.48	97.90	1	.00	.62	8.86	.00	.69
+ Pressure	.07	16.00	1	.00	.27	3.97	.00	.45
+ Sociopolitical Control	.00	.05	1	.82	.01	.20	.85	-.03
+ Pressure x Sociopolitical Control	.00	.20	1	.65	-.03	-.45	.65	.06
Symptoms/								
+ Neuroticism	.48	97.90	1	.00	.57	8.17	.00	.69
+ Pressure	.07	16.00	1	.00	.23	3.41	.00	.45
+ Self-Control	.01	2.12	1	.15	-.15	-2.12	.04	-.35
+ Pressure x Self-Control	.03	7.56	1	.01	-.15	-2.75	.01	-.19
Symptoms/								
+ Neuroticism	.48	97.90	1	.00	.57	8.03	.00	.69
+ Pressure	.07	16.00	1	.00	.27	3.92	.00	.45
+ Interpersonal Support	.01	3.21	1	.08	-.12	-1.78	.08	-.34
+ Pressure x Interpersonal Support	.00	.00	1	.99	.00	.02	.98	-.14
Symptoms/								
+ Neuroticism	.48	97.90	1	.00	.61	8.76	.00	.69
+ Pressure	.07	16.00	1	.00	.27	3.80	.00	.45
+ Health Value	.00	.00	1	.98	.00	.03	.98	-.02
+ Pressure x Health Value	.00	.01	1	.92	.01	.10	.92	.02

(table continues)

Equation[a]	δR^2 [b]	F	df[c]	$p(F)$	b [d]	t	$p(t)$	r [e]
Symptoms/								
+ All variables below	.61	10.53	14	.00				
- Neuroticism	.20	48.81	1	.00				
- Pressure & all products	.10	3.53	7	.00				
- All resources & all products	.06	1.29	12	.23				
- Personal Efficacy & its product	.00	.60	2	.55				
- Interpersonal Control & its product	.00	.44	2	.65				
- Sociopolitical Control & its product	.00	.23	2	.79				
- Self-Control & its product	.04	4.95	2	.01				
- Interpersonal Support & its product	.00	.93	2	.40				
- Health Value & its product	.00	.07	2	.93				
- All products	.04	1.65	6	.14				
- Personal Efficacy's product	.00	.99	1	.32				
- Interpersonal Control's product	.00	.00	1	.99				
- Sociopolitical Control's product	.00	.02	1	.88				
- Self-Control's product	.04	9.63	1	.00				
- Interpersonal Support's product	.00	.95	1	.33				
- Health Value's product	.00	.13	1	.72				
Symptoms/								
+ Neuroticism	.48	97.90	1	.00	.55	8.00	.00	.69
+ Pressure	.07	16.00	1	.00	.21	3.06	.00	.45
+ Behavioral Disengagement	.03	7.56	1	.01	.14	1.97	.05	.39
+ Self-Control	.00	1.20	1	.28	-.12	-1.69	.09	-.35
+ Pressure x Self-Control	.02	4.86	1	.03	-.12	-2.21	.03	-.19
Satisfaction/								
+ Neuroticism	.13	16.22	1	.00	-.31	-3.23	.00	-.36
+ Pressure	.04	4.64	1	.03	-.20	-2.16	.03	-.29
+ Active Coping	.00	.10	1	.75	-.04	-.40	.69	.09
+ Pressure x Active Coping	.00	.07	1	.79	-.02	-.27	.79	-.03
Satisfaction/								
+ Neuroticism	.13	16.22	1	.00	-.30	-3.27	.00	-.36
+ Pressure	.04	4.64	1	.03	-.21	-2.28	.03	-.29
+ Acceptance	.02	2.13	1	.15	-.13	-1.45	.15	-.10
+ Pressure x Acceptance	.00	.00	1	.99	.00	.02	.99	.02

(table continues)

Equation[a]	δR^2[b]	F	df[c]	$p(F)$	b[d]	t	$p(t)$	r[e]
Satisfaction/								
+ Neuroticism	.13	16.22	1	.00	-.33	-3.74	.00	-.36
+ Pressure	.04	4.64	1	.03	-.18	-2.06	.04	-.29
+ Seeking Emotional Support	.08	11.64	1	.00	.29	3.40	.00	.26
+ Pressure x Seeking Emotional Support	.01	1.18	1	.28	-.09	-1.09	.28	-.14
Satisfaction/								
+ Neuroticism	.13	16.22	1	.00	-.31	-3.28	.00	-.36
+ Pressure	.04	4.64	1	.03	-.21	-2.17	.03	-.29
+ Behavioral Disengagement	.00	.23	1	.63	.04	.45	.65	-.09
+ Pressure x Behavioral Disengagement	.00	.00	1	.97	.00	.04	.96	-.11
Satisfaction/								
+ All variables below	.31	4.46	10	.00				
- Neuroticism	.12	16.82	1	.00				
- Pressure & all products	.06	1.79	5	.12				
- All coping strategies & all products	.14	2.58	8	.01				
- Active Coping & its product	.02	1.22	2	.30				
- Acceptance & its product	.02	1.29	2	.28				
- Seeking Emotional Support & its product	.13	8.97	2	.00				
- Behavioral Disengagement & its product	.01	.64	2	.53				
- All products	.02	.78	4	.54				
- Active Coping's product	.00	.03	1	.87				
- Acceptance's product	.00	.21	1	.65				
- Seeking Emotional Support's product	.01	1.89	1	.17				
- Behavioral Disengagement's product	.01	1.08	1	.30				
Satisfaction/								
+ Neuroticism	.13	16.21	1	.00	-.31	-3.26	.00	-.36
+ Pressure	.04	4.64	1	.03	-.20	-2.15	.03	-.29
+ Personal Efficacy	.00	.05	1	.83	-.02	-.22	.83	.06
+ Pressure x Personal Efficacy	.00	.05	1	.83	-.02	-.22	.83	.03
Satisfaction/								
+ Neuroticism	.13	16.21	1	.00	-.30	-3.25	.00	-.36
+ Pressure	.04	4.64	1	.03	-.19	-2.05	.04	-.29
+ Sociopolitical Control	.01	.91	1	.34	-.09	-1.06	.29	-.06
+ Pressure x Sociopolitical Control	.01	1.69	1	.20	-.12	-1.30	.20	-.16

(table continues)

Equation[a]	δR^2[b]	F	df[c]	$p(F)$	b[d]	t	$p(t)$	r[e]
Satisfaction/								
+ Neuroticism	.13	16.21	1	.00	-.26	-2.62	.01	-.36
+ Pressure	.04	4.64	1	.03	-.20	-2.08	.04	-.29
+ Interpersonal Control	.01	1.22	1	.27	.10	1.05	.30	.25
+ Pressure x Interpersonal Control	.00	.05	1	.82	-.02	-.23	.82	.00
Satisfaction/								
+ Neuroticism	.13	16.21	1	.00	-.29	-2.93	.00	-.36
+ Pressure	.04	4.64	1	.03	-.20	-2.13	.04	-.29
+ Self-Control	.00	.33	1	.57	.04	.45	.65	.19
+ Pressure x Self-Control	.00	.18	1	.67	-.03	-.43	.67	-.01
Satisfaction/								
+ Neuroticism	.13	16.21	1	.00	-.25	-2.63	.01	-.36
+ Pressure	.04	4.64	1	.03	-.19	-2.06	.04	-.29
+ Interpersonal Support	.02	2.89	1	.09	.16	1.68	.10	.26
+ Pressure x Interpersonal Support	.00	.03	1	.87	.01	.16	.87	.10
Satisfaction/								
+ Neuroticism	.13	16.21	1	.00	-.30	-3.20	.00	-.36
+ Pressure	.04	4.64	1	.03	-.20	-2.08	.04	-.29
+ Health Value	.00	.02	1	.89	.01	.14	.89	.02
+ Pressure x Health Value	.00	.01	1	.92	.01	.11	.92	-.01

(table continues)

Equation[a]	δR^2 [b]	F	df [c]	$p(F)$	b [d]	t	$p(t)$	r [e]
Satisfaction/								
+ All variables below	.22	1.91	14	.03				
- Neuroticism	.03	4.09	1	.05				
- Pressure + all products	.05	.92	7	.50				
- All resources + all products	.05	.54	12	.88				
- Personal Efficacy + its product	.00	.18	2	.83				
- Interpersonal Control + its product	.01	.35	2	.71				
- Sociopolitical Control + its product	.02	1.23	2	.30				
- Self-Control + its product	.00	.11	2	.89				
- Interpersonal Support + its product	.01	.80	2	.45				
- Health Value + its product	.00	.01	2	.99				
- All products	.02	.40	6	.88				
- Personal Efficacy's product	.00	.00	1	.99				
- Interpersonal Control's product	.00	.22	1	.64				
- Sociopolitical Control's product	.01	1.73	1	.19				
- Self-Control's product	.00	.07	1	.80				
- Interpersonal Support's product	.00	.35	1	.56				
- Health Value's product	.00	.01	1	.92				

[a]All variables are Year 1. The dependent variable precedes the slash. The plus sign signifies addition of variable(s) to the variable(s) already in the equation. The minus sign signifies removal of variable(s) from the equation containing all variables. All variables were standardised except for the product term which is the product of standardised variables. [b]Stepwise change in R^2. [c]Total df = 108. [d]Unstandardised regression coefficient in the final equation. [e]Zero-order correlation with the independent variable.

For Seeking Emotional Support as the dependent variable, significant changes were not apparent when entering Neuroticism or Pressure. Beyond that, significant changes were apparent for Personal Efficacy (R^2 change = .04, regression coefficient positive) and Interpersonal Support (R^2 change = .15, regression coefficient positive). For the omnibus equation, R^2 was .27. There were significant changes when removing all resources with their products (R^2 change = .26), Personal Efficacy with its product (R^2 change = .05), Self-Control with its product (R^2 change = .06), Interpersonal Support with its product (R^2 change = .10), Personal Efficacy's product alone (R^2 change = .04), and Self-Control's product alone (R^2 change = .06). With sex added to the omnibus equation, R^2 was .34, and there were significant changes when removing all resources with their products (R^2 change = .17), Interpersonal Support with its product (R^2 change = .05), Personal Efficacy's product alone (R^2 change = .03), Self-Control's product alone (R^2 change = .04), and sex (R^2 change = .06). That is to say, sex added to total explained variance, and slightly reduced the variance uniquely explained by Interpersonal Support.

For Behavioral Disengagement as the dependent variable, significant changes were apparent when entering Neuroticism (R^2 change = .06), and then Pressure (R^2 change = .05). Beyond that, significant changes were apparent for Personal Efficacy (R^2 change = .07) and for its product (R^2 change = .05). The full equation was BD = -.03 + .13N + .17Pr - .27PE - .23PrPE, where BD = Behavioral Disengagement, N = Neuroticism, Pr = Pressure, PE = Personal Efficacy. Hence, with N = 0: if PE = -1 (one standard deviation below the mean), then BD = +.24 + 40Pr; if PE = +1 (one standard deviation above the mean), then BD = -.30 - .06Pr. Significant changes were also apparent for Interpersonal Control (R^2 change = .13) and for its product (R^2 change = .10). The full equation was BD = -.05 + .02N + .14Pr - .45IC - .31PrIC, where BD = Behavioral Disengagement, N = Neuroticism, Pr = Pressure, IC = Interpersonal Control. Hence, with N = 0: if IC = -1, then BD = .40 + .45Pr; if IC =

+1, then BD = -.50 - .17Pr. A significant change was also apparent for Self-Control's product (R^2 change = .05). The full equation was BD = -.04 + .12N + .17Pr - .21SC - .20PrSC, where BD = Behavioral Disengagement, N = Neuroticism, Pr = Pressure, SC = Self-Control. Hence, with N = 0: if SC = -1, then BD = .17 + .37Pr; if SC = +1, then BD = -.25 - .03Pr. A significant change was also apparent for Interpersonal Support's product (R^2 change = .04). The full equation was BD = -.02 + .11N + .19Pr - .17IS - .19PrIS, where BD = Behavioral Disengagement, N = Neuroticism, Pr = Pressure, IS = Interpersonal Support. Hence, with N = 0: if IS = -1, then BD = .15 + .38Pr; if IS = +1, then BD = -.19 + .00Pr. For the omnibus equation, R^2 was .37, and there were significant changes when removing Pressure with its products (R^2 change = .14), all resources with their products (R^2 change = .26), Interpersonal Control with its product (R^2 change = .09), all products (R^2 change = .11), and Interpersonal Control's product alone (R^2 change = .03). With sex added to the omnibus equation, R^2 was .37, and there were significant changes when removing Pressure with its products (R^2 change = .14), all resources with their products (R^2 change = .26), Interpersonal Control with its product (R^2 change = .09), all products (R^2 change = .11), and Interpersonal Control's product alone (R^2 change = .03), but not when removing sex. That is to say, sex made little difference of any kind.

Recall that Pressure stood for the stressor; Active Coping for problem-focused coping, Acceptance for reappraisal, Seeking Emotional Support for emotion-focused coping, Behavioral Disengagement for avoidance; Spheres of Control and Self-Control for perceived control, Interpersonal Support for social support; and Neuroticism for negative affectivity. Thus, to summarise, for problem-focused coping, after controlling for a small effect of negative affectivity (acting to decrease problem-focused coping), there was no significant main effect of stressor, a small main effect of personal control (acting to increase problem-focused coping), a small main effect of interpersonal control (acting to increase problem-focused coping), and a moderate main effect of self-control (acting to increase problem-focused coping). For reappraisal, there was no effect of negative affectivity, nor of any other variables. For emotion-focused coping, there was no significant effect of negative affectivity, nor of stressor, and a moderate main effect of social support (acting to increase emotion-focused coping). For avoidance, after controlling for a small effect of negative affectivity (acting to increase avoidance), there was a small main effect of stressor (acting to increase avoidance), a small main effect of personal control (acting to decrease avoidance) and a small interactive effect of stressor and personal control, a moderate main effect of interpersonal control (acting to decrease avoidance) and a moderate interactive effect of stressor and interpersonal control, a small interactive effect of stressor and self-control, and a small interactive effect of stressor and social support. The interactive effects were such that as the level of stressor increased, the level of avoidance increased more for those lower on the resource than for those higher on the resource. Independently, being female was also associated with higher emotion-focused coping.

Effect of Stressor and Coping Strategies on Symptoms

In these analyses, the aim was to establish whether coping strategies moderated any effect of stressors on symptoms, having first controlled for the effect of negative affectivity on symptoms. The dependent variable was Symptoms.

As shown in Table 27, significant changes were apparent when entering Neuroticism (R^2 change = .48), and when entering Pressure (R^2 change = .07). Beyond that, F-change was significant only for Behavioural Disengagement (R^2 change = .03). For the omnibus equation, R^2 was .58, and significant F-changes were apparent when removing Neuroticism (R^2 change = .25), Pressure with its products (R^2 change = .05), and Behavioural Disengagement with its product (R^2 change = .03). With sex added to the omnibus equation, R^2 was .58, and significant changes were apparent when removing Neuroticism (R^2 change = .22), Pressure with its products (R^2 change = .05), and Behavioural Disengagement with its product (R^2 change = .02), but not when removing sex. That is to say, sex did not add to total explained variance, but did slightly reduce the variance uniquely explained by Neuroticism. This is consistent with negative affectivity mediating the effect of sex on symptoms. A simplified set of analyses pointed to the same conclusion: sex by itself predicted Neuroticism (R^2 change = .10, p < .01); Neuroticism by itself predicted Symptoms (R^2 change = .48, p < .01); sex by itself predicted Symptoms (R^2 change = .05, p = .02); but with Neuroticism already in the equation, sex did not predict Symptoms (R^2 change = .00, p = .98).

To summarise, it was possible to explain a large proportion (three fifths) of the variance in symptoms. Negative affectivity explained half of the variance in symptoms. After controlling for this large effect of negative affectivity (acting to increase symptoms), there was a small main effect of stressor (acting to increase symptoms), and a small main effect of avoidance (acting to increase symptoms). Being female was associated with higher symptoms, possibly mediated by negative affectivity.

Effect of Stressor and Resources on Symptoms

In these analyses, the aim was to establish whether resources moderated any effect of stressors on symptoms, having first controlled for the effect of negative affectivity on symptoms. The dependent variable was Symptoms.

The analyses were analogous to those in the previous section, but with resource variables taking the place of coping variables. As shown in Table 27, after entering Neuroticism and Pressure, a significant change was apparent only when entering Self-Control's product (R^2 change = .03, regression coefficient negative). The full equation was Symptoms = -.03 + .57N + .23Pr - .15SC - .15PrSC, where N = Neuroticism, Pr = Pressure, SC = Self-Control. Hence, with N = 0 (at the mean): if SC = -1, then Symptoms = .12 + .38Pr; if SC = +1, then Symptoms = -.18 + .08Pr. This then is consistent with a buffering effect. Furthermore, the original Symptoms scores were transformed (logarithmically) so as to inflate low scores relative to high scores. Therefore, in interpreting the results, one should emphasise differences in

Symptoms at high levels of Symptoms. This then looks even more consistent with a buffering effect.

For the omnibus equation, R^2 was .61, and significant changes were apparent when removing Neuroticism (R^2 change = .20), Pressure with its products (R^2 change = .10), Self-Control with its product (R^2 change = .04), and Self-Control's product alone (R^2 change = .04). With sex added to the omnibus equation, R^2 was .61, and significant changes were apparent when removing Neuroticism (R^2 change = .16), Pressure with its products (R^2 change = .10), Self-Control with its product (R^2 change = .04), and Self-Control's product alone (R^2 change = .04), but not when removing sex. That is to say, sex did not add to total explained variance, but did slightly reduce the variance uniquely explained by Neuroticism. Again, this is consistent with negative affectivity mediating the effect of sex on symptoms (see previous simplified analysis).

To summarise, after controlling for the large effect of negative affectivity, and the small main effect of stressor, there was a small buffering effect of self-control (acting to decrease symptoms).

Effect of Stressor and Resources on Symptoms After Controlling for Coping Strategies

In these analyses, the aim was to establish whether stressor and resources had effects on symptoms, having first controlled for the effect of coping strategies (and negative affectivity) on symptoms. In other words, do coping strategies mediate the effect of resources on symptoms, as discussed above? However, only one such analysis was necessary. In the analyses described above, Behavioral Disengagement was the only coping variable to demonstrate a significant relationship with Symptoms, and Self-Control's product (with Pressure) was the only resource variable to demonstrate a significant relationship with Symptoms. Self-Control's product did demonstrate a significant relationship with Behavioral Disengagement. Therefore, it merely remained to establish whether Self-Control's product had a significant relationship with Symptoms, having first controlled for the effect of Behavioral Disengagement on Symptoms.

As shown in Table 27, after entering Neuroticism, Pressure, and Behavioral Disengagement, a significant change was not apparent when entering Self-Control, but there was a significant change for Self-Control's product (R^2 change = .02). (It is a moot point as to whether or not, technically, one should have entered Behavioral Disengagement's product as well as Behavioural Disengagement. It was decided not to enter the product, on the pragmatic grounds that, in the original analysis in which Behavioural Disengagement had predicted Symptoms, the product term had not added significantly to prediction).

To summarise, it appears that the small buffering effect of self-control is not mediated by avoidance.

Analyses for Satisfaction

With Satisfaction as the dependent variable, significant changes were apparent when entering Neuroticism (R^2 change = .13) and then Pressure (R^2 change = .04).

Beyond this effect of Neuroticism and Pressure, the only coping variable producing a significant effect was Seeking Emotional Support (R^2 change = .08, regression coefficient positive). For the omnibus equation containing all coping variables, R^2 was .31, and there were significant changes when removing Neuroticism (R^2 change = .12), all coping strategies with products (R^2 change = .14) and Seeking Emotional Support with its product (R^2 change = .13). With sex added to the omnibus equation, R^2 was .32, and there were significant changes when removing Neuroticism (R^2 change = .12), and Seeking Emotional Support with its product (R^2 change = .09), but not when removing sex. That is to say, sex did not add to total explained variance, but did slightly reduce the variance uniquely explained by Seeking Emotional Support.

Beyond the aforementioned effect of Neuroticism and Pressure, no resource variable or product produced a significant effect. For the omnibus equation containing all resource variables, R^2 was .22, but there were no significant changes when removing variables. With sex added to the omnibus equation, R^2 was .25, and there were significant changes when removing Neuroticism (R^2 change = .06) and sex

(R^2 change = .04). That is to say, sex added to total explained variance.

To summarise, it was possible to explain a third of the variance in life satisfaction. Negative affectivity explained just over a tenth of the variance in life satisfaction. After controlling for this effect of negative affectivity (acting to decrease satisfaction), there was a small main effect of stressor (acting to decrease satisfaction), and a moderate main effect of emotion-focused coping (acting to increase satisfaction).

Goodness of Fit?

The aim of these analyses was to examine the main and interactive effects of perceived controllability and coping behaviour on symptoms, having first controlled for the effect of negative affectivity on symptoms. In addition, the effect of level of stressor was considered. The dependent variable was Symptoms.

The basic analysis was to enter Neuroticism, then enter a coping variable, then enter a proxy for perceived controllability, then enter the product of the coping variable and the proxy for perceived controllability. The coping variable could be Active Coping, Seeking Emotional Support, or Behavioural Disengagement. The proxy for perceived controllability could be Acceptance, Personal Efficacy, Interpersonal Control, Sociopolitical Control, or Self-Control. The analysis could be for the whole sample, for those high on Pressure (at or above the median), or for those low on Pressure (below the median). All combinations were tried.

For the whole sample, there were the (previously noted) significant changes when entering Neuroticism (R^2 change = .48) and then Behavioural Disengagement (R^2 change = .05), but no significant changes beyond that. For those high on Pressure, there were significant changes when entering Neuroticism (R^2 change = .43) and then Behavioural Disengagement (R^2 change = .06), but no significant changes beyond that. For those low on Pressure, there was a significant change when entering Neuroticism (R^2 change = .48), but no significant changes beyond that.

These results provide no support for the goodness of fit hypothesis.

Analysis of Year 2 Data

The comparison between those who were successfully followed up (N = 102) and those who were not (N = 7) revealed the following differences on Year 1 variables. On mean age and on sex, there was no significant difference. On Pressure, dropouts (M = 149.2, SD = 31.4) were significantly lower than the rest (M = 186.9, SD = 46.5), $t(107) = 2.11$, $p = .04$. On the four coping variables, MANOVA indicated no significant overall difference, approximate $F(4, 104) = 1.43$, $p = .23$. On the six resource variables, MANOVA indicated a marginally significant overall difference, approximate $F(6, 102) = 2.23$, $p = .05$. Follow-up discriminant function analysis indicated that the crucial variables were Interpersonal Control (standardised structure coefficient = .60, dropouts M = 39.6 and SD = 5.8, the rest M = 46.9 and SD = 8.5) and perhaps Personal Efficacy (standardised structure coefficient = -.35, dropouts M = 51.7 and SD = 7.9, the rest M = 48.0 and SD = 7.4). On the two well-being variables, MANOVA indicated no significant overall difference, approximate $F(2, 106) = 1.99$, $p = .14$.

For the 102 subjects who were successfully followed up, the comparisons of Year 2 scores with Year 1 scores revealed the following. On Pressure, there was a marginally significant decrease, paired-sample $t(101) = 1.95$, $p = .05$, M = 7.7, SD = 39.8. On coping variables, repeated measures MANOVA indicated that there was no significant overall change, approximate $F(4, 98) = .70$, $p = .60$. On well-being variables, repeated measures MANOVA indicated that there was a significant overall change, approximate $F(2, 100) = 9.07$, $p < .01$). Follow-up discriminant function analysis indicated that the crucial variable was Symptoms (standardised structure coefficient = 1.00) rather than Satisfaction (standardised structure coefficient = -.28). Symptoms decreased from Year 1 (M = .48, SD = .25) to Year 2 (M = .39, SD = .25), the M

within-subject change being -.09, *SD* = .21. There were moderately high correlations between Year 1 and Year 2 scores: for Pressure, $r = .63$, $p < .01$; for Active Coping, $r = .59$, $p < .01$; for Acceptance, $r = .53$, $p < .01$; for Seeking Emotional Support, $r = .55$, $p < .01$; for Behavioral Disengagement, $r = .53$, $p < .01$), for Symptoms, $r = .64$, $p < .01$; for Satisfaction, $r = .65$, $p < .01$; $N = 102$.

In the regression analyses, the aim was to examine the effect of current stressor and current coping on change from the previous year in well-being, whilst controlling for negative affectivity. The results are shown in Table 28.

For Year 2 Symptoms as the dependent variable, significant changes were apparent when entering Year 1 Symptoms (R^2 change = .41), Neuroticism (R^2 change = .05), and Pressure (R^2 change = .14). Beyond that, there was a significant change when entering Seeking Emotional Support's product (R^2 change = .02, regression coefficient positive). The full equation was $Sy_2 = .02 + .43Sy_1 + .17N + .42Pr - .08SE - .14PrSE$, where Sy_2 = Year 2 Symptoms, Sy_1 = Year 1 Symptoms, N = Neuroticism, Pr = Pressure, SE = Seeking Emotional Support. Hence with $Sy_1 = 0$ and $N = 0$: if $SE = -1$, then $Sy_2 = .10 + .56Pr$; if $SE = +1$, then $Sy_2 = -.06 + .28Pr$. This then is broadly consistent with a buffering effect. There was also a significant change when entering Behavioural Disengagement (R^2 change = .03, regression coefficient positive). For the omnibus equation, R^2 was .66, and significant changes were apparent when removing Year 1 Symptoms (R^2 change = .09) and Pressure with its products (R^2 change = .11). With sex added to the omnibus equation, R^2 was .66, and significant changes were apparent when removing Year 1 Symptoms (R^2 change = .09), and Pressure with its products (R^2 change = .11), but not when removing sex. That is to say, sex made little difference of any kind.

To summarise, it was possible to explain a large proportion (two thirds) of the variance in current symptoms. Previous symptoms explained two fifths of the variance in current symptoms. After controlling for this effect of previous symptoms (acting to increase current symptoms), and a

Table 28

Regression Analyses of Year 2 Data with Control for Neuroticism and for Year 1 Levels of the Independent Variable

Equation[a]	δR^2 [b]	F	df [c]	$p(F)$	b [d]	t	$p(t)$	r [e]
Symptoms 2/								
+ Symptoms 1	.41	70.70	1	.00	.38	4.36	.00	.64
+ Neuroticism	.05	8.45	1	.00	.15	1.59	.12	.60
+ Pressure	.14	32.77	1	.00	.38	5.40	.00	.62
+ Active Coping	.02	3.76	1	.06	-.16	-2.27	.03	-.36
+ Pressure x Active Coping	.01	3.35	1	.07	-.10	-1.83	.07	.02
Symptoms 2/								
+ Symptoms 1	.41	70.70	1	.00	.38	4.15	.00	.64
+ Neuroticism	.05	8.45	1	.00	.18	1.96	.05	.60
+ Pressure	.14	32.77	1	.00	.40	5.64	.00	.62
+ Acceptance	.00	.81	1	.37	.06	.85	.40	-.01
+ Pressure x Acceptance	.00	.15	1	.70	-.02	-.39	.70	.11
Symptoms 2/								
+ Symptoms 1	.41	70.70	1	.00	.43	4.66	.00	.64
+ Neuroticism	.05	8.45	1	.00	.17	1.90	.06	.60
+ Pressure	.14	32.77	1	.00	.42	6.05	.00	.62
+ Seeking Emotional Support	.00	.53	1	.47	-.08	-1.24	.22	.10
+ Pressure x Seeking Emotional Support	.02	5.61	1	.02	-.14	-2.37	.02	.07
Symptoms 2/								
+ Symptoms 1	.41	70.70	1	.00	.36	4.02	.00	.64
+ Neuroticism	.05	8.45	1	.00	.15	1.64	.11	.60
+ Pressure	.14	32.77	1	.00	.37	5.05	.00	.62
+ Behavioral Disengagement	.03	7.05	1	.01	.17	2.20	.03	.44
+ Pressure x Behavioral Disengagement	.00	.17	1	.68	.03	.41	.68	.10

(table continues)

Equation[a]	δR^2[b]	F	df[c]	$p(F)$	b[d]	t	$p(t)$	r[e]
Symptoms 2/								
+ All variables below	.66	15.80	11	.00				
- Symptoms 1	.09	23.18	1	.00				
- Neuroticism	.01	1.32	1	.25				
- Pressure & all products	.11	5.72	5	.00				
- All coping strategies & all products	.06	2.09	8	.05				
- Active Coping & its product	.01	1.24	2	.29				
- Acceptance & its product	.01	1.04	2	.36				
- Seeking Emotional Support & its product	.02	2.01	2	.14				
- Behavioral Disengagement & its product	.01	1.51	2	.23				
- All products	.02	1.42	4	.24				
- Active Coping's product	.00	.67	1	.41				
- Acceptance's product	.00	.18	1	.67				
- Seeking Emotional Support's product	.01	3.73	1	.06				
- Behavioral Disengagement's product	.00	.07	1	.79				
Satisfaction 2/								
+ Satisfaction 1	.42	72.58	1	.00	.59	7.46	.00	.65
+ Neuroticism	.02	3.11	1	.08	-.04	-.51	.61	-.35
+ Pressure	.01	2.22	1	.14	-.07	-.88	.38	-.36
+ Active Coping	.05	9.86	1	.00	.25	3.18	.00	.33
+ Pressure x Active Coping	.00	.34	1	.56	.04	.59	.56	-.06
Satisfaction 2/								
+ Satisfaction 1	.42	72.58	1	.00	.57	6.84	.00	.65
+ Neuroticism	.02	3.11	1	.08	-.11	-1.28	.20	-.35
+ Pressure	.01	2.22	1	.14	-.13	-1.49	.14	-.36
+ Acceptance	.00	.05	1	.83	-.01	-.12	.90	-.06
+ Pressure x Acceptance	.00	.49	1	.49	.05	.70	.49	-.01
Satisfaction 2/								
+ Satisfaction 1	.42	72.58	1	.00	.53	6.37	.00	.65
+ Neuroticism	.02	3.11	1	.08	-.13	-1.54	.13	-.35
+ Pressure	.01	2.22	1	.14	-.16	-1.88	.06	-.36
+ Seeking Emotional Support	.03	6.54	1	.01	.19	2.46	.02	.21
+ Pressure x Seeking Emotional Support	.00	.02	1	.88	-.01	-.15	.88	-.11

(table continues)

Equation[a]	δR^2[b]	F	df[c]	$p(F)$	b[d]	t	$p(t)$	r[e]
Satisfaction 2/								
+ Satisfaction 1	.42	72.58	1	.00	.56	6.79	.00	.65
+ Neuroticism	.02	3.11	1	.08	-.07	-.84	.41	-.35
+ Pressure	.01	2.22	1	.14	-.09	-1.05	.30	-.36
+ Behavioral Disengagement	.02	3.31	1	.07	-.15	-1.64	.11	-.34
+ Pressure x Behavioral Disengagement	.00	.00	1	.99	.00	.01	.99	-.05
Satisfaction 2/								
+ All variables below	.54	9.70	11	.00				
- Satisfaction 1	.21	41.00	1	.00				
- Neuroticism	.00	.71	1	.40				
- Pressure & all products	.02	.68	5	.64				
- All coping strategies & all products	.09	2.26	8	.03				
- Active Coping & its product	.03	2.55	2	.08				
- Acceptance & its product	.02	1.76	2	.18				
- Seeking Emotional Support & its product	.02	2.32	2	.10				
- Behavioral Disengagement & its product	.01	.65	2	.52				
- All products	.01	.59	4	.67				
- Active Coping's product	.00	.00	1	.94				
- Acceptance's product	.01	1.95	1	.17				
- Seeking Emotional Support's product	.00	.90	1	.35				
- Behavioral Disengagement's product	.00	.06	1	.81				

[a]All variables are Year 2 except for Symptoms 1, Satisfaction 1 and Neuroticism which are Year 1. The dependent variable precedes the slash. The plus sign signifies addition of variable(s) to the variable(s) already in the equation. The minus sign signifies removal of variable(s) from the equation containing all variables. All variables were standardised except for the product term which is the product of standardised variables. [b]Stepwise change in R^2. [c]Total df = 101. [d]Unstandardised regression coefficient in the final equation. [e]Zero-order correlation with the independent variable.

small effect of negative affectivity (acting to increase current symptoms), there was a moderate main effect of current stressor (acting to increase symptoms), a small buffering effect of emotion-focused coping (acting to decrease symptoms), and a small main effect of avoidance coping (acting to increase symptoms).

For Year 2 Satisfaction as the dependent variable, significant changes were apparent when entering Year 1 Satisfaction (R^2 change = .42), but not Neuroticism, nor Pressure. Beyond that, there was a significant change when entering Active Coping (R^2 change = .05, regression coefficient positive), and when entering Seeking Emotional Support (R^2 change = .03, regression coefficient positive). For the omnibus equation, R^2 was .54, and significant changes were apparent when removing Year 1 Satisfaction (R^2 change = .21) and all coping variables with their products (R^2 change = 09). With sex added to the omnibus equation, R^2 was .54, and significant changes were apparent when removing Year 1 Satisfaction (R^2 change = .20). That is to say, sex made little difference of any kind.

To summarise, it was possible to explain half of the variance in current life satisfaction. Previous satisfaction explained two fifths of the variance in current satisfaction. After controlling for this effect of previous satisfaction (acting to increase current satisfaction), there was no significant effect of negative affectivity, no significant main effect of current stressor, a small main effect of problem-focused coping (acting to increase satisfaction), and a small main effect of emotion-focused coping (acting to increase satisfaction).

Other Analyses

The question of whether Year 1 stressor and coping did predict change in well-being from Year 1 to Year 2 was addressed briefly. With Year 2 Symptoms as the dependent variable, beyond the effects of Year 1 Symptoms (R^2 change = .41) and Neuroticism (R^2 change = .05), there were small effects of Year 1 stressor (R^2 change = .03) and Year 1 Behavioral Disengagement (R^2 change = .06). With Year 2

Satisfaction as the dependent variable, beyond the effect of Year 1 Satisfaction (R^2 change = .42), there was a small interactive effect of Year 1 Pressure and Acceptance (R^2 change = .05). The full equation was $Sa_2 = -.03 + .60Sa_1 - .10N - .13Pr + .02Ax - .25PrAx$, where Sa_2 = Year 2 Satisfaction, Sa_1 = Year 1 Satisfaction, N = Neuroticism, Pr = Year 1 Pressure, Ax = Year 1 Acceptance. Hence with $Sa_1 = 0$ and N = 0: if Ax = -1, then $Sa_2 = -.05 + .08Pr$; if Ax = +1, then $Sa_2 = -.01 - .38Pr$. That is to say, stressors had a deleterious effect on satisfaction when reappraisal was high.

It was also decided to conduct cross-lagged correlation analyses, for Behavioral Disengagement and Symptoms, and for Seeking Emotional Support and Satisfaction; these being the variables that showed the most consistent cross-sectional relationships. In these analyses, the variables were not standardised. The results are shown in Table 29. The correlation between Behavioural Disengagement 1 and Symptoms 2 ($r = .51$, $N = 102$, $p < .01$) was larger than the correlation between Symptoms 1 and Behavioral Disengagement 2 ($r = .26$, $N = 102$, $p = .01$); the difference between these two correlations was significant at the .05 level. This is consistent with the direction of causation being from Behavioral Disengagement to Symptoms. Neither the correlation between Seeking Emotional Support 1 and Satisfaction 2 ($r = .19$, $N = 102$, $p = .06$), nor that between Satisfaction 1 and Seeking Emotional Support 2 ($r = .12$, $N = 102$, $p = .21$) was significantly different from zero; and the difference between these two correlations was not significant at the .05 level.

Discussion

Strengths and Limitations

Among the weaknesses of this study are that self-reports were used throughout. On the other hand, there was some control for negative affectivity. Much of the analysis was cross-sectional; but there was at least some study of change over time. The sample was self-selected and occupationally rather homogeneous; but the study was conducted in the field adding to its external validity. The sample size, although adequate for the analyses conducted, was not large enough for

Table 29

Cross Lagged Correlation Analysis

Variable[a]	1	2	3	4	5	6	7
1. Behavioral Disengagement 1	-						
2. Behavioral Disengagement 2	.53**	-					
3. Symptoms 1	.44**	.26*	-				
4. Symptoms 2	.51**	.44**	.64**	-			
5. Seeking Emotional Support 1	.10	-.03	.13	.12	-		
6. Seeking Emotional Support 2	.09	.09	.15	.10	.55**	-	
7. Satisfaction 1	-.11	-.25	-.34**	-.29*	.23	.12	-
8. Satisfaction 2	-.18	-.34**	-.31*	-.44**	.19	.21	.65**

Note. $N = 102$.

[a] The number after the variable name indicates the year.

*$p < .01$. **$p < .001$.

more sophisticated analyses taking account of measurement error; but the follow-up rate was excellent. Complex sets of constructs were represented by small numbers of measures, which would mitigate against detecting subtle effects of matching between stressors and buffers (Cohen & Edwards, 1989). On the other hand, the study did include measures of both resources and coping, did distinguish between appraisal and other aspects of coping (which would be important if one took a transactional perspective), did include two measures of well-being, and did provide some empirical justification (confirmatory factor analysis) for reducing a set of variables to a smaller number (e.g., coping) or a single variable (e.g., the stressor). One measure, the stressor, was work-specific, the others referred to life in general; however, this was necessary in order to maintain the trust of subjects who did not wish to detail their personal lives. The measures were generalised over time, asking subjects to say what kind of people they were (in the case of the resources) or to generalise over a three-month period (in the case of coping and well-being), again mitigating against detecting subtle matching over time as events unfurl (Cohen & Edwards, 1989). On the other hand, subjects appeared content to make, and capable of making, such generalisations, the pattern of results was meaningful, and, as previously noted, episodic measures can have their own problems. There remain a number of unexplored interactions such as that between social support and locus of control (S. Cohen, 1988; Hurrell and Murphy, 1991); on the other hand, the data was quite thoroughly explored, and to proceed further might have drawn serious accusations of capitalising on chance. As it is, multiple tests of significance were conducted, with alpha remaining at .05; however, the direction of effects could have been predicted, so that one-tailed testing could have been justified, even though it was not used. In interpreting the results of multiple tests of significance, it is particularly important to look for patterns in the results, rather than placing a lot of weight on any single finding.

Dangling Variables

In this study, certain variables stood out as being unassociated with other variables. One such variable was Health Value, which had been included speculatively. Its failure to predict coping strategies is perhaps not surprising. The coping strategies may have been health-related, in the sense that they had the potential to buffer the adverse effects of stress. However, this does not mean that they were health-directed, in the sense of the individual having health as their goal. Health-related behaviour can be goal-directed, but the goals in question are often other than health (e.g., Eiser & Gentle, 1988). Furthermore, even if the relevant goal is health, value expectancy theory would require other conditions, such as internal locus of control and high self-efficacy, for behaviour to occur (e.g., Rosenstock, Strecher, & Becker, 1988; Wallston, 1989, 1991, 1992).

Another variable that stood out was Sociopolitical Control. Perhaps this sphere of life is, for most people, remote from their day-to-day stressors and coping efforts. Perhaps the measurement of sociopolitical control needs refinement (cf., Zimmerman & Zahniser, 1991).

Of the coping variables, Acceptance stood out as being generally unassociated with other variables. Nor did it predict well-being in interaction with other variables, in an albeit rather weak test of the goodness of fit hypothesis.

Controlling for Negative Affectivity

There is a clear effect of negative affectivity as measured by Neuroticism upon reported symptoms as measured by the Global Symptom Index. However, the measures of well-being (and stressors and coping strategies) asked subjects to focus on the past three months, and Burke et al. (1993) suggest that researchers who use long time-frames for affect questionnaires may simply be measuring negative affectivity. It might then be argued that the present study simply shows that one measure of negative affectivity (Neuroticism) predicts another measure of negative affectivity (three-month Symptoms). However, whilst Neuroticism predicted much of the variance in three-months Symptoms, there was still much left to explain, and some of this was predicted by other variables. It might also, contrarily, be argued that Neuroticism is merely a measure of previous symptoms. However, Neuroticism related to Symptoms and to other variables in a manner consistent with it measuring a general, negative affectivity bias. The following discussion relates to the results after controlling for negative affectivity.

Resources, Coping, and Well-Being

It appears (from the Year 1 data) that stressors act to increase symptoms (main effect of Pressure on Symptoms). Avoidance coping acts to increase symptoms (main effect of Behavioral Disengagement on Symptoms). Self-control exerts a buffering effect (interactive effect of Pressure and Self Control on Symptoms), the size of this effect being small but typical of the literature (Cohen & Edwards, 1989). There is no evidence that this buffering effect is mediated by coping. Stressors act to decrease satisfaction (main effect of Pressure on Satisfaction). Emotion-focused coping acts to increase satisfaction (main effect of Seeking Emotional Support on Satisfaction).

It appears that belief that one has control predisposes one to use more problem-focused coping (main effects of Personal Efficacy, Interpersonal Control and especially Self-Control, on Active Coping). However, as noted, the Spheres of Control scales, rather than measuring locus of control (perceived contingency between action and outcome), may be measuring self-efficacy (perceived ability to take action). Moreover, as noted, the Self Control Schedule is a somewhat heterogenous measure. It includes items referring to belief in ability, that is to say perhaps reflecting self-efficacy. It also includes items referring to the application of problem-solving strategies, that is to say perhaps reflecting a problem-focused coping style. This could simply mean that a measure of problem-focused coping style (Self-Control) predicted a measure of problem-focused coping (Active Coping). These matters cannot be resolved without further clarification of measurement issues.

It appears that perceived availability of social support predisposes one to use more emotion-focused coping (main effect of Interpersonal Support on Seeking Emotional Support). In this regard, it should be emphasised that there is a strong social flavour in the measure of emotion-focused coping (the Seeking Emotional Support scale). Hence the finding makes sense, but is perhaps not profound.

It appears that belief that one has control predisposes one to use less avoidance coping (main effects of Personal Efficacy and Interpersonal Control, but not Self Control, upon Behavioral Disengagement). Stressors act to increase avoidance coping (main effect of Pressure on Behavioral Disengagement), but resources buffer this effect to some extent (interactive effect of Pressure and the various resource variables upon Behavioral Disengagement). This finding was robust (the R^2 changes were fairly large), and cannot easily be dismissed as artefact.

It appears that being female predisposes one to use more emotion-focused coping. Being female is associated with higher symptoms, an association which may be mediated by negative affectivity.

It appears (from the analysis of change from Year 1 to Year 2) that previous well-being has a strong effect on current well-being, but that beyond this, a deleterious effect of avoidance on symptoms and a beneficial effect of emotion-focused coping on satisfaction are still detectable. In the case of avoidance and symptoms, the evidence is consistent with the former causing the latter rather than vice versa.

Conclusions

The need to incorporate some control for negative affectivity in stress research (Payne, 1988) is reinforced by the current study. Indeed, much previous research, which has in the main not incorporated such control, must be approached with circumspection.

Using strict criteria (Baron & Kenny, 1986; Cohen & Edwards, 1989; Cox & Ferguson, 1991), this study provided little evidence for coping or resources buffering the effect of stressors on well-being (except for a slight buffering effect of perceived self-control); nor for coping mediating between resources and well-being. Hence, this study perpetuates Cohen and Edwards' (1989) rather bleak conclusion as regards the evidence for moderation and mediation.

This study found main effects of coping on well-being. However, while symptoms were predicted by avoidance coping, satisfaction was predicted by emotion-focused coping. This serves to illustrate that in the study of stress and well-being, it is necessary to specify what aspect of well-being is being considered; well-being is not a unitary construct.

As regards the specific finding on avoidance coping and symptoms, other recent studies in British nurses (albeit entirely cross-sectional and not controlling for negative affectivity) also point to avoidance coping being associated with higher (worse) mental symptoms (Spelten, Smith, Totterdell, Barton, & Folkard, 1993; Tyler & Cushway, 1992). In an oft-cited longitudinal study of an American community sample (albeit not controlling for negative affectivity), Aldwin and Revenson (1987) found that Escapism, a factor derived from the Ways of Coping Scale (Folkman & Lazarus, 1985), stood out from other coping variables in its ability to explain the variance in current symptoms.

Perhaps the most intriguing of the findings in this study are the effects of stressors and resources on coping. A simple interpretation of these results is that, under stress, individuals tend to avoid the issue unless they have the means to deal with it (interactive effect of stressors and resources on avoidance coping). If they have the means to deal with it, then the way they deal with it is coloured by the particular means at their disposal. If they have a high sense of personal control, then they tend to address the problem (effect of perceived control on problem-focused coping). If they have a high sense of social support, then they tend to address the emotional sequelae (effect of social support on emotion-focused coping). This plausible model merits further investigation. It arose because this research took care to consider the effect of stressors (as well as resources) on coping; and the dimensionality of coping beyond the conventional problem- versus emotion-focused dichotomy.

CHAPTER 5

AN ATTRIBUTIONAL MODEL APPLIED TO HEALTH-RELATED BEHAVIOUR CHANGE*

*This chapter corresponds to: Ingledew, D. K., Hardy, L., & Cooper, C. L. (1993). *An attributional model applied to health-related behaviour change* (Research Rep. No. 19). Bangor: University of Wales, Bangor, School of Education, Division of Health and Human Performance.

Abstract

This study examined the structure of causal attributions, and applied attribution theory to the study of health-related behaviour change. It was hypothesised that the structure of attributions is as posited by McAuley, Duncan, and Russell (1992), but that in this regard there might be differences between success and failure conditions. It was hypothesised that, following success or failure, attributions influence affective reactions and efficacy expectations, which in turn influence intentions, which in turn influence behaviour; this was an adaptation of Weiner's (1986) theory.

At Year 1, 109 hospital staff rated their intentions to perform each of ten health-related behaviours over the coming year. At Year 2, 102 of the subjects indicated whether they had succeeded or failed in relation to their intentions; selected their greatest success and their greatest failure; completed McAuley et al.'s (1992) Revised Causal Dimension Scale (CDSII) and a list of affective reactions, separately with respect to the greatest success and the greatest failure; and, finally, rated their efficacy expectations and intentions, separately for each of the ten behaviours.

Repeated measures MANOVA of the CDSII scale scores indicated that causes of success, compared with causes of failure, were seen as more internal, more stable, and more personally controllable. Confirmatory factor analyses indicated that the McAuley et al. (1992) model adequately fitted the success data, but not the failure data, there being a particular problem with the Stability scale, the scoring of which was modified for later analyses. Exploratory factor analyses eventuated in a six-factor solution for the success affects (Calm, Cheerful, Grateful, Confident, Kindly, and Proud) and a four-factor solution for the failure data (Surprised, Disgruntled, Anxious, Unashamed).

Regression analyses revealed main and interactive effects of attributions (CDSII scale scores) on affective reactions (saved factor scores). The interactive effects always involved the stability dimension. Attributions did not predict efficacy expectation, in either the success or the

failure condition. Attributions (personal control combined with instability) did predict intention in the success condition; however, this was not mediated by affective reactions. Other regression analyses were consistent with efficacy expectations influencing behaviour, this being partially mediated by intention.

These results point to a number of avenues for further research, including the need to consider the interactive as well as the main effects of attributions, and the need to test the relative merits of single models incorporating success/failure as against separate models for success and failure.

Introduction

Theories Incorporating Attributions

Much of the early work on attributions (Heider, 1958; Kelley, 1971, 1973) was concerned with the attributions that individuals make for other peoples' actions, and this social psychological tradition is still strong (e.g., Hewstone, 1989). Weiner (1979, 1986; Weiner, Frieze, Kukla, Reed, Rest, & Rosenbaum, 1971) has applied attribution concepts to the area of achievement motivation, with the emphasis on attributions for one's own success or failure (rather than the actions of others). He suggested that attributions for success or failure determine affective reactions and success expectations, both of which then determine subsequent behaviour. Bandura (1977, 1986), although not primarily concerned with attributions, has applied them within his self-efficacy theory. He suggested that previous performance influences self-efficacy, that this effect is moderated by attributions, and that self-efficacy influences future behaviour. Abramson, Seligman, and Teasdale (1978) have made use of attribution concepts in their reformulation of the learned helplessness hypothesis. They suggested that perceptions of present and past non-contingency lead to expectations of future non-contingency, but that this effect is moderated by attributions for the present or past non-contingency.

Categorisation of Attributions

Researchers have suggested various categorisations of attributions. Försterling (1988) notes that it is possible to make relational distinctions, for example between proximal and distal attributions, or between simple and complex attributions. More commonly, qualitative distinctions are made. Weiner (1986; see also 1985) discusses several possible distinctions: locus of causality (the term locus of control is avoided so as to avoid confusion with Rotter, 1966), stability, controllability, intentionality, and globality. Weiner describes empirical studies (mainly factor analysis and multidimensional scaling) which lend support to the existence of locus, stability, and controllability dimensions. He puts aside the issue of whether intentionality might be another dimension. He notes that, empirically, intentionality and controllability intercorrelate highly, even though, conceptually, they can be distinguished. He acknowledges that globality might be another dimension. He notes that, conceptually, a useful distinction can be made between consistency across time (stability) and consistency across situations (globality), but that, empirically, studies do not reveal a globality dimension. However, as Brewin (1985) points out, the studies did not actually set out to find globality. Weiner (1986) also has problems with the controllability dimension. He notes that, from the perspective of the successful or failing person, external causes seem by definition to be uncontrollable, but then accepts that causes could be seen as controllable by others, so that controllability comes to mean controllable by anyone.

Measurement of Attributions

Those concerned with the measurement of attributions (e.g., Benson, 1989; Elig & Frieze, 1979; Lichtenstein, 1988; Russell, 1982) have addressed a number of issues. Should subjects generate their own attributions or select from a list? Should subjects be asked for attributions at the most basic level (raw causes) or at some higher level of abstraction (categories or dimensions)? Should attributions, once recorded, be then converted into some higher level of abstraction? If so, then who is to do the conversion?

On this last point, Russell (1982) developed the Causal Dimension Scale (CDS) to overcome the "fundamental attribution researcher error" (p. 1137), the researcher's assumption that he or she can accurately interpret the subject's attributions. The CDS required subjects to state their attribution (raw cause) and then to rate this attribution on items that reflect attribution dimensions. The final CDS comprised nine such items, three for Locus of Causality, three for Stability and three for Controllability. Problems subsequently emerged with the Controllability scale (e.g., Biddle & Jamieson, 1988; McAuley & Gross, 1983; Russell, McAuley, & Tarico, 1987; Schaufeli, 1988; Vallerand & Richer, 1988). These problems led McAuley, Duncan, and Russell (1992) to develop the Revised Causal Dimension Scale (CDSII), retaining the Locus of Causality and the Stability scales, but creating separate Personal Control and External Control scales. Their scale development included confirmatory factor analysis. However, this confirmatory factor analysis of the CDSII was on pooled success and failure data.

Vallerand and Richer (1988) had previously conducted confirmatory factor analyses of Russell's (1982) CDS which suggested that there might be differences between success and failure conditions. They studied students receiving examination marks who completed the CDS and were categorised as either perceived success or perceived failure. Confirmatory factor analyses of the CDS were conducted on the success data alone, the failure data alone, and the success and failure data conflated. The results were consistent with an oblique three-factor model for the CDS. However, in the pursuit of good fit, it was necessary to include cross-loadings, and the pattern of these cross-loadings was different for success and failure; although in both success and failure the item *changeable/unchanging*, supposedly a Stability item, loaded on the Control factor. However, Vallerand and Richer emphasis that they do not view the patterns of cross-loadings that they obtained as being definitive. They also conducted a multi-group analysis, of the success and failure data simultaneously, the results of which reinforced the idea that success and failure might be different. Therefore, it is reasonable to ask whether the structure of the revised version of the CDS, the CDSII, might not differ for success and failure.

In their attributional reformulation of the learned helplessness hypothesis, Abramson et al. (1978) speculated that there might be an attributional style. This led to the development of the Attributional Style Questionnaire (Seligman, Abramson, Semmel, & von Baeyer, 1979; Peterson, Semmel, von Baeyer, Abramson, Metalsky, & Seligman, 1982; Peterson & Villanova, 1988). This starts with hypothetical rather than actual situations and produces scores for

Internality, Stability and Globality. There is some doubt, however, as to the actual evidence for a style as measured by this Questionnaire (Cutrona, Russell, & Jones, 1985).

Consequences of Attributions

Success expectation. On the basis of empirical findings, Weiner (1986) proposes a psychological law, that "changes in expectancy of success following an outcome are influenced by the perceived stability of the cause of the event" (pp. 114-115). He reinterprets Rotter's (1966) laboratory studies, arguing that it was perceived stability, not perceived locus, that determined expectancy shift.

Efficacy expectation. In Bandura's (1977) model, the impact of previous performance upon efficacy expectations is influenced by attributions. He does not present an elaborate model, but, in simple terms, success attributed to ability enhances self-efficacy, whereas failure attributed to ability reduces self-efficacy. Weiner (1986) does not include efficacy expectations in his model.

Affects. Weiner (1979) suggested that stability is linked with success expectation, whilst internality is linked primarily with affects. His more recent model is more complex (Weiner, 1986). For one thing, emotions can be outcome-dependent, rather than attribution dependent. One can simply feel good after success and bad after failure. Then both causal attributions and causal dimensions can generate more differentiated affects. Weiner (1986) maintains that there is empirical evidence linking success with happiness; internal locus with pride; controllability with anger, guilt and gratitude; and uncontrollability with pity and shame. He is optimistic that further research will provide evidence linking failure with frustration and sadness; and stability with hope or fear. In discussing the affective consequences of attributions, Weiner (1986) tries to equate affect and value, stating that "the subjective value of the goal has an isomorphism, or a one-to-one correspondence, with its emotional impact" (p. 118). More blatantly, Weiner (1990) states that "causal dimensions have psychological consequences, being related to both expectancy and affect (in this conception, affect is presumed to be the value of goal attainment)" (p. 10).

Behaviour. Weary, Stanley, and Harvey (1989) review evidence that attributions can influence subsequent behaviour. Försterling (1988) presents evidence that attributional retraining can lead to an increase in persistence and an improvement in performance. Bandura (1989) reports that causal analyses indicate that attributions influence performance through the mediation of self-efficacy rather than directly. In Weiner's (1986) model, attributions influence behaviour through the mediation of success expectation and affects. He reviews studies (e.g., Graham, 1984; Covington & Omelich, 1984) that support parts, if not the whole, of this model.

Outcome expectations. Bandura (1989) retains a role for outcome expectations in his model. In theory, efficacy expectations, outcome expectations, and outcome values interact to influence behaviour (Maddux, 1991). However, Bandura's model does not include an effect of attributions on outcome expectations, and Weiner's (1986) model does not include outcome expectations at all.

Intentions. Neither Weiner (1986) nor Bandura (1986) have a specific role for intentions as mediating the influence of other variables on behaviour. Behavioural intention is normally associated with the Theory of Planned Behaviour (Ajzen, 1988). However, recent reviews of self-efficacy theory incorporate the notion of intention (Maddux, 1991; Schwarzer, 1992), and there is no a priori reason why studies employing Weiner's (1986) theory should not also do so (e.g., Eiser, van der Pligt, Raw, & Sutton, 1985).

Circular effects. Kelley and Michela (1980) divide research that is concerned with causal attributions into two, antecedents and consequences, but they warn that a simplistic model is highly inadequate for the study of attributions, rather "its linear antecedent-attribution-consequence structure must be replaced by representations of circular causal processes" (p. 491). Consistent with this, Bandura (1989) states that "causal attributions and self-efficacy appraisals involve bidirectional causation" (p. 416), and Weiner (1986) reviews evidence for bidirectional linkages and feedback loops in his model.

Individual Differences

Abramson et al.'s (1978) attributional reformulation of the learned helplessness hypothesis spawned a great deal of research, reviewed, for example, by Brewin (1985), Coyne and Gotlib (1983), Burns and Seligman (1991), and Peterson and Seligman (1984). Sweeney, Anderson, and Bailey's (1986) meta-analysis found that for negative events, attributions to internal, stable and global causes had a reliable and significant association with depression; for positive events, attributions to external, unstable, and specific causes were associated with depression, but the relations for positive events were weaker than the corresponding ones for negative events; they also note that some evidence does suggest that the causal link is from attributional style to depression, rather than vice versa. Robins (1988) claims that statistical power is low in this area of research. Carver (1989) notes that attributional style is a multidimensional construct, but that it is often measured by combining dimensions into composite scores, resulting in much loss of information.

From the work on attributional style and depression, there has developed a body of research into explanatory style and physical health (Peterson, 1988; Peterson & Seligman, 1987; Peterson, Seligman, & Vaillant, 1988); and performance deficits, for example in the academic and sporting spheres (Peterson, 1990). There may be other attributional styles, for example angry (Försterling, 1984), or lonely (Anderson, Horowitz, & French, 1983), or anxious (Försterling, 1988).

The literature on attributional styles, like the literature on attributions and achievement, suggests that attributions influence emotions and also performance. Attributional style researchers perhaps tend to neglect expectations (Försterling, 1988), and to see emotions as an endpoint rather than as mediating further effects of attributions.

Attributions and Health-Related Behaviour

Michela and Wood (1986) review causal attributions in health and illness. However, much of this relates to attributions for symptoms or for illness. There have been many studies of self-efficacy and health-related behaviour, reviewed by Bandura (1986), DiClemente (1986), O'Leary (1985, 1992), Strecher, DeVellis, Becker, and Rosenstock (1988), and Yalow and Collins (1987), often incorporating attribution concepts. Kok, Den Boer, De Vries, Gerards, Hospers, and Mudde (1992) explicitly bring together self-efficacy and attribution concepts as aids to explaining and modifying health-related behaviour. However, applications of Weiner's (1986) theory to health-related behaviour change have been surprisingly few. Some examples follow. (As noted above, Weiner, 1986, proposes that attributions determine affective reactions and success expectations, both of which then determine behaviour.)

Eiser et al. (1985) sent a questionnaire to around 20,000 individuals who had written to a TV company asking for information on how to stop smoking. The return rate (around 12%) was low, so that overall the study group was highly selected. The questionnaire asked "Why do you think that so many smokers fail when they try to give up smoking?", with subjects asked to rank five causes: difficulty, effort, knowledge, personality, luck. (Note that these attributions were for the failure of others). These were converted by formulae into stable and internal attribution scores. (Note that this involves investigator bias). Subjects were also asked "If you tried to stop smoking altogether, how likely do you think you would be to succeed?", giving a measure of "confidence", which Eiser et al. equate both with self-efficacy and with success expectation. There were also measures of "probability difference" and "utility"; these look like measures of outcome expectation and outcome value, the outcome in question being reduced risk of lung cancer. Subjects were asked "Do you intend to try to stop smoking in the near future?", giving a measure of intention. Approximately a year later, subjects were sent a follow-up questionnaire to determine their current smoking status. Path analysis supported the hypotheses, that stable rather than internal attributions should influence confidence, confidence (and probability difference and utility) should influence intention, intention should influence behaviour. This analysis was confined to those who had made a previous attempt to stop. The study would perhaps have been more robust if it had asked at baseline about number of previous attempts at quitting. This would have allowed the inclusion of previous failure as a variable in the model. It would also have allowed the measurement at baseline of subjects' attributions for their own rather than others' failures.

Hospers, Kok, & Strecher (1990) studied participants in a weight control program. Subjects were asked about the number of previous attempts at losing weight through formal programmes, and analysis was confined to those who had made one or more such attempts. Subjects were asked to rate whether their previous failures were due to stable or unstable, internal or external, and controllable or uncontrollable causes (on 4-point scales, but no further details of method are given). They were asked about their desired weight at the end of the programme; and to rate how confident they were that they would reach this desired weight, which the authors equate with success expectation. Two indices of actual success were used, attainment of personal goal, and reduction in body mass index. Path analysis indicated that number of previous attempts was related positively to stability attribution which in turn was related negatively to success expectation which in turn was related positively to goal attainment. There were no significant associations between number of previous attempts and success expectation or goal attainment, or between stability and goal attainment; and no significant associations between locus of causality or controllability and the other variables. (Results were somewhat different for body mass index reduction).

McAuley, Poag, Gleason, and Wraith (1990) advertised for middle-aged sedentary individuals who had previously dropped out of structured exercise programmes (i.e., the sample was highly self-selected). The CDSII (McAuley et al., 1992) was employed to measure subjects causal attributions for having dropped out. Subjects also completed a questionnaire about their affective reactions to having dropped out (11 affects, scored on 9-point scales). Hierarchical multiple regression analyses examined the relationship between causal dimensions and specific affective reactions. Causal dimensions were shown to influence affective reactions. However, McAuley et al. note that the proportions of variance accounted for were modest, and the number of statistical tests performed was large. They also note that actual failure was some time previous, and recommend longitudinal studies.

Schoeneman and Curry (1990) asked students to select a health-related behaviour that they had attempted to change, indicate whether they had succeeded or failed, and complete the CDS (Russell, 1982) with respect to this success or failure. Success and failure were compared in two ways. The means on the three CDS scales were compared: causes of failure were seen as less stable and less controllable than causes of success. The three CDS scales were dichotomised at the midpoint, and the frequencies of the resulting eight types were compared: for failure, the most frequent type was internal-unstable-controllable; for success, the most frequent types were internal-controllable-stable and internal-controllable-unstable. Schoeneman and Curry think that this represents a tendency towards "personal changeability" of cause, conducive to the correcting of failure and the maintenance of success. This is to be distinguished from the "self-serving" bias (Weary Bradley, 1978), where success is attributed to internal and failure to external causes. However, Schoeneman and Curry also found that their results varied according to the type of health-related behaviour. Interestingly, they also posit that the personal changeability tendency may be more likely when individuals have had time to take stock than when they are reacting immediately to a success or a failure.

Thus, the limited literature on health-related behaviour change is consistent with parts of Weiner's (1986) model, although the whole has not been tested. Försterling (1988) notes that:

> Like all other behaviors or emotional reactions ... that have so far been discussed from an attributional viewpoint, health behavior is also overdetermined. This means that we do not assume that attributions explain the major part of the variance regarding - for instance - why people smoke or engage in other behaviors that are damaging to health. Obviously many factors play a role. One may smoke because of an environment that reinforces this habit, genetic addictive predisposition, boredom, or whatever. All of these factors may have nothing to do with attributions. However, ... attributions may play an important role with regard to selected aspects of health-related behaviors; for instance, when an individual attempts to stop smoking or keep to a diet and fails to do so. These behaviours can be conceptualized as special cases of goal setting, intention formation, or persistence. (p. 74)

Research hypotheses

In this study, an attempt was made to apply Weiner's (1986) attribution theory to health-related behaviour change. The study was longitudinal in the sense that intention to change was elicited at one point in time, and actual change was assessed a full year later.

It was hypothesised that the structure of the CDSII would be as proposed by McAuley et al. (1992), but that there would be differences between success and failure conditions. It was hypothesised that attributions would influence affective reactions and efficacy expectations which would in turn influence future intentions which would in turn influence future behaviours.

Clearly, adapting Weiner's (1986) model to include efficacy expectations (rather than success expectations) and to include intentions requires some justification. This is given in the Method section.

Method

Subjects

Subjects were from the staff (excluding doctors) of a large British mental hospital which was in the process of closing. Out of approximately 600 such employees, 110 volunteered for the longitudinal study. At Year 1, usable data was obtained from 109 subjects, of whom 69 were women and 40 were men. The mean age was 36.1 (*SD* = 10.2) years. Subjects were predominantly from nursing and administrative jobs. At Year 2, one year later, data was obtained from 102 of the original subjects, 63 women and 39 men.

Measures

Attributions. The Year 1 data collection was taken as an opportunity to pilot the measurement of attributions. Subjects were asked to think of and describe a situation from the past year in which they had set out to change their behaviour in a healthier direction, but failed. They were then asked to nominate the causes of this failure. Similarly, they were asked to think of and describe a situation in the past year in which they had set out to change their behaviour in a healthier direction and succeeded; and then nominate the causes of this success. The subjects' open-ended written answers served as the starting point for a subsequent personal interview, about a month later, in which they were asked to look at, and if necessary clarify, the causes given, and then complete attribution questionnaires.

Two attribution questionnaires were used. One was Schaufeli's (1988) adaptation of Russell's (1982) CDS. This adaptation comprises eleven items, five for Locus of Causality, three for Stability, and three for Controllability. Each item is a 9-point scale in semantic differential format (e.g., *permanent* at one end versus *temporary* at the other). The other measure was the 5-Attributional Dimension Scale (ADS) (Benson, 1989 and personal communication). This comprises twenty items, four each for Internality, Stability, Controllability, Globality and Universality. Each item is a 5-choice scale, each choice being labelled. Benson claims that his instrument is superior to Russell's because it measures more dimensions, has more items per dimension, and because of the response format.

A total of 54 subjects completed one or both of these questionnaires. This number was considered entirely adequate for the purpose of piloting the measurement of attributions. All 54 subjects completed the ADS, once for success and once for failure; 17 subjects also completed the CDS, once for success and once for failure. The order of presentation (ADS versus CDS, success versus failure) was varied. Subjects were asked to talk aloud, ask questions, and discuss what they were doing. Because there was so much interaction, it was not meaningful to analyse the questionnaires quantitatively. Rather the following observations were made.

There were problems with both instruments. It was found that reducing causes to a single cause often required considerable negotiation and compromise; neither instrument can comfortably handle multiple attributions. With both instruments, subjects had conceptual difficulties, for example with the notion of "outside of you" versus "inside of you", or with the notion of being "responsible" (which might or might not include upbringing or even genetics). With both instruments, there was a more basic problem. The instruments were developed in, and would typically be applied to, situations in which there is some kind of test such as a college examination or a sports trial. It is in the nature of such a test that it is likely to recur (making stability questions meaningful), that it belongs to a set of similar tests (making globality questions meaningful), and that is taken by a well-defined group of other people (making universality questions meaningful). For many of the situations under study, this was not the case, creating a problem especially with stability, globality, and universality questions. Subjects tended to deal with this by answering the questions as if they referred to the cause in isolation from the success or failure, rather than the cause in relation to the success or failure. Hence, questions about social support as a cause of success in dieting might be answered simply as questions about social support.

There were some specific problems with the ADS. One of the Internality questions ("Are these reasons mostly about others ... mostly something about you?") was often misconstrued as a Universality (generalising to other people) question. There was a lot of confusion over two of the four ADS Controllability items, subjects often not knowing whether someone should include themselves or not. [With the CDS, there was similar confusion over one of the three Controllability items. Schaufeli (1988) split two of Russell's (1982) Controllability items into internal and external variants, but for some reason he did not split the remaining one]. There was some discomfort over the ADS Globality questions, subjects often complaining about the vagueness of words such as "similar" or "situation". There was some discomfort over the ADS Universality questions, subjects often complaining that they could not see inside other people's minds. With some of the ADS items, the options did not subjectively constitute an interval scale. In particular, there were some large subjective jumps between adjacent options, for example from "Might change quite a bit during a year" to "Rarely change even a little during a year".

Of the subjects who completed both instruments, a majority preferred the ADS, primarily because of the response format. Others preferred the CDS, primarily because of its brevity. It was decided, on balance, that the CDS should be used for the measurement of attributions in Year 2. This was because of the specific problems with the ADS outlined above, and also because there is a larger literature on the CDS. Choosing the CDS meant that globality and universality would not be measured, tying the research into the Weiner (1986) school of thinking (globality in particular being important in the attributional style school of thinking). In choosing the CDS, it was clear from the piloting that it would be important to assist subjects to understand the response format, to make sense of the more cryptic questions, and to keep focused on the cause qua cause, without hopefully exerting undue influence. On the specific issue of the response format, it is a moot point whether in this case the semantic differential format has any particular advantage that would compensate for the difficulties it presents to subjects compared with a simpler Likert-type format.

The actual instrument used in Year 2 was McAuley et al.'s (1992) CDSII. This comprises 12 items, 3 for Locus of Causality (LOC), 3 for Stability, 3 for Personal Control (PC), and 3 for External Control (EC). The items are listed in Table 30.

Success and failure. In Year 1, subjects were asked to rate their intention to carry out each of ten behaviours: "Cope well with stressful situations"; "Exercise regularly"; "Drink alcohol only in moderation (if at all)"; "Sleep well"; "Spend enough time doing things which are refreshing, calming or relaxing"; "Not smoke"; "Eat healthily"; "Maintain reasonable weight"; "Sort out your future in relation to the closure of the hospital"; "Generally look after your health".

In Year 2, the plan was that a subject would peruse his or her intentions from the previous year; report the outcome (success or failure) for each intention; and complete the CDSII for each outcome. However, it turned out that asking subjects to complete the CDSII for each outcome where there had been some (greater than zero) intention would have meant asking each subject to complete the CDSII between eight and ten times. Clearly, ways had to be found of reducing this number.

One possibility was to select a subset of the behaviours, the same subset for all subjects, and ask only about these. Another possibility was to select a subset of the behaviours, a different subset for different subjects (for example a 50% random sample), and ask only about these. Both these possibilities felt uncomfortably arbitrary.

Another possibility was to investigate the attributions for an outcome only if the intention had been high. However, it was difficult to see how to define high, especially when intentions were generally high. Even if the maximum possible score (7) was taken as high, this would have meant each subject completing the CDSII on average five times.

Another possibility was to investigate the attributions for an outcome only if the subject was not already behaving healthily as judged by Year 1 behavioural self-ratings. This would have meant each subject completing the CDSII on average three times. However, the underlying premise, that change to behaving well is more interesting and important than maintenance of behaving well, was felt to be unwarranted,

Table 30

Items of the CDSII

No.	Poles		High Score Indicates	Scale
1.	That reflects an aspect of yourself	Reflects an aspect of the situation	Internality	Locus of Causality
2.	Manageable by you	Not manageable by you	Personal control	Personal Control
3.	Permanent	Temporary	Stability	Stability
4.	You can regulate	You cannot regulate	Personal control	Personal Control
5.	Over which others have control	Over which others have no control	External control	External Control
6.	Inside of you	Outside of you	Internality	Locus of Causality
7.	Stable over time	Variable over time	Stability	Stability
8.	Under the power of other people	Not under the power of other people	External control	External Control
9.	Something about you	Something about others	Internality	Locus of Causality
10.	Over which you have power	Over which you have no power	Personal control	Personal Control
11.	Unchangeable	Changeable	Stability	Stability
12.	Other people can regulate	Other people cannot regulate	External control	External Control

Note. The range of possible item scores is 1 to 9. The scale score is the simple sum of the item scores.

quite apart from uncertainties about the validity of the behavioural self-ratings.

Another possibility was to investigate attributions only for failures, on the grounds that a subject who has succeeded is in no further need of attention. From the point of view of the attributional reformulation of the learned helplessness hypothesis (Abramson et al., 1978), attributions for failure are more pertinent than attributions for success. However, in Weiner's model (1986) of achievement behaviour, attributions for success are just as important as attributions for failure. They have affective consequences and expectancy consequences, affecting the likelihood of future success, that is to say the maintenance of behaviour change. Only in the case of "sorting out your future in relation to the closure of the hospital" could it be allowed that the success might be irreversible.

The strategy that was actually chosen was to ask subjects: "Which was the greatest success, which was the greatest failure?". Subjects were then asked only about these two, varying the order. Subjects had little difficulty in selecting a greatest success and a greatest failure; although some subjects had no failures from which to select and so were asked only about their success. Of course, subjects might choose on the basis of actual change in behaviour, the value they place on the outcome, the way in which they attribute the outcome, or how they feel about the outcome. To illustrate, they might read the success question as "Which success showed the most change?", "Which success was most important to you?", "Which was *your* greatest success?", or "Which success do you feel best about?".

Note that success and failure is as perceived by the subject. It might have been possible to assess success and failure more objectively. For example, one might have looked at Year 1 behavioural self-ratings and Year 2 behavioural self-ratings, and calculated shifts. However, as noted, the behavioural self-ratings are of uncertain validity, in other words the claim to objectivity might be spurious. Furthermore, it seems reasonable, even desirable, that outcomes should be as perceived, given that attributions and many of their consequences (affects and expectations) are inherently subjective (see Biddle, 1993).

One might also be tempted to think that if a subject gives the same cause for more than one success or failure, then one need only ask once about that cause. However, theory dictates that one should ask about the cause in relation to each of the successes or failures.

Affects. In the present study, the effect of specific attributions upon specific affective reactions was to be examined, but the effect of the specific attributions upon general well-being was not to be examined, even though one might hypothesise a cumulative effect. This was because any effect on well-being of the specific attributions (solicited and measured in this study) would likely be lost amongst the effect on well-being of many other attributions (spontaneous and not measured in this study). Nevertheless, it seemed desirable to include in the present study such affective reactions as might plausibly have some long-term bearing upon general well-being. To this end, a measure of mental symptoms, the Brief Symptom Inventory (Derogatis & Melisaratos, 1982) was examined. The subscales of this are Somatization, Obsessive Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. Of these, the subscales that seemed most pertinent were Interpersonal Sensitivity, Depression, Anxiety and Hostility. However, the actual items are rather extreme for use as indicators of affective reactions to simple successes and failures (e.g., Depression is indicated by "Thoughts of ending your life", "Feeling lonely", "Feeling blue", "Feeling no interest in things", "Feeling hopeless about the future", "Feelings of worthlessness"). Furthermore, the Brief Symptom Inventory, like many measures of well-being, omits positive aspects of well-being.

For help with the more positive aspects of well-being, the Profile of Mood States Bipolar Form (Lorr & McNair, 1988) was examined; note that it is the scales, not the items, that are bipolar. The scales are Composed-Anxious, Agreeable-

Hostile, Elated-Depressed, Confident-Unsure, Energetic-Tired, Clearheaded-Confused. Of these, the scales that seemed most pertinent were Composed-Anxious, Agreeable-Hostile, Elated-Depressed, and Confident-Unsure. Many of the actual items also appeared suitable for use as indicators of affective reactions to simple successes and failures (e.g., Elated-Depressed is indicated by "cheerful", "playful", "lighthearted", "joyful", "jolly", "elated", versus "sad", "dejected", "lonely", "downhearted", "discouraged").

Guidance was also sought from previous attribution research. For example, Russell and McAuley (1986), themselves guided by previous literature, produced two lists of affects, one list for success and another list for failure. When administered to students, factor analysis of the success affects generated three factors, labelled Competence, Gratitude and Positive Affect; and separate factor analysis of the failure affects gave four factors, labelled Anger, Guilt, Surprise, and Negative Affect.

It was decided to take the lead from such previous research, and use two separate lists of affects, one for success and one for failure. The alternative, one list combining all affects, was considered, but rejected on the grounds that this would have exposed subjects to too many blatantly inappropriate items. Another alternative, one list made up of bipolar items, was also considered, but this would have required developmental work beyond the scope of this study.

Specifically, it was decided to include all items which in Russell and McAuley's (1986) study had loaded highly (greater than 0.3) on any factor. In addition, it was ensured that the failure list contained at least three items which plausibly related to Brief Symptom Inventory notions of Interpersonal Sensitivity ("inadequate", "inferior", "incompetent"), Depression ("sad", "depressed", "downhearted"), Anxiety ("afraid", "nervous", "anxious") and Hostility ("angry", "annoyed", "furious"). It was similarly ensured that the success list contained at least three items which plausibly related to the obverse of Interpersonal

Sensitivity ("competent", "self-assured", "confident"), Depression ("serene", "cheerful", "elated"), Anxiety ("relaxed", "calm", "composed") and Hostility ("kindly", "agreeable", "good-natured"); the word *serene* did not seem quite right, but it was actually rather difficult to think of words that might represent elation rather than general positive affect. Immediately after completing the CDSII for success, subjects were asked "How have you felt about this success? Have you felt ...?", followed by the success affects list. The response format was a 7-point scale ranging from *Not at all* to *Extremely*. Immediately after completing the CDSII for failure, they were asked "How have you felt about this failure? Have you felt ...?", followed by the failure affects list.

Expectations, intentions, and behaviours. At Year 1 and at Year 2, efficacy expectations were measured by asking "Over the next twelve months, how confident are you that you could, if you tried, ...?", followed by the ten behaviours (listed above). The response format was a 7-point scale ranging from *Not at all confident* to *Very confident*. Intentions were measured by asking "Over the next twelve months, to what extent do you actually intend to ...?", followed by the ten behaviours, with 7-point scales ranging from *Do not at all intend to do this* to *Strongly intend to do this*. These efficacy and intention questions did not immediately follow the assessment of attributions; other (unconnected) data was collected in between.

Outcome expectations were also measured, the question being "Over the next twelve months, to what extent do you think it will help you to stay healthy if you ...?", followed by the ten behaviours. However, it was decided not to make use of this data, the reason being that it was increasingly obvious that the presumption that these behaviours were being conducted for health reasons was unwarranted. (The self-efficacy measure makes no such assumption as to the underlying goal of the behaviour. This may be one of the reasons why self-efficacy measures fare so well in the prediction of health-related behaviour; see the introduction to this chapter). For the same reason, use was not made of a measure of value placed on health, the Health Value Scale (Lau, Hartman, & Ware, 1986).

At Year 1 and at Year 2, behaviours were measured by asking "To what extent are the following descriptive or undescriptive of your behaviour over the past three months?", followed by "Coping well with stressful situations", "Exercising regularly", "Drinking a lot of alcohol", "Sleeping well", "Spending enough time doing things which are refreshing, calming or relaxing", "Smoking", "Eating healthily", "Maintaining reasonable weight", "Taking steps to sort out your future in relation to the closure of the Hospital", "Generally looking after your health", ranging on a 7-point scale from *Very undescriptive* through *Neither* to *Very descriptive*. Thus (after reverse scoring the drinking and smoking items), these behaviour questions were congruent with the efficacy expectation and intention questions.

Note that the efficacy expectation question ("How confident are you that you could, if you tried, ...?") does not presume that the individual will actually try. It is then appropriate to follow this up with an intention question ("To what extent do you actually intend to ...?). On the other hand, a success expectation question (e.g., "How confident are you that you will ...?") would presume that the individual will make an attempt. Perhaps, historically, some attribution researchers (e.g., Weiner, 1986) came to focus on success expectations because they were dealing with situations (e.g., academic) where they felt it could be assumed that the individual would be making an attempt (because they had little choice). In the present research, and in general when studying health-related behaviour change, it cannot be assumed that the individual will be making an attempt (they do have choice). Hence, it becomes appropriate to use efficacy questions coupled with intention questions, rather than using success expectations questions. Without such a modification, Weiner's model is severely limited in it application.

Other. Some possible confounding variables were also measured. Age and sex were recorded, and the Eysenck

Personality Questionnaire Neuroticism and Lie scales (Eysenck & Eysenck, 1975) were included as measures of negative affectivity (Watson & Pennebaker, 1989) and social desirability, respectively.

Analyses

Constraints on the analysis. As noted, subjects were asked to identify their greatest success and their greatest failure and then asked about their attributions, affects, expectations and intentions separately for the success and the failure. Thus, there were two conditions, success and failure, but these were not independent groups. Within a condition, there was no variability in success or failure. It was possible to make some comparisons between the conditions; specifically, it was possible to compare success and failure in terms of means on attributional dimensions, and in terms of the structure of attributions. However, it was not possible to include success/failure in the same model as affects, because different affects were measured in the success and failure conditions. Furthermore, the various regression analyses were interdependent (there were to be tests of whether affects and expectations mediated between attributions and expectations and intentions), so it was logical to conduct all such analyses separately for success and failure conditions.

Analyses of attributions. The distributions of scores on the CDSII items and scales, and the alpha reliabilities of the scales, were examined. Age and sex differences on the scale scores were examined. These analyses were done separately for success and failure. Then, for each CDSII scale, the mean score for success and the mean score for failure was compared.

The factor structure of the attribution data was examined, using LISREL 7 (Jöreskog & Sörbom, 1989) for confirmatory factor analysis, starting from McAuley et al.'s (1992) model. It was decided in the first instance to use multi-sample analysis (Jöreskog & Sörbom, 1989; Bollen, 1989), with the success data forming one sample, and the failure data the other sample, not forgetting that these were in fact the same individuals. Multi-sample analysis typically involves a hierarchy of increasingly exacting tests. For a measurement model, the first hypothesis to be tested might be that the groups have the same form (same number of factors, and same pattern of fixed, free and constrained factor loadings, error variances, and factor covariances). The second hypothesis might be that, in addition, the groups have identical factor loadings. Subsequent hypotheses might be that, in addition, the groups have identical error variances and/or identical factor covariances.

Analyses of affects. The distributions of scores on the affect items were examined. The factor structure of the affect data was examined using exploratory factor analysis with Maximum Likelihood estimation and oblique rotation.

Effect of attributions on affects, expectations and intentions. Regression analysis was used to examine the effect of attributions on affects, efficacy expectations, and intentions. In these analyses, possible two-way interactive effects of attributions were explored. Thus, hierarchical linear regression analysis incorporating cross-product terms was used (Jaccard, Turrisi, & Wan, 1990). All variables were first standardised, product terms were then computed, and the unstandardised solution was examined. It was also intended to examine whether efficacy expectations and affects mediated between attributions and intentions. Because of the incorporation of interaction terms, conventional regression analysis was used, rather than structural equation modelling with latent variables (see Chapter 4).

In any analysis, the same individual was always referring to the same behaviour. For example, if the individual's greatest success was to not smoke, then it was their attributions for the success of not smoking, their emotional reactions to the success of not smoking, their efficacy expectation for not smoking, and their intention to not smoke that were included in analyses. Thus, different individuals were referring to different behaviours, and in this sense, the analyses were not concerned with the exact nature of the behaviour.

In addition, regression analysis was used to examine the effect of efficacy expectations and intentions on behaviour. Specifically, the effect of Year 1 efficacy expectations and intentions on Year 2 self-reported behaviours was examined. This analysis was done for each of the ten behaviours separately. It was not possible to examine the effect of Year 2 efficacy expectations and intentions on future behaviour, since there was no such follow-up.

Results

Descriptive Statistics for Attributions

The choices of subjects for their greatest success and greatest failure are shown in Table 31. Popular choices for greatest success (chosen by ten or more individuals) included coping well, spending time doing relaxing things, and sorting out the future. Popular choices for greatest failure included exercising regularly, spending time doing relaxing things, not smoking, maintaining reasonable weight, and sorting out the future. Whereas all subjects specified a greatest success, eight subjects could not think of a failure. Excluding these eight subjects, and treating greatest success and greatest failure as variables with the choices as cases, the Spearman correlation was .04, N = 10, P = .91, suggesting little association between success and failure conditions with regard to choices.

The means, standard deviations, skewnesses, minima and maxima for the item and scale scores are shown in Table 32. Note that 102 subjects completed the CDSII for a success, and of these 94 also completed the CDSII for a failure (the remainder having no failures). As can be seen there were some negative skewnesses, coupled with relatively high means, notably for Locus of Causality and Stability in the success condition. There was a restricted range of scores, coupled with a relatively high mean and low standard deviation, for Personal Control in the success condition. It was not felt, however, that these aberrations were so extreme as to warrant elimination or transformation of items or scales.

The alpha reliabilities for the scales are also shown in Table 32. Alpha for Stability in the failure condition, at

Table 31

Subjects' Choices for Their Greatest Success and Greatest Failure

Choice	Greatest Success		Greatest Failure	
	n	%	*n*	%
Cope well with stressful situations	36	35.3	7	6.9
Exercise regularly	8	7.8	20	19.6
Drink alcohol only in moderation (if at all)	2	2.0	4	3.9
Sleep well	1	1.0	5	4.9
Spend enough time doing things which are refreshing, calming or relaxing	17	16.7	13	12.7
Not smoke	1	1.0	14	13.7
Eat healthily	4	3.9	8	7.8
Maintain reasonable weight	5	4.9	11	10.8
Sort out your future in relation to the closure of the hospital	19	18.6	11	10.8
Generally look after your health	9	8.8	1	1.0
None of the above	0	0.0	8	7.8
Total	102	100.0	102	99.9

Note. Each subject chose one greatest success and one greatest failure.

Table 32

Descriptive Statistics of the CDSII for Success and Failure

Variable	M	SD	Skewness	Minimum	Maximum	α
			Success (N = 102)			
Item 1	6.76	1.95	-1.08	1.00	9.00	
Item 2	7.77	1.29	-1.46	2.00	9.00	
Item 3	7.34	1.74	-1.57	1.00	9.00	
Item 4	7.57	1.23	-.88	4.00	9.00	
Item 5	4.63	2.18	-.09	1.00	9.00	
Item 6	7.16	1.73	-1.10	1.00	9.00	
Item 7	6.58	1.91	-.84	1.00	9.00	
Item 8	4.14	2.16	.38	1.00	9.00	
Item 9	7.25	1.68	-1.68	1.00	9.00	
Item 10	7.56	1.11	-.63	5.00	9.00	
Item 11	6.19	2.00	-.80	1.00	9.00	
Item 12	4.93	2.09	-.29	1.00	9.00	
Locus of Causality Scale	21.18	4.55	-1.39	3.00	27.00	.81
External Control Scale	13.70	5.34	.04	3.00	27.00	.77
Stability Scale Scale	20.11	4.83	-1.25	4.00	27.00	.81
Personal Control Scale	22.90	3.04	-.97	12.00	27.00	.78
			Failure (N = 94)			
Item 1	5.66	2.48	-.38	1.00	9.00	
Item 2	5.97	2.38	-.72	1.00	9.00	
Item 3	4.19	2.36	.29	1.00	9.00	
Item 4	5.78	2.26	-.67	1.00	9.00	
Item 5	4.71	2.57	-.04	1.00	9.00	
Item 6	5.77	2.40	-.63	1.00	9.00	
Item 7	4.44	2.47	.34	1.00	9.00	
Item 8	4.50	2.53	.12	1.00	9.00	
Item 9	6.70	2.06	-1.11	1.00	9.00	
Item 10	6.17	2.27	-.79	1.00	9.00	
Item 11	3.54	2.07	.89	1.00	9.00	
Item 12	4.40	2.39	.22	1.00	9.00	
Locus of Causality Scale	18.13	5.98	-.69	3.00	27.00	.82
External Control Scale	13.62	6.50	.00	3.00	27.00	.84

(table continues)

Variable	*M*	*SD*	Skewness	Minimum	Maximum	α
Stability Scale	12.17	5.35	.31	3.00	25.00	.66
Personal Control Scale	17.91	6.20	-.81	3.00	27.00	.88

0.66, was on the low side. Alpha for this scale would increase to 0.74 if item 3 were to be removed.

MANOVA indicated no significant difference between males and females on the CDSII scales in either the success condition [approximate $F(4, 97) = .63$, $p = .64$], or, separately, the failure condition [approximate $F(4, 89) = .70$, $p = .60$]. Age correlated significantly at the .05 level only with Stability in the failure condition ($r = .32$, $N = 94$, $p < .01$). Neuroticism correlated significantly only with Personal Control in the failure condition ($r = -.27$, $N = 94$, $p < .01$). The Lie scale did not correlate significantly with any of the CDSII scales. It was not felt that any of these variables needed to be routinely included in the subsequent regression analyses.

Comparison of Attributions in Success and Failure

Repeated measures MANOVA was used to examine whether success and failure differed in terms of scores on the four CDSII scales. This analysis was, perforce, limited to the 94 individuals who completed the CDSII for both success and failure. There was a significant overall difference between success and failure [approximate $F(4, 90) = 43.67$, $p < .01$]. Follow-up discriminant function analysis highlighted Stability (standardised structure coefficient = -.89), Personal Control (standardised structure coefficient = -.53), and Locus of Causality (standardised structure coefficient = -.30), rather than External Control (standardised structure coefficient = -.03). The success minus failure within-subject difference scores were as follows: Stability, $M = 7.92$, $SD = 6.41$; Personal Control, $M = 4.99$, $SD = 6.75$; Locus of Causality, $M = 3.04$, $SD = 7.36$; External Control, $M = .27$, $SD = 7.60$. Thus, overall, success compared with failure was seen as more internal, more stable, and more personally controllable.

Associations Between Attributions

The correlations between CDSII scales are shown in Table 33. Within the success condition, Locus of Causality correlated positively with Personal Control ($r = .36$, $N = 102$, $p < .01$) and negatively with External Control ($r = -.30$, $N = 102$, $p < 0.01$). Personal Control and External Control did not

Table 33

Intercorrelations of the CDSII Scales for Success and Failure

Condition and Scale	1	2	3	4	5	6	7
1. Success, Locus of Causality	-						
2. Success, External Control	-.30*	-					
3. Success, Stability	.20	-.02	-				
4. Success, Personal Control	.36**	-.18	.26*	-			
5. Failure, Locus of Causality	.06	.00	-.01	-.13	-		
6. Failure, External Control	-.15	.18	-.03	-.04	-.62**	-	
7. Failure, Stability	-.20	.14	.22	-.09	.38**	-.12	-
8. Failure, Personal Control	-.04	-.03	-.17	.07	.49**	-.36**	.06

Note. Pairwise deletion for missing values; N = 102 within the success condition, otherwise N = 94.

*p < .01. **p < .001.

correlate significantly with each other. Stability correlated positively with Personal Control ($r = .26$, $N = 102$, $p < 0.01$), but not significantly with the other scales. Within the failure condition, Locus of Causality correlated positively with Personal Control ($r = .49$, $N = 94$, $p < .01$) and negatively with External Control ($r = -.62$, $N = 94$, $p < 0.01$). Personal Control and External Control correlated significantly negatively with each other ($r = -.36$, $N = 94$, $p < .01$). Stability correlated positively with Locus of Causality ($r = .38$, $N = 94$, $p < 0.01$), but not significantly with the other scales. There were no significant correlations of scales in the success condition with scales in the failure condition. Overall, the pattern of correlations hints at possible differences between success and failure conditions, but further consideration of this is best reserved for the confirmatory factor analyses when the associations between variables can be considered at the latent level.

Factor Analyses of Attributions

The fits of various LISREL models to the data are shown in Table 34. Reasonable fit was taken to be indicated by values of at least 0.05 for the probability of chi^2, 0.90 for the Goodness of Fit Index, and 0.85 for the Adjusted Goodness of Fit Index.

The first analysis was a multi-sample analysis, one sample being the success data, the other the failure data. McAuley et al.'s (1992) four-factor model was applied. The across-groups constraint was that the groups should have the same form. Jöreskog and Sörbom's (1989) stricture not to standardise the variables within each group was followed. That is to say, as well as analysing covariance rather than correlation matrices, scales for the latent variables were set by fixing appropriate item-factor loadings to value 1, rather than by fixing the factor variances to value 1. Error variances were free to vary, but error covariances were fixed to value 0. The overall fit was not good. It was, therefore, not worth trying more stringent constraints. However, the Goodness of Fit Index for the first (success) group looked reasonable, at .91.

Table 34

LISREL Measures of Fit for Various Models Applied to the CDSII Data

Data	Basic Specification[a]	Additional Specifications	Chi²	df	p	GFI	AGFI	RMSR	Note
Success and failure as two groups	Four factor	Same form for each group.	161.64	96	.000	.857	-	.496	
Success	Four factor	None.	61.16	48	.096	.908	.851	.199	See Table 35.
Success	Four factor	Item 4 free to load on LOC.	52.30	47	.276	.919	.866	.185	
Success	Four factor	Item loadings constrained to be equal within each factor.	74.36	56	.051	.887	.843	.254	
Success	Three factor	None.							No convergence.
Failure	Four factor	None.[b]	98.88	49	.000	.859	.775	.646	
Failure	Four factor	Item 3 free to load on LOC.[b]	69.85	48	.021	.892	.824	.363	
Failure	Four factor	Item 3 free to load on LOC. Item 9 free to load on PC.[b]	55.25	47	.191	.912	.854	.309	See Table 36.
Failure	Four factor	Item loadings constrained to be equal within each factor.	104.54	56	.000	.847	.786	.631	
Failure	Three factor	None.	136.70	52	.000	.799	.698	.717	

(table continues)

Data	Basic Specification[a]	Additional Specifications	Chi²	*df*	*p*	GFI	AGFI	RMSR	Note
Failure	Three factor	Item 3 free to load on LOC/EC. Item 9 free to load on PC. Item 1 free to load on S.	89.99	49	.000	.841	.748	.397	

Note. *N* = 100 for success data, 94 for failure data. GFI = Goodness of Fit Index. AGFI = Adjusted Goodness of Fit Index. RMSR = Root Mean Square Residual. LOC = Locus of Causality. S = Stability. PC = Personal Control. EC = External Control.

[a]Four-factor specification based on McAuley, Duncan, and Russell (1992), comprising Locus of Causality, Stability, Personal Control, and External Control factors. Three-factor specification formed by collapsing Locus of Causality and External Control factors. All models oblique. [b]Error covariance of item 11 fixed at a value equal to its value in the equal loadings model.

It was decided therefore to look at the success and failure data separately. In these models, scales for the latent variables were set by fixing the factor variances to value 1. This has the advantage of being perhaps easier to understand than the alternative of fixing a factor loading to 1. Furthermore, if a factor loading is fixed to 1 to set the scale for the latent variable, LISREL will not compute a modification index for that particular loading.

The McAuley et al. (1992) model applied to the success data produced an acceptable fit. The factor pattern matrix and factor correlation matrix are shown in Table 35. As can be seen, all free factor loadings were greater than 0.6. As regards the factors, Locus of Causality correlated positively with Personal Control (.50) and negatively with External Control (-.40). Personal Control and External Control correlated negatively with each other (-.32). Stability correlated positively with Locus of Causality (0.26), positively with Personal Control (0.25), but not notably with External Control. The Modification Indices suggested that item 4 (*you can regulate/you cannot regulate*), nominally a Personal Control item, be allowed to load on the Locus of Causality factor. This seemed indeed to be a potentially ambiguous item, so the modification was made. The fit was then very good, and there were no further large (significant at the .01 level) modification indices. The McAuley et al. model with the additional constraint that within each factor all item loadings should be equal (which one would expect of items to be used in additive scales), produced a fit that was approaching reasonable. The difference in chi^2 between the McAuley et al. model and this more constrained model was not significant [$chi^2(8) = 13.20$, $p > 0.10$].

The McAuley et al. (1992) model applied to the failure data did not fit at all well. The largest modification index by far (25.8) suggested allowing item 3 (*permanent/temporary*), nominally a Stability item, to load on Locus of Causality, and the estimated change suggested that it would load positively. To make this modification would be to accept that in failure situations, individuals tend to equate permanence with

Table 35

LISREL Standardised Solution for Four Factor Model Applied to CDSII Success Data

Variable	Factor 1	2	3	4
	Item-factor loadings			
Item 1	.65	.00	.00	.00
Item 2	.00	.00	.75	.00
Item 3	.00	.67	.00	.00
Item 4	.00	.00	.61	.00
Item 5	.00	.00	.00	.75
Item 6	.87	.00	.00	.00
Item 7	.00	.82	.00	.00
Item 8	.00	.00	.00	.78
Item 9	.81	.00	.00	.00
Item 10	.00	.00	.90	.00
Item 11	.00	.79	.00	.00
Item 12	.00	.00	.00	.64
	Factor-factor correlations			
Factor 1 (Locus of Causality)	-			
Factor 2 (Stability)	.26	-		
Factor 3 (Personal Control)	.50	.25	-	
Factor 4 (External Control)	-.40	.07	-.32	-

internality. The modification was made. Note that the other Stability items (*stable/variable* and *unchangeable/changeable*), showed no such desire to load on Locus of Causality, but perhaps they do not have quite the same connotation of everlastingness. Modification indices then suggested allowing item 9 (*something about you/something about others*), nominally a Locus item, to load on Personal Control. There is clearly room for ambiguity in this item, so the modification was made. The fit was then reasonable. There were no further large modification indices. The final solution is shown in Table 36. Note that item 3 ended up loading higher on Locus of Causality (0.55) than on Stability (0.31). Item 9 had only a modest loading on Personal Control (0.35). Otherwise, factor loadings were above 0.6. As regards the factors, the pattern of correlations deviated from that in the success condition in the following ways. Whereas in the success condition Stability had a small positive correlation with Personal Control (.25), in the failure condition this was not so (.11). In the success condition, the correlation between Locus of Causality and External Control was moderate (-.40), but in the failure condition it was higher (-.72).

Note that in the four-factor models applied to the failure data it was necessary to fix the error variance for item 11, because LISREL kept producing negative estimates for this. The remedy used was to fix it at a value equal to its value in the equal loadings model, that is to say the McAuley et al. (1992) model with the additional constraint that within each factor all item loadings should be equal. Not surprisingly, this equal loadings model itself produced a poor fit, but the difference in chi^2 between the McAuley et al. model and the more constrained model was not significant [$chi^2(7) = 5.66$, $p > 0.50$].

It was considered possible that the structure of attributions in the failure condition might be different to the extent of there being a different number of factors. It was decided, therefore, to conduct an exploratory factor analysis on the failure data. Using Maximum Likelihood estimation and oblique rotation, this produced a three-factor

Table 36

LISREL Standardised Solution for Modified Four Factor Model Applied to CDSII Failure Data

Variable	Factor 1	2	3	4
Item 1	.73	.00	.00	.00
Item 2	.00	.00	.82	.00
Item 3	.55	.31	.00	.00
Item 4	.00	.00	.85	.00
Item 5	.00	.00	.00	.75
Item 6	.84	.00	.00	.00
Item 7	.00	.72	.00	.00
Item 8	.00	.00	.00	.87
Item 9	.63	.00	.35	.00
Item 10	.00	.00	.85	.00
Item 11	.00	.76	.00	.00
Item 12	.00	.00	.00	.76
Factor 1 (Locus of Causality)	-			
Factor 2 (Stability)	.21	-		
Factor 3 (Personal Control)	.46	-.11	-	
Factor 4 (External Control)	-.72	.03	-.43	-

solution wherein items 1, 6, and 9 (nominally Locus of Causality items) loaded in one direction and items 5, 8, and 12 (nominally External Control items) loaded in the other direction on the same factor. However, the fit was not good [$chi^2(33, N = 94) = 58.71, p < .01$]. (Incidentally, exploratory factor analysis of the success data produced a four-factor solution consistent with the McAuley et al. (1992) model, and fitting well). Reverting to LISREL, a three factor model, with the Locus of Causality and External Control items loading on one factor, applied to the failure data, produced a poor fit, even with modifications. This three-factor model applied to the success data did not converge.

On the basis of these results, it was decided to score the CDSII as proposed by McAuley et al. (1992), but excluding item 3 in the failure condition, weighting items 7 and 11 to produce the measure of Stability. It was decided that the problems with item 9 were not so great as to justify its exclusion.

Descriptive Statistics and Factor Analyses of Affects

When completing the affects questionnaires, many subjects had problems, and had to be helped, with items such as "kindly", "serene", "agreeable", "composed", and "elated". These words, often found in affect and well-being questionnaires, are perhaps too arcane for most uses outside of universities. The descriptive statistics for the affects are shown in Table 37. The item "guilty" in the success condition had a low mean and low standard deviation coupled with high skewness. It was decided to drop this item from subsequent analyses. The item "pleased" in the success condition had a restricted range and a high mean and low standard deviation, but was not especially skewed. It was decided to retain this in the analysis.

Exploratory factor analysis of the affects for the success condition produced a four-factor solution, but the fit was not good [$chi^2(101) = 146.34, p <.01$]. Nor was the fit particularly good for a five-factor solution [$chi^2(86) = 117.19, p = .01$]. The fit for a six factor solution was good [$chi^2(72) = 78.04, p = .29$]. The solution is shown in Table

Table 37

Descriptive Statistics of the Affect Items for Success and Failure

Item	$\underline{M}$	$\underline{SD}$	Skewness	Minimum	Maximum
		Success ($\underline{N}$ = 101)			
Relaxed	5.02	1.46	-1.05	1.00	7.00
Pleased	6.17	.91	-.75	4.00	7.00
Kindly	4.65	1.77	-.83	1.00	7.00
Good	5.81	1.11	-1.31	2.00	7.00
Serene	4.15	1.69	-.52	1.00	7.00
Agreeable	5.39	1.33	-1.05	1.00	7.00
Competent	5.55	1.20	-1.37	1.00	7.00
Cheerful	5.58	1.42	-1.50	1.00	7.00
Self-assured	5.46	1.26	-1.02	1.00	7.00
Good-natured	5.33	1.39	-1.41	1.00	7.00
Confident	5.54	1.21	-1.22	1.00	7.00
Guilty	1.60	1.17	2.32	1.00	6.00
Calm	5.13	1.27	-.81	1.00	7.00
Thankful	5.48	1.70	-1.24	1.00	7.00
Happy	5.86	1.10	-1.35	2.00	7.00
Composed	5.25	1.26	-.82	1.00	7.00
Surprised	3.60	1.94	.33	1.00	7.00
Elated	3.91	1.94	-.14	1.00	7.00
Grateful	5.13	1.65	-.81	1.00	7.00
Proud	4.89	1.82	-.71	1.00	7.00
		Failure ($\underline{N}$ = 94)			
Inadequate	3.04	1.87	.46	1.00	7.00
Sad	2.97	1.81	.54	1.00	7.00
Inferior	2.30	1.58	1.14	1.00	7.00
Angry	3.38	1.98	.31	1.00	7.00
Unhappy	3.47	1.93	.22	1.00	7.00
Ashamed	2.44	1.64	.96	1.00	7.00
Guilty	3.26	2.04	.32	1.00	7.00
Annoyed	3.95	1.95	-.04	1.00	7.00
Displeased	4.05	1.94	-.17	1.00	7.00
Depressed	2.12	1.49	1.22	1.00	6.00

(table continues)

Item	M	SD	Skewness	Minimum	Maximum
Afraid	1.94	1.41	1.66	1.00	7.00
Nervous	1.80	1.32	1.80	1.00	7.00
Incompetent	2.33	1.69	1.15	1.00	7.00
Furious	2.14	1.71	1.46	1.00	7.00
Surprised	2.26	1.62	1.16	1.00	7.00
Disappointed	4.47	1.86	-.35	1.00	7.00
Upset	2.57	1.74	1.02	1.00	7.00
Astonished	1.97	1.50	1.52	1.00	7.00
Downhearted	2.91	1.87	.61	1.00	7.00
Anxious	2.57	1.77	.76	1.00	7.00

38. The factors were labelled Calm, Cheerful, Grateful, Confident, Kindly, and Proud. "Serene" loaded (0.3 or greater) on Calm but also on Kindly. "Competent" loaded on Confident but also on Proud. "Happy" loaded on Cheerful but also on Proud. The solution is similar to that of Russell and McAuley (1986) (who found Competence, Gratitude and Positive Affect factors) in as much as both solutions have a factor relating to competence and a factor relating to gratitude; the solutions differ in the extent to which positive affectivity is further differentiated.

Exploratory factor analysis of the affects for the failure condition produced a four factor solution with a good fit [$chi^2(116) = 125.24$, $p = .26$]. The factors were labelled Surprised, Disgruntled, Anxious, Unashamed (this last factor having mainly negative loading items). The solution is shown in Table 39. "Inadequate" loaded on both Disgruntled and (negatively) on Unashamed. "Incompetent" loaded on both Disgruntled and (negatively) on Unashamed. "Upset" and "Anxious" loaded on both Disgruntled and Anxious. It might be argued that the Disgruntled factor represents negative affect; however, there is a separate anxiety-related factor. The fact that anger and sadness are mixed up was reflected in subjects' queries such as "Do you mean angry with others or angry with myself?". This could be a cultural phenomenon; whatever, there is a need to clarify it in future research. This solution is similar to that of Russell and McAuley (1986) (who found Anger, Guilt, Surprise, and Negative Affect factors) in as much as both solutions have a factor relating to surprise and a factor relating to guilt; the solutions differ in the make up of the other two factors.

For the success and the failure solutions, the factor scores were saved. These saved scores were then used in subsequent regression analyses.

Regression Analyses

In the regression analyses for the effect of attributions on affects, expectations and intentions (all Year 2 data), the value of N was lower in the success (N = 89) than in the failure (N = 94) condition (even though there were more

Table 38

Exploratory Factor Analysis of the Affect Items for Success

Variable	Factor 1	2	3	4	5	6
	Item-factor loadings					
Relaxed	.40	.18	-.12	.17	.16	.00
Pleased	.12	.04	.03	.15	.03	.53
Kindly	-.08	-.08	.19	.10	.85	-.05
Good	.26	.08	.05	-.04	.12	.51
Serene	.35	.12	.02	-.06	.52	-.00
Agreeable	.24	.28	-.06	.01	.37	.22
Competent	.17	-.04	-.01	.36	.01	.35
Cheerful	-.03	.97	.10	.12	-.08	-.05
Self-assured	.10	.09	.12	.84	-.02	-.07
Good-natured	.09	.30	-.01	.04	.40	.29
Confident	-.05	.05	-.03	.84	.03	.03
Calm	.98	-.05	.17	.08	-.07	-.06
Thankful	.03	.03	.87	.02	.03	.03
Happy	.03	.45	.14	.17	.02	.36
Composed	.40	.16	.06	.24	.09	.11
Surprised	-.06	.07	.07	-.04	-.16	.32
Elated	-.07	.18	.08	-.01	.20	.48
Grateful	.06	.02	.87	-.01	.08	.02
Proud	-.08	-.05	.09	.09	.00	.78
	Factor-factor correlations					
Factor 1 (Calm)	-					
Factor 2 (Cheerful)	.37	-				
Factor 3 (Grateful)	.17	.32	-			
Factor 4 (Confident)	.49	.44	.27	-		
Factor 5 (Kindly)	.45	.29	.21	.29	-	
Factor 6 (Proud)	.20	.55	.44	.33	.14	-

Note. *N* = 100. Goodness of fit $chi^2(72) = 78.04$, *p* = .29. Total variance explained 65.1%.

Table 39

Exploratory Factor Analysis of the Affect Items for Failure

	Factor			
Variable	1	2	3	4
	Item-factor loadings			
Inadequate	-.18	.43	.25	-.30
Sad	.10	.61	-.03	-.02
Inferior	.02	.40	.26	-.23
Angry	.04	.75	.12	.10
Unhappy	.14	.86	-.07	.05
Ashamed	.04	-.02	.02	-.82
Guilty	.04	.16	-.18	-.81
Annoyed	-.05	.89	-.03	.04
Displeased	-.05	.72	-.00	-.12
Depressed	.18	.17	.38	-.27
Afraid	.07	.04	.75	.05
Nervous	.04	.00	.88	.12
Incompetent	.02	-.08	.62	-.50
Furious	.28	.45	.20	-.16
Surprised	.68	.02	.02	.02
Disappointed	-.14	.71	-.00	-.07
Upset	.27	.40	.32	-.12
Astonished	.99	-.04	.02	-.06
Downhearted	.15	.53	.15	-.17
Anxious	.16	.30	.55	.04
	Factor-factor correlations			
Factor 1 (Surprised)	-			
Factor 2 (Disgruntled)	.33	-		
Factor 3 (Anxious)	.48	.51	-	
Factor 4 (Unashamed)	-.16	-.52	-.32	-

Note. N = 94. Goodness of fit $chi^2(116)$ = 125.24, p = .26. Total variance explained 64.8%.

successes than failures reported). The reason was as follows. If the greatest success was "Sorting out your future ..." then an individual who had finally sorted out their future would find the corresponding expectation and intention questions inapplicable. This would then constitute missing data which in listwise deletion would pull down *N*. Listwise deletion was used in these analyses because, later on, the extent to which affects and expectations mediated the effect of attributions on intentions was to be considered.

The full results of these regression analyses for the effect of attributions on affects, expectations and intentions are shown in Appendix D; key findings are shown in Table 40. Stability, Locus of Causality (LOC), Personal Control (PC) and External Control (EC) predicted affects, expectations and intentions (all Year 2 data) as described in the following two paragraphs, which are followed by a summary.

In the success condition, Calm was predicted by the product of Stability and EC (R^2 change = .08; Calm = .00 + .19 Stability + .21 EC - .30 Product; if Stability = -1, Calm = -.19 + .51 EC; if Stability = +1, Calm = .19 - .19 EC). Cheerful was predicted by the product of Stability and PC (R^2 change = .09; Cheerful = .06 + .00 Stability + .05 PC - .29 Product; if Stability = -1, Cheerful = .06 + .34 PC; if Stability = +1, Cheerful = .06 - .25 PC). Grateful was predicted by EC on its own (R^2 change = .05 when entered first, regression coefficient positive in the final equation). Confident was predicted by PC on its own (R^2 change .10, regression coefficient positive), and by Stability on its own (R^2 change .06, regression coefficient positive), and additionally by the product of Stability and PC (R^2 change .08; Confident = .05 + .19 Stability + .21 PC - .26 Product; if Stability = -1, Confident = -.14 + .47 PC; if Stability = +1, Confident = .24 - .05 PC). Note that whereas Confident was still predicted by PC when Stability was already in the equation (R^2 change .06), Confident was not predicted by Stability when PC was already in the equation (R^2 change non-significant). Kindly was predicted by Stability on its own (R^2 change .06, regression coefficient positive), and by EC on

Table 40

Key Findings of Regression Analyses Examining the Effect of Attributions

Dependent variable	Predictor variable[a]	δR^2 [b]	b[c]
	Success		
Calm	External Control x Stability	.08	-ve
Cheerful	Personal Control x Stability	.09	-ve
Grateful	External Control	.05	+ve
Confident	Personal Control	.10	+ve
	Stability	.06	+ve
	Personal Control x Stability	.08	-ve
Kindly	Stability	.06	+ve
	External Control	.08	+ve
Proud	None		
Efficacy	None		
Intention	Personal Control x Stability	.07	-ve
	Failure		
Surprised	Personal Control	.09	-ve
	Locus of Causality x Stability	.05	-ve
	External Control x Stability	.04	+ve
Disgruntled	Personal Control	.09	-ve
Anxious	Stability	.05	+ve
	External Control x Stability	.05	+ve
	Personal Control	.07	-ve
Unashamed	None		
Efficacy	None		
Intention	None		

[a]Variables which produced a significant (.05 level) change in $\underline{R}^2$ when entered alone, or, in the case of cross-product variables, when entered last. [b]Stepwise change in $\underline{R}^2$. [c]Sign of regression coefficient in the final equation (containing two attributions and their product).

its own (R^2 change .08, regression coefficient positive). Proud was not predicted by the attribution variables. Efficacy was not predicted by the attribution variables. Intention was predicted by the product of Stability and PC (R^2 change = .07; Intention = .09 + .13 Stability + .10 PC - .23 Product; if Stability = -1, Intention = -.04 + .33 PC; if Stability = +1, Intention = .22 - .13 PC).

In the failure condition, Surprised was predicted by PC on its own (R^2 change .09, regression coefficient negative). Surprised was also predicted by the product of Stability and LOC (R^2 change .05; Surprised = .03 + .12 Stability - .04 LOC - .19 Product; if Stability = -1, Surprised = -.09 + .15 LOC; if Stability = +1, Surprised = .15 - .23 LOC). Surprised was also predicted by the product of Stability and EC (R^2 change .04; Surprised = .00 + .10 Stability + .13 EC + .18 Product; if Stability = -1, Surprised = -.10 -.05 EC; if Stability = +1, Surprised = .10 + .31 EC). Disgruntled was predicted by PC on its own (R^2 change .09, regression coefficient negative). Anxious was predicted by Stability on its own (R^2 change .05, regression coefficient positive), and additionally by the product of Stability and EC (R^2 change .05; Anxious = .00 + .19 Stability + .14 EC + .19 Product; if Stability = -1, Anxious = -.19 -.05 EC; if Stability = +1, Anxious = .19 + .35 EC). Anxious was also predicted by PC on its own (R^2 change .07, regression coefficient negative). Unashamed was not predicted by the attribution variables. Efficacy was not predicted by the attribution variables. Nor was Intention.

In short, in the success condition, subjects tended to be calm if the cause was seen as externally controllable but unstable; cheerful if the cause was seen as personally controllable but unstable; grateful if the cause was seen as externally controllable; confident if the cause was seen as personally controllable especially if the cause was also seen as unstable; kindly if the cause was seen as stable, and kindly if the cause was seen as externally controllable. Subjects expressed an intention to carry on with the behaviour if the cause was seen as personally controllable but unstable. In the failure condition, subjects tended to be surprised if the cause was seen as not personally controllable, surprised if the cause was seen as externally located (locus) but stable, and surprised if the cause was seen as externally controllable but stable; disgruntled if the cause was seen as not personally controllable; anxious if the cause was seen as stable especially if the cause was also seen as externally controllable, and anxious if the cause was seen as not personally controllable.

It had been intended to examine whether efficacy expectations and affects mediated the effect of attributions on intentions. However, Efficacy was not predicted, in either the success or the failure condition. Intention was predicted in the success condition, by the product of Stability and Personal Control. Cheerfulness and Confidence were both also predicted by the product of Stability and Personal Control. Therefore an analysis was conducted to see if Cheerfulness or Confidence mediated the effect of Stability and Personal Control on Intention. Confidence did not predict Intention (R^2 change not significant). With Confidence already in the equation, the product of Stability and Personal Control still predicted Intention (R^2 change .05). Cheerfulness did not predict Intention (R^2 change not significant). With Cheerfulness already in the equation, the product of Stability and Personal Control still predicted Intention (R^2 change .07). Hence there was no evidence for the hypothesised mediation.

The effects of Efficacy (Year 1) and Intention (Year 1) on Behaviour (Year 2) are shown in Table 41 for each of the behaviours. Efficacy predicted Intention (R^2 changes ranging from .17 up to .55). Intention generally predicted Behaviour (R^2 changes up to .56, but non-significant for coping and eating). Efficacy alone generally predicted Behaviour (R^2 changes up to .77, but non-significant for coping, eating and sorting out the future), but this prediction was reduced or eliminated when Intention was already in the equation. This pattern of results is consistent with Intention acting as a partial mediator between Efficacy and Behaviour.

Table 41

Regression Analyses Examining the Effect of Efficacy Expectations and Intentions on Behaviour

Equation[a]	δR^2[b]	F	$p(F)$	β[c]	t	$p(t)$	r[d]
"Cope well with stressful situations" (N = 101)							
Behaviour/							
+ Efficacy	.03	2.84	.10				.17
Behaviour/							
+ Intention	.01	1.25	.27	.05	.44	.66	.11
+ Efficacy	.02	1.75	.19	.15	1.32	.19	.17
Intention/							
+ Efficacy	.19	22.79	.00				.43
"Exercise regularly" (N = 102)							
Behaviour/							
+ Efficacy	.16	19.39	.00				.40
Behaviour/							
+ Intention	.14	16.63	.00	.19	1.57	.12	.38
+ Efficacy	.04	4.87	.03	.27	2.21	.03	.40
Intention/							
+ Efficacy	.46	84.25	.00				.68
"Drink alcohol only in moderation (if at all)" (N = 102)							
Behaviour/							
+ Efficacy	.39	63.48	.00				-.62
Behaviour/							
+ Intention	.24	32.41	.00	-.18	-1.81	.07	-.49
+ Efficacy	.16	27.30	.00	-.51	-5.23	.00	-.62
Intention/							
+ Efficacy	.38	61.36	.00				.62
"Sleep well" (N = 100)							
Behaviour/							
+ Efficacy	.07	7.41	.01				.27
Behaviour/							
+ Intention	.09	9.82	.00	.23	2.03	.05	.30
+ Efficacy	.02	1.85	.18	.15	1.36	.03	.27
Intention/							
+ Efficacy	.26	33.65	.00				.51

(table continues)

Equation[a]	δR^2[b]	F	$p(F)$	β[c]	t	$p(t)$	r[d]
"Spend enough time doing things which are refreshing, calming or relaxing" (N = 101)							
Behaviour/							
+ Efficacy	.17	19.56	.00				.41
Behaviour/							
+ Intention	.09	9.48	.00	.10	.92	.36	.30
+ Efficacy	.08	10.04	.00	.35	3.17	.00	.41
Intention/							
+ Efficacy	.31	43.80	.00				.55
"Not smoke" (N = 102)							
Behaviour/							
+ Efficacy	.77	331.93	.00				-.88
Behaviour/							
+ Intention	.56	125.45	.00	-.21	-3.07	.00	-.75
+ Efficacy	.23	108.71	.00	-.72	-10.43	.00	-.88
Intention/							
+ Efficacy	.55	122.95	.00				.74
"Eat healthily" (N = 101)							
Behaviour/							
+ Efficacy	.01	.95	.33				.10
Behaviour/							
+ Intention	.02	2.15	.15	.14	1.10	.28	.15
+ Efficacy	.00	.01	.92	.01	.10	.92	.10
Intention/							
+ Efficacy	.38	59.78	.00				.61
"Maintain reasonable weight" (N = 99)							
Behaviour/							
+ Efficacy	.07	7.16	.01				.26
Behaviour/							
+ Intention	.06	6.62	.01	.16	1.46	.15	.25
+ Efficacy	.03	2.65	.11	.18	1.63	.11	.26
Intention/							
+ Efficacy	.24	30.89	.00				.49

(table continues)

Equation[a]	δR^2[b]	F	p(F)	β[c]	t	p(t)	r[d]
"Sort out your future in relation to the closure of the hospital" (N = 87)							
Behaviour/							
+ Efficacy	.02	1.77	.19				.14
Behaviour/							
+ Intention	.09	8.76	.00	.30	2.61	.01	.31
+ Efficacy	.00	.04	.85	.02	.19	.85	.14
Intention/							
+ Efficacy	.17	16.87	.00				.41
"Generally look after your health" (N = 102)							
Behaviour/							
+ Efficacy	.18	22.05	.00				.43
Behaviour/							
+ Intention	.08	8.91	.00	.11	1.08	.28	.29
+ Efficacy	.11	13.24	.00	.37	3.64	.00	.43
Intention/							
+ Efficacy	.22	28.49	.00				.47

[a]The Intention and Efficacy variables are Year 1, the Behaviour variables Year 2. The dependent variable precedes the slash. The plus sign signifies addition of a variable to those already in the equation. All variables are unstandardised. [b]Stepwise change in R^2. [c]Standardised regression coefficient in the final equation. [d]Zero-order correlation with the independent variable.

Discussion

In this research, each subject was asked to choose one of a list of behaviours as their greatest success and one as their greatest failure. The frequency distributions of choices for the greatest success and the greatest failure were markedly different. Subsequent analyses ignored the exact nature of the behaviour. Consequently, in these subsequent analyses, any difference between success and failure conditions might reflect the different underlying behaviours. This is a problem. On the other hand, a serendipitous consequence of the approach taken in this study is that the same subjects contributed to the success and failure data. (Note, however, that it is not paired data because each subject is always referring to a different behaviour for success and failure). This can be contrasted with the more typical procedure whereby all subjects are referring to the same behaviour, but are allocated either to the success or the failure data (e.g., Vallerand & Richer's, 1988, study of students taking an examination). This allocation is clearly not a random process; it is based on the subject's performance or perceived performance or both. Consequently, in any subsequent analyses, any difference between success and failure conditions might reflect the different subjects. There may be no perfect solution to this problem. Ideally, one would wish each subject to be referring to the same behaviour; and to be contributing to both the success and the failure data (i.e, truly matched data), or failing that, to be contributing to either the success or the failure data by some random process. This would represent a considerable challenge in this kind of field research, where it would be difficult to manipulate success and failure, never mind perceptions of success and failure.

Causes of success, compared with causes of failure, were seen as more internal, more stable, and more personally controllable (with no difference on external control). This is consistent with previous literature on the CDS (e.g., Russell, 1982; Vallerand & Richer, 1988; Schaufeli, 1988; Schoeneman & Curry, 1990). This has been cited as evidence of a self-serving bias, which is legitimate if one focuses on the locus of causality dimension. However, in so doing, one should not neglect the stability and controllability dimensions, and their possible influence upon future attempts to correct failure or maintain success. Furthermore, it may be presumptuous to use the term *bias*. It may be that, in the case of some health-related behaviour changes, causes of success actually are more internal, stable and personally controllable. This merits further investigation.

The structure of the CDSII, as proposed by McAuley et al. (1992), was confirmed for the success condition, but not for the failure condition. McAuley et al. pooled success and failure data in their confirmatory factor analysis of the CDSII, even though Vallerand and Richer (1988) had previously found that the structure of the original CDS varied between success and failure. The current study and the Vallerand and Richer study differ somewhat in their detailed findings, but concur in finding problems with the Stability scale. It may also be that success and failure differ in the strengths of associations between the different attributional dimensions.

Locus of causality (internality) was positively associated with personal control and negatively associated with external control, in both success and failure. Such an association between locus and controllability is consistent with previous literature (e.g., Vallerand & Richer, 1988; McAuley et al., 1992). It suggests that, in people's minds, there is much overlap between where the cause lies and who controls the cause. However, logically, it is still possible to maintain the distinction between locus and controllability; for example, genetics might be a cause that is internal but not controllable.

There was some support for Weiner's (1986) model, in that attributions predicted affects. However, there was no evidence that these affects then influenced anything else (they did not mediate any effect of attributions on efficacy expectation or intention). The explanation could be that the affects are mere by-products of the attributional process. Alternatively, the explanation might lie in the fact that the efficacy and intention measures were pooled measures which were not concerned with the exact nature of the behaviour (see below).

The main effects of attributions on affects make some sense. It is not difficult to accept that, in success, people might feel grateful if they saw the cause as having been externally controlled, confident if personally controlled, kindly if stable or externally controlled; and that, in failure, they might feel surprised if they saw the cause as having been personally controlled, disgruntled if not personally controlled, anxious if stable or not personally controlled. However, the interactive effects of attributions on affects, and on intention, make less immediate sense. Why, in success, should people feel calm if they saw the cause as having been externally controlled but unstable; cheerful, and confident, and full of intent, if personally controlled but unstable? Why, in failure, should they feel surprised if they saw the cause as having been externally located but stable, or externally controlled but stable; and anxious if externally controlled but stable? Previous studies (e.g., Russell & McAuley, 1986) are of very limited help, because they do not include interactions.

It may be that, in success, stability is being revealed as in part a retrospective assessment of whether or not the previous success was a "a foregone conclusion". If the previous success was a foregone conclusion, then one might not have any particular feelings about it (no main effect of stability). If the previous success was not a foregone conclusion, and if one took credit for it, then one might well feel cheerful and confident and full of intent (interactive effect of stability and personal control). In failure, it may be that stability is being revealed as in part a prospective assessment of whether or not future failure will be "a foregone conclusion". If future failure is a foregone conclusion, then one might well feel anxious (main effect of stability), especially if the cause is also externally controlled (interactive effect of stability and external control). These are post hoc and partial arguments.

Nevertheless, it will be recalled that the confirmatory factor analyses of the CDSII revealed differences between success and failure that hinged to some extent on the Stability scale. It further illustrates that one has little idea of what subjects are actually focusing on when they complete attributional questionnaires like the CDSII or, for that matter, when they complete affect questionnaires. More qualitative research is called for in this regard.

In this research, attributions did not predict efficacy expectation, and attributions predicted intention only in the success condition. This can be contrasted, in the health-related behaviour domain, with the study of Eiser et al. (1985), described earlier. However, as noted, in the present research, the analyses were not concerned with the exact nature of the behaviour; the data was pooled for greatest success and pooled for greatest failure. If attributions predicted efficacy expectations and intentions for some behaviours but not for others, then this effect might be lost in the pooling process. Some light is thrown on this by the other analyses which indicated that efficacy expectations influenced behaviour, with intention acting as a partial mediator, for some behaviours but not for others. There was strong prediction for smoking and drinking. However, there was negligible prediction for coping well, eating healthily, and sorting out the future. This poor prediction might be due to the vagueness of the behaviours. However, there was reasonably good prediction for other somewhat vague behaviours such as generally looking after health. Whatever the reason for the poor prediction, to pool such data, as was done when examining the effect of attributions on efficacy expectations and intentions, could easily lead to effects not being detected. It will be recalled that the original reason for pooling data was practical; it was not reasonable to ask subjects to complete the CDSII and the affects lists too many times.

In this research, the regression analyses were conducted quite separately for success and failure. This was primarily because there were separate affect lists for success and failure. However, this does raise the question of whether there should be one or two models. Should there be one model, incorporating success/failure (as a quantitative variable), or two models, one for success and one for failure? There are arguments for the single model. It would clearly be more parsimonious. It would also allow for the testing of interactions between success/failure and other variables. For example, Bandura (1977, 1986) clearly implies an interactive effect of success/failure and attributions on self-efficacy. However, there are hints in this research that success and failure are qualitatively different conditions (the self-serving and other biases, the structure of attributions, the interaction effects of stability and other attributional dimensions on affects and intention). Therefore, the question of whether there should be one or two models needs to be answered empirically.

It could be argued that this study entailed an unreasonably large number of tests of statistical significance. This is certainly a weakness. However, what emerged was a meaningful *pattern* of results (in particular involving Stability). This is a counterbalancing strength.

All in all, on the basis of this research one can remain cautiously optimistic that an adaptation of Weiner's (1986) model, one that incorporates efficacy expectations and intentions rather than success expectations, may prove useful in understanding health-behaviour change in real-life situations. The research certainly raises as many questions as it answers. The interactions between attributional dimensions in determining other variables merit further investigation. There is a need for further qualitative research to elucidate subjects' thought processes. There is a need for comparative testing of models to determine whether success and failure can be incorporated in a single model. Bi-directional causation might be usefully incorporated. There is a need, perhaps to focus on single health behaviours rather than pooling them.

The ultimate application of these findings will perhaps be through some sensitive adaptation of attributional retraining as reviewed by Försterling (1986). Certainly, attributional models have a useful role to play in health promotion planning (Kok et al., 1992).

CHAPTER 6
CONCLUSION

Main Findings

In Chapter 2, confirmatory factor analyses of Carver, Scheier, and Weintraub's (1989) COPE scales were consistent with a four-dimensional view of coping: problem-focused coping, reappraisal, emotion-focused coping, and avoidance. Latent class analysis of health behaviour data was weakly consistent with a two-type model of health behaviour: those showing healthy behaviour, and those showing more mixed behaviour. MANOVA indicated that health behaviour types did not differ significantly on coping strategies (four COPE scales representing the four coping dimensions). Men and women did differ significantly on these coping strategies, women demonstrating more emotion-focused coping.

Whereas Chapter 2 focused on *routine* health behaviours, Chapter 3 focuses on health behaviours *when they are used as ways of coping*. In Chapter 3, it was found that, in general, subjects did acknowledge using health behaviours as ways of coping with stressful situations. However, certain behaviours, notably drinking alcohol, were not acknowledged. Regression analyses tested whether the use of health behaviours as coping behaviours (represented by saved factor scores) was predictable from other, more documented, coping strategies (represented by the four COPE scales). Avoidance coping emerged as a modestly good predictor of the use of negative health behaviours as ways of coping (eating more than usual, and smoking). Problem-focused coping was a predictor, albeit weak, of the use of more positive behaviours (relaxation, and self-care). However, this still left much of the variance in the use of health behaviours as ways of coping to be explained. Exercise (specifically exercise maintenance) as a way of coping remained to be explained.

In Chapter 4, regression analyses tested whether particular resources and particular coping strategies moderated the effect of stressors on well-being, and whether the influence of the resources on well-being was mediated by the coping strategies. Negative affectivity emerged as a general confound, and was controlled for. Analysis of baseline data indicated that there were main effects of stressors on well-being, and main effects of coping on well-being (avoidance coping on symptoms, and emotion-focused coping on satisfaction), but no main effects of resources on well-being, and no interactive effects (except for perceived self-control slightly buffering the effect of stressors on symptoms). There were main and interactive effects of stressors and resources on coping: internal control predisposed to problem-focused coping; social support predisposed to emotion-focused coping; stressors acted to increase avoidance coping, but resources buffered this effect to some extent. However, the evidence did not extend to coping mediating between resources and well-being. There was an overall improvement in well-being (mainly attributable to a decline in symptoms) from baseline to follow-up. Analysis of the follow-up data (with control for baseline well-being) again pointed to stressors acting to increase symptoms, avoidance coping acting to increase symptoms, and emotion-focused coping acting to increase life satisfaction. Cross-lagged correlation analyses suggested that the causal link was more likely from avoidance coping to symptoms than vice versa, but did not elucidate the association between emotion-focused coping and satisfaction.

In Chapter 5, confirmatory factor analyses of McAuley, Duncan, and Russell's (1992) Revised Causal Dimension Scale (CDSII) indicated that McAuley et al.'s model fitted the success data, but not the failure data, there being a particular problem with the Stability scale. MANOVA of CDSII scale scores indicated that causes of success, compared with causes of failure, were seen as more internal, more stable, and more personally controllable. Exploratory factor analyses of affective reactions data eventuated in a six-factor solution for the success affects (Calm, Cheerful, Grateful, Confident, Kindly, and Proud) and a four-factor solution for the failure data (Surprised, Disgruntled, Anxious, Unashamed). Regression analyses revealed main and interactive effects of attributions (CDSII scale scores) on affective reactions (saved factor scores). The interactive effects always involved the Stability dimension. Attributions did not predict efficacy expectation, in either the success or the failure condition. Attributions (the product of stability and personal control) did predict intention in the success condition; however, this was not mediated by affective reactions. Other regression analyses were consistent with efficacy expectations influencing behaviour, this being partially mediated by intention.

Methodological Issues

Aspects of validity. Cook and Campbell (1979) distinguish between internal validity, external validity, statistical conclusion validity, and construct validity. This provides a useful framework for discussing the validity of this research.

Internal validity. There are several available approaches to controlling for confounding variables. These are control by manipulation, control by randomisation, control by matching, control by elimination, and control via the statistical analysis (e.g., Pedhazur & Schmelkin, 1991). In this research, the approach adopted was control via the statistical analysis. This was not an experiment or a quasi-experiment, so there was no randomisation or manipulation. It was a survey, without matching or elimination (no category of subject was explicitly sought or excluded). In the statistical analysis, certain variables (age, sex, negative affectivity and social desirability) were treated as possible confounds. Otherwise, variables were treated as having a part to play within moderating or mediating mechanisms. If one's model is that A causes B but C also causes B, then it might be appropriate to test the effect of A on B whilst controlling for C. However, if one's model is that A causes B but this effect is moderated by C, or that A causes B but this effect is mediated by C, then it is not appropriate merely to test the effect of A on B whilst controlling for C; rather, one should use the appropriate tests for moderation and mediation (Baron & Kenny, 1986; Cox & Ferguson, 1991).

This research had a longitudinal aspect. Longitudinal studies can provide evidence supporting causality rather than mere association (Menard, 1991), especially if the follow-up rate is high, which it was in this research. In the stressors, coping and well-being research (Chapter 4), longitudinal analyses examined which baseline variables predicted changes in individuals' level of well-being from baseline to follow-up. Specifically, these analyses examined what predicted individuals' future well-being having controlled for their baseline well-being. In effect individuals were then acting as their own controls. In the attributions research (Chapter 5), baseline efficacy expectations and intentions were used to predict follow-up behaviours. In addition, baseline intentions were used as the starting point for follow-up questions about success/failure.

The approach taken in this research can be seen as epidemiological, there being a growing recognition of the applicability of epidemiological methods to psychology, especially in areas like stress and health (Palinkas, 1985; Kasl, 1985; Marmot & Madge, 1987). Clearly, much of epidemiology is concerned with predicting a dependent variable which is not self-reported and which is dichotomous (death). However, epidemiological methods can just as easily be applied to predicting other aspects of well-being. Experimental or quasi-experimental studies are often impractical or unethical, making analytic surveys the method of choice. Such analytic surveys can be cross-sectional or longitudinal. They can compare individuals with different levels of health status in terms of their levels of putative risk factors, or compare individuals with different levels of putative risk factors in terms of their health status. Potential confounding or moderating variables can be dealt with by measuring them and including them in the statistical analysis. To illustrate, a recent study of the effects of alcohol consumption upon risk of death sampled a population, measured individual's alcohol consumption, age, sex, body mass index and smoking levels at baseline, and then checked mortality at follow-up (Gronbæk et al., 1994). Alcohol consumption constituted the independent variable, death the dependent variable. The confounding and modifying roles of age, sex, body mass index and smoking level upon the relationship between alcohol consumption and mortality were examined at the stage of the statistical analysis. In such a study, there is no role for an *external* control group. The fact that the study is on a sample from a single population might lead one to call into question the generalisability (external validity) of the study, and therefore to conduct a similar study in another population. However, this does not reflect upon the *internal* validity of the study.

From the perspective of internal validity, the ideal design would be a randomised controlled trial, a true experiment. Clearly, in the present study, random allocation to intervention and control groups was not practical even if it would have been ethical, nor was manipulation of independent variables. Therefore, one would have had to have settled for a quasi experimental design involving, say, a hospital under closure and one or more comparison hospitals, with pre- and post-tests. Even if such pre-tests had been possible (it is difficult to see how the researcher could have been the first to know that a hospital was closing) and even if comparable institutions had existed (it is difficult to see how such institutions could be isolated from change), it has to be emphasised that the purpose of the study was not to isolate the effect of the closure per se. Rather, the closure represented a situation in which it would be possible to examine whether and which individual differences in perceptions and behaviours would lead to differences in outcome.

External validity. Clearly, the population used for this study has implications for the external validity of the study. Just as importantly, the fact that the sample was self-selected has implications for the external validity of the study. Of around 600 individuals approached, 110 took part. It should first be emphasised that what was being asked of subjects was considerable, involving two half days of their time. Subjects had to be not only willing but also able to participate. Management had agreed that this could be in work time, but it usually still meant that colleagues had to cover for absence from duties. In other words, many of the factors that led to non-participation would have been random to all intents and purposes (i.e., in relation to the aims of the study). Other factors, however, may not have been random, and it is important to have some idea of how participants differed from non-participants.

In comparing participants with non-participants, one might wish to gain information on the non-participants. However, in such a close knit community, the merest hint that one was trying to collect any information on non-participants, even of an aggregate nature, would have prejudiced the whole study. Therefore, it is necessary to compare participants with the best available external reference groups, even if such external reference groups may be somewhat removed and themselves self-selected. The participants were predominantly from nursing (67% of the sample) and administration (18%), whereas one might expect perhaps 50% of hospital staff to be nurses and around 15% to be in administration. The participants' Sources of Pressure subscale means were somewhat lower than those reported by Cooper, Sloan, and Williams (1988, 1989). Their COPE scale means were comparable with those reported by Carver et al. (1989). Their Brief Symptom Index subscale means were somewhat higher than those reported by Derogatis and Spencer (1982) for non-patient adults. Their Satisfaction With Life Scale mean was comparable with those reported by Diener, Emmons, Larsen, and Griffin (1985). Their Spheres of Control scale means were comparable with those reported by Parkes (1988). Their Self Control Schedule mean was somewhat higher than those reported by Rosenbaum (1988). Their Interpersonal Support Evaluation List mean was comparable with those reported by Cohen, Mermelstein, Kamarck and Hoberman (1985). Their Neuroticism and Lie scale scores were comparable with those reported by Eysenck and Eysenck (1975). Their Revised Causal Dimension Scale means were comparable with those reported by McAuley (1991). For each of these variables, the standard deviation of the sample was also comparable with that of the external reference group. As regards health behaviours, as noted in Chapter 2, health behaviour levels in the sample were generally comparable with those in other British samples, except for the sample's high prevalence of safe drinking. Thus, the sample was not odd in any extreme sense. Nevertheless, one would be cautious about extrapolating the conclusions beyond the sort of health professionals who took part.

It should perhaps be noted that in a study involving an intervention and a control group, selection poses a major threat to internal validity (one is concerned that intervention and control groups will differ on some confounding variable). In the survey design employed here, selection is seen less as a threat to internal validity (because of the thorough measurement and statistical control of potential confounding variables), and more as a threat to external validity. One way or another, self-selection will always be a problem in ethically sound studies of well-being.

Statistical conclusion validity. As regards statistical conclusion validity, the main problem with this research was the use of multiple tests of significance. When comparing means, multivariate tests were used whenever appropriate. However, in, for example, the regression analyses, there is no simple compensation for multiple tests. One can use a more stringent alpha level. However, whilst such an approach has the apparent advantage of objectivity, there are problems with it. It is not at all clear how close two tests need to be before an adjustment to alpha is needed. It might be clear that one should adjust alpha when performing similar tests on similar data. But should one adjust alpha in the stress and coping analyses because one is performing regression analyses on the attributions data; or because one is performing some quite different analysis on some quite different data set; or because someone else is performing a different analysis on a different data set? Strict probability arguments might suggest that one should adjust alpha in all these cases. It is clearly difficult to know where to draw the line.

In this research, alpha was deliberately not adjusted. Instead, not too much importance was attached to single results. More importance was attached to recurrent patterns of results involving the same, or the same class of, variables (for example resources interacting with stressors in their effect on avoidance coping, or stability interacting with other attributional dimensions in its effect on affects). This can be justified on probability grounds, in that the probability of such a recurrent pattern involving the same, or the same class of, variables arising by chance is quite small, even if one does not specify in advance exactly which particular variable or class of variables will be involved. (To take an analogy, if one rolls a dice ten times, the probability of obtaining ten of the same number, any number, is very small, around one in ten million. The probability of obtaining five or more of the same number is still small.) One could even argue that when such patterns appear in the data, one should be more lenient, not more stringent as regards alpha. Lest this sound outrageous, it can be noted that even in the case of a multivariate test such as MANOVA, there are two simultaneous reasons for performing it, one because univariate tests might be too lenient (MANOVA adjusts for multiple testing), the other because univariate tests might be too stringent (MANOVA adjusts for associations between the dependent variables).

As regards the power of the studies, in the particular instance where the main finding was a non-significant result (Chapter 2), it was determined that power was adequate by Cohen's (1992) criteria.

Construct validity. As regards construct validity, this is in part a matter of measurement validity, which is in turn partly a matter of measurement reliability. Wherever possible, established measures, mainly additive scales, were used. Even then, confirmatory factor analysis was often used. Where ad hoc measures were employed, exploratory factor analysis was often applied and the factor scores saved for use in subsequent analyses. In these ways, an attempt was made to ensure some reliability. The variables that might be particularly prone to unreliability would be the single-item health behaviour items in Chapter 2 (although these were subject to latent class analysis) and the single-item efficacy and intention items in Chapter 5. Then there is the additional question of validity. In this regard, some biases, specifically negative affectivity and social desirability, were checked and where necessary controlled for (see above). Other question marks remain, for example over the perceived control variables in Chapter 4. There is also a general issue regarding the appropriate level of specificity of many of the variables, in particular the time period to which they should refer.

There is also the fact that all of the measures were self-report, whereas one might prefer a blend of self-report, physiological and unobtrusive measures (Bailey & Bhagat, 1987). As regards physiological measurements, these have their own reliability and validity challenges, but just as importantly, as Bailey and Bhagat (1987) put it, "the confusing nature and unconscious effects of physiological measurement, coupled with the inconvenience imposed on the subject and a common reluctance among subjects to allow physiological measurements, offers partial explanation why physiological measures are not widely used as a supplement to self-report instruments when gathering data on job stress" (p. 223). It is certainly this researcher's view that to have incorporated physiological measurements would have prejudiced the quantity and quality of self-report data obtained. The same argument can be applied to the use of unobtrusive measures. Subjects would have had to have been made aware that supplementary data of a non-specific nature was being collected, and this could well have put them on their guard. Hence all the eggs were put in the self-report basket, and considerable energy put into ensuring its quality. Well known self-report biases (negative affectivity and social desirability) were controlled for. There is also the wider issue of biases introduced by the experimenter, although it was argued (in the introduction to this thesis) that the way in which the research was done should minimise these.

The presence of so many interactions in the models meant that structural equation modelling with latent variables was not practical, even though it might be desirable. In an ideal world one might envisage testing one model which incorporated measurement and structural aspects. However, extant structural equation modelling programmes cannot easily handle interactions, and interactions were pervasive in this research. The arguments which militated against the use of structural equation modelling with latent variables in the current research were fully developed in Chapter 4.

Theoretical Implications

The aforementioned methodological concerns inevitably circumscribe the theoretical implications of this research. Nevertheless, theoretical implications will be drawn, and, coming full circle, the utility of the heuristic model presented in Figure 1 will be assessed.

The findings in Chapter 2 provide some insight into the structure of coping and of health behaviour. The evidence for a four-dimensional model of coping is mainly confirmatory, helping to consolidate previous research in this area (Cox & Ferguson, 1991). The evidence, less strong, for a typology of health behaviours is more challenging, given that previous research has mainly searched for continuous dimensions (e.g., Stephens, 1986).

As regards the model in Figure 1, these findings serve to elucidate the content of the health behaviours and coping strategies box. The coping strategies can be differentiated into the four dimensions of problem-focused coping, reappraisal, emotion-focused coping, and avoidance; and the health behaviours (very tentatively) into two types, healthy and mixed.

Both Chapter 2 and Chapter 3 are concerned with the question of whether one way of coping is better or worse than another in the sense of being linked with health behaviours that are in themselves health promoting or damaging. The findings of Chapter 2 suggest that routine health behaviours and coping strategies are not linked. Hence, one need not be concerned about double jeopardy (the individual suffering twice because some health damaging behaviour is inextricably linked with some maladaptive coping strategy), or other theoretical possibilities. The findings of Chapter 3 suggest that individuals do use health behaviours as ways of coping.

In general, the use of these health behaviours as ways of coping is only weakly predicted by other, more documented, coping strategies. Avoidance coping, however, is a modestly good predictor of the use of negative health behaviours as ways of coping. This is consistent with the previous literature, where such behaviours tend to be used as indicators of avoidance (e.g., Amirkhan, 1990; Carver et al., 1989; Endler & Parker, 1990; Folkman & Lazarus, 1988).

As regards the model in Figure 1, these findings serve to further elucidate the content of the health behaviours and coping strategies box. Health behaviours and coping strategies should be clearly separated, except that it should be allowed that health behaviours are sometimes used as coping strategies, in particular that negative health behaviours are sometimes used for avoidance coping.

Chapter 4 is concerned with whether and how one way of coping is better or worse than another in the sense of buffering the effects of stressors. The findings reinforce the need to control for negative affectivity in stress research (Payne, 1988), placing a question mark over much previous research that has not incorporated such control. There was, in fact, little evidence for coping or resources buffering the effect of stressors on well-being (except for a slight buffering effect of perceived self-control); nor for coping mediating between resources and well-being. This perpetuates Cohen and Edwards' (1989) rather bleak conclusion as regards the evidence for moderation and mediation. The study did find main effects of coping on well-being. The fact that, whereas symptoms were predicted by avoidance coping, satisfaction was predicted by emotion-focused coping, serves to emphasise that well-being is not a unitary construct. The specific finding on avoidance coping and symptoms is to some extent consistent with other literature (Spelten, Smith, Totterdell, Barton, & Folkard, 1993; Tyler & Cushway, 1992; Aldwin & Revenson, 1987). Perhaps the most challenging of the findings in this study were the effects of stressors and resources on coping: internal control predisposing to problem-focused coping; social support predisposing to emotion-focused coping; stressors acting to increase avoidance coping, but resources buffering this effect to some extent. A simple interpretation of these results would be that, under stress, individuals tend to avoid the issue, unless they have the means to deal with it (effect of stressors and resources on avoidance coping). If they have the means to deal with it, then the way they deal with it is coloured by the particular means at their disposal: if they have a high sense of personal control, then they tend to address the problem (effect of perceived control on problem-focused coping); if they have a high sense of social support, then they tend to address the emotional sequelae (effect of social support on emotion-focused coping).

As regards the model in Figure 1, these findings suggest modifications as follows. Mental health should be differentiated so as to separate symptoms and satisfaction. Resources should be differentiated so as to separate perceived control and social support. As noted above, coping should be differentiated so as to separate problem-focused coping, reappraisal, emotion-focused coping, and avoidance. The path suggesting an influence of stressors on health should remain intact. The paths suggesting an interactive influence of stressors and resources on coping should also remain intact. However, these paths could be elaborated to indicate that stressors primarily influence avoidance coping, perceived control primarily influences problem-focused coping and social support primarily influences emotion-focused coping, and that problem- and emotion-focused coping then both inhibit avoidance coping. The path suggesting a direct effect of coping on health should remain intact but could be elaborated to indicate that avoidance coping primarily influences symptoms and emotion-focused coping primarily influences satisfaction. On the basis of the available evidence, the path indicating a moderating effect of coping on the stressor health relationship could be removed. Paths could be added to the model indicating that negative affectivity influences stressors and health and coping, thus according negative affectivity a more explicitly causal rather than a mere nuisance role. (These paths could be further elaborated in that negative affectivity had a stronger influence on symptoms than on satisfaction; and a modest influence on problem-focused coping and avoidance but a negligible influence on emotion-focused coping and acceptance.)

Overall, the results of Chapters 2, 3, and 4 suggest that, in answering the question as to whether one way of coping is better than another, it is necessary to move away from a simple dichotomous view of coping of the kind previously taken (Roth & Cohen, 1986; Suls & Fletcher, 1985). Similarly, it is necessary to move away from a unitary view of well-being. Nevertheless, it has to be said that, in this research, avoidance coping emerged as the least adaptive way of coping, because of its association with negative health behaviours and with mental symptoms.

Chapter 5 asks whether and how one way of attributing is better or worse than another in terms of its effect on how one feels and whether one will try to maintain a health promoting lifestyle. The evidence that the structure of the CDSII may be different for success and failure conditions is foreshadowed in previous literature (Vallerand & Richer, 1988). The evidence for a bias (causes of success, compared with causes of failure are seen as more internal, more stable, and more personally controllable) is also consistent with previous literature (e.g., Russell, 1982; Vallerand & Richer, 1988; Schaufeli, 1988; Schoeneman & Curry, 1990). The study provides some support for Weiner's (1986) model in that attributions predicted affects. Even then, however, the interactive effects of attributions on affects did not make immediate sense, and had to be explained in a post hoc fashion, previous literature (e.g., Russell & McAuley, 1986) being of little help because it did not include interactions. There was no evidence that the affects mediated any effect of attributions on intention. Attributions did not predict efficacy expectation, and attributions predicted intention only in the success condition. However, such effects could have been hidden because the efficacy and intention measures were pooled across various behaviours. All in all, on the basis of this research one can remain moderately optimistic that an adaptation of Weiner's (1986) model, one that incorporates efficacy expectations and intentions rather than success expectations, may prove useful in understanding health-behaviour change in real-life situations.

As regards the model in Figure 1, these results suggest that attributions should be differentiated to distinguish between stability, locus of causality, internal control, and external control. The path suggesting an influence of attributions on affects should remain intact. However, it could be differentiated to allow attributional dimensions to have interactive effects especially involving the stability dimension. Based on the present research alone, there is no justification for the paths linking affects to intentions, or attributions to efficacy expectations. One might as well have a simplified model whereby attributions have two separate effects, one upon affects and the other upon intentions. However, one would be loath to do this without further research that did not involve pooling of behaviours, and which dealt with the possibility that success and failure may require different models.

All in all, the heuristic model described in Figure 1 provided a useful structure for the research described in this thesis. This, in turn, has lead to a more differentiated model which can to some extent be judged in terms of it fruitfulness in suggesting possible interventions and further research.

Applied Implications

There is now an extensive literature summarising research into the effectiveness of organisational stress management interventions (e.g., Beehr & O'Hara, 1987; Burke, 1993; Callan, 1993; DeFrank & Cooper, 1987; Ivancevich & Matteson, 1987; McLeroy, Green, Mullen, & Foshee, 1984; Murphy & Schoenborn, 1987; Murphy, 1984, 1987, 1988; Quick, Bhagat, Dalton, & Quick, 1987). Two themes emerge from this literature. The first is that the research has many methodological weaknesses. The second is that the focus is too much on the individual and not enough on the organisation. Murphy (1988) summarises:

> Actions aimed at changing the worker, as opposed to changing the work environment, are by far the most prevalent strategies. EAPs [employee assistance programmes] have an indirect link to worker distress via problem drinking (despite 'broad brush' claims), and their approach to the problem is tertiary. Though EAPs are increasingly prevalent in work settings, well-controlled studies are needed to determine their 'active ingredient(s)' and long-term benefits. Stress management has a more direct link with employee distress and the approach is secondary prevention (assuming, of course, that the 'problem' is work stress and not general life stress). Evaluations of stress management have become more common in recent years and have used more rigorous experimental designs that EAPs. However, these studies suffer from short-term evaluation periods and a restricted range of outcome measures. Studies evaluating actions aimed at reducing or preventing work stressors, primary prevention approaches, are quite rare in the literature but have produced consistent and provocative results. (p. 331)

What is also notable is that the stress management interventions that focus on the individual tend to employ a rather limited range of techniques. This includes relaxation, biofeedback, meditation, exercise, cognitive restructuring, and time management (Murphy, 1988; De Frank & Cooper, 1988). It is a moot point as to what kind of coping is being encouraged by these techniques. Although there has been a very large amount of research into coping, there has been little systematic application of the findings. An exception to this general rule is provided by Folkman, Chesney, McKusick, Ironson, Johnson, and Coates (1991) who describe a pilot project which converts their transactional model of stress into a training programme.

The present research would suggest that, because there was a main effect of stressors on well-being, there would be merit in taking action to reduce the overall level of stressors. Ivancevich & Matteson (1987) advocate that one should conduct a needs diagnosis (a list of stressors), and then draw up corrective managerial action goals (a list of things to do). In the present research, the mean scores on the Occupational Stress Indicator (Cooper, Sloan & Williams, 1988) Sources of Pressure subscales could serve as the needs assessment. Since these different stressors appeared to be empirically highly interrelated, there would be merit in tackling any or all of them.

The present research suggests that there would be merit in discouraging avoidance coping, because it appears to be positively associated with the use of damaging health behaviours as ways of coping, and positively associated with higher mental symptoms. More positively, one could encourage the alternatives: emotion focused coping, which appears to be related to life satisfaction; and active coping, which might just lead to a better resolution in the long term, even though this was not tested in this research; or reappraisal, although there was not evidence from this research that it had any particular merits. Since there are no precedents, presumably such an intervention would be primarily an educational one, pointing out the different ways of coping and what is known about their costs and benefits. However, the present research also suggests that there would be merit in taking action to bolster the individual's resources, their sense of social support and most especially their sense of personal control, because these moderated the effect of stressors on avoidance coping.

There is a literature on enhancing social support, but it is in its infancy, and when effects are demonstrated the mechanism is unclear (Heller, Price, & Hogg, 1990; Ganster & Victor, 1988). Gottlieb (1992) presents a typology of social support interventions, giving examples of interventions at the individual, dyadic, group, social system, and community levels, distinguishing between interventions that augment or mobilise existing ties, and interventions that graft on new ties. With regard to the latter, he argues that:

> Experience reveals that there are several social-psychological conditions that make for an inhospitable start-up in dyadic support programs involving the introduction of a new social tie. They include the beneficiaries' lack of opportunity to reciprocate aid, the use of a targeted and problem-centered approach to a population that is at risk but not symptomatic, the introduction of support agents whose emphasis on establishing a quasiprofessional helping relationship is interpreted by the recipients as a sign of their own incompetence, and a miscarried social comparison process.

> The latter topic has also proved to be of inordinate importance in support interventions that introduce an entire set of new ties into people's lives [support groups].... Although participants may share a common life event or transition, there is evidence that the group's composition has important implications for the covert downward and upward social comparisons members make. Similarities and differences among the members in stressor severity and the circumstances under which it occurs, differences in the participants' stage of coping with it and apparent mastery of it, and differences in the meaning it has, are ultimately consequential for mutual identification and relationship formation. (p. 304).

Such caveats might make one wary of trying to introduce such a programme into a workplace. Perhaps the simplest approach would be, just as one might conduct an audit of stressors, so one might conduct an audit of sources and types of social support. One could then at least ensure that when major decisions were taken during reorganisations, the likely effect of such decisions on social support is taken into account, so that one could at least claim to have done one's best to minimise the erosion of existing support networks.

One might, then, choose to focus on enhancing the sense of personal control. The concept of control is to be found at the interface between occupational and health psychology (e.g., Sauter, Hurrell, & Cooper, 1989; Steptoe & Appels, 1989). The term control is used in so many different ways (e.g., Rodin, 1990). In the workplace, control is often operationalised (crudely) as, for example, employee participation in decision making, or job autonomy. As far as interventions are concerned, according to Ganster & Fusilier (1989):

> Overall, there is a paucity of research that explicitly links organizational interventions with employee control beliefs. In many cases what is needed is just the addition of sound measures of employee control perceptions to the evaluation design.... The related problem with the intervention literature is the frequent inability to separate changes in employee control from other factors that are likely affected by the intervention. (pp. 270-271)

Since there are so few precedents for what one might do, during a major reorganisation, to enhance or at least not erode personal control beliefs, the common sense approach of an audit followed by an action plan would again seem appropriate. However, there is a problem in this regard. In this research, doubt was cast on what actually underlay the measures of perceived control, there being an argument that they might be generalised measures of self-efficacy (Paulhus & van Selst, 1990). This might lead to a different kind of intervention, although one suspects it would not be very different, since the most direct way of enhancing self-efficacy is said to be performance accomplishment (Bandura, 1977, 1986), just as the most obvious way of enhancing perceived control would be the experience of control.

Försterling (1988) reviews the literature on attributional retraining. He is concerned that different theoretical models can lead to different, occasionally contradictory, prescriptions as to what are desirable and what are undesirable attributions. Nevertheless, most of the attributional retraining studies have taught subjects to attribute failure to lack of effort; some also taught subjects to attribute success to effort. Most of the interventions reviewed by Försterling have been based on persuasion; although there is an example of an intervention based on operant conditioning and one based on the provision of attribution-relevant information. Most of the studies have demonstrated that the programmes have a favourable effect on attributions, expectations, or behaviour (although there is insufficient evidence that behavioural changes are actually mediated by changes in attributions).

Such attributional retraining techniques could be applied in the present context. However, it would be important to clarify what attributions should be encouraged. It would seem reasonable to encourage the perception that causes are personal controllable, since such a perception was positively associated with positive affects and intentions in the success condition (when combined with instability), and negatively associated with negative affects in the failure condition. One might baulk at encouraging instability attributions, even though the evidence points to this. However, when encouraging the idea that causes of recent successes or failures are personally controllable, one is implying that they are appropriate. However, there is a problem in this regard. In this research, doubt was cast on what actually underlay the measures of perceived control, there being an argument that they might be generalised measures of self-efficacy (Paulhus & van Selst, 1990). This might lead to a different kind of intervention, although one suspects it would not be very different, since the most direct way of enhancing self-efficacy is said to be performance accomplishment (Bandura, 1977, 1986), just as the most obvious way of enhancing perceived control would be the experience of control.

Försterling (1988) reviews the literature on attributional retraining. He is concerned that different theoretical models can lead to different, occasionally contradictory, prescriptions as to what are desirable and what are undesirable attributions. Nevertheless, most of the attributional retraining studies have taught subjects to attribute failure to lack of effort; some also taught subjects to attribute success to effort. Most of the interventions reviewed by Försterling have been based on persuasion; although there is an example of an intervention based on operant conditioning and one based on the provision of attribution-relevant information. Most of the studies have demonstrated that the programmes have a favourable effect on attributions, expectations, or behaviour (although there is insufficient evidence that behavioural changes are actually mediated by changes in attributions).

Such attributional retraining techniques could be applied in the present context. However, it would be important to clarify what attributions should be encouraged. It would seem reasonable to encourage the perception that causes are personal controllable, since such a perception was positively associated with positive affects and intentions in the success condition (when combined with instability), and negatively associated with negative affects in the failure condition. One might baulk at encouraging instability attributions, even though the evidence points to this. However, when encouraging the idea that causes of recent successes or failures are personally controllable, one is implying that they are unstable in the sense that it was not always like this, nor need it always be like this.

The actual attributional change techniques reviewed by Försterling (1988) are somewhat limited, more suited to educational than occupational settings. Later in the same volume, however, Försterling discusses how attributions can be changed through information (consensus, distinctiveness, and consistency dimensions); through operant methods, persuasion, and vicarious learning; and through indirect communication. This opens up broader possibilities for intervention, not necessarily at the individual level. More generally, one should be aware that certain forms of health promotion might inadvertently promote attributions that are not helpful; for example, programmes that mimic clinical situations might lead to success being attributed externally which might mean that self-efficacy is not enhanced (Strecher, De Vellis, Becker, & Rosenstock, 1986).

Further Research

The application of latent class analysis to health behaviours is a novel approach which merits further research on larger databases (e.g., Blaxter, 1990; Nutbeam & Catford, 1987; Wardle and Steptoe, 1991; White, Nicolaas, Foster, Browne, & Carey, 1993). Ultimately, it is important to know whether, when dealing with health behaviours, we are dealing with a set of disconnected behaviours, a set of behaviours that can be described in terms of dimensions, or a set of behaviours that are best described in terms of types. At the same time, there is room for better measures of individual health behaviours, this being an area that seems to have escaped detailed psychometric scrutiny.

The research into health behaviours as ways of coping with stress also merits further development. The present research was very much exploratory, and there is a need to repeat and extend it. In this regard, there is a need to develop ways of asking about certain behaviours which are often denied, especially drinking. There is a need to further examine the structure of health behaviours used as ways of coping. Confirmatory factor analysis could be used, to test models derived inter alia from the current exploratory work. There is a need, ultimately, to develop new items for inclusion in coping inventories. This will require further clarification of how health behaviours as ways of coping relate to other, more documented, ways of coping.

The research into stressors, resources, coping and well-being merits extension in several directions. There are a wide range of measurement issues: the dimensionality of stressors, coping, resources and well-being; and the validity of some of these measures, especially the resource measures. There is a need to further explore the role of negative affectivity, including the relative merits of according it a role in models as a causal variable versus treating it as a nuisance variable. There is a need to test the proposed model, whereby, when exposed to stressors, individuals without resources avoid the issue, whereas individuals with resources cope in a way consistent with those resources. Such a model implies a complex interaction over time. There is still room for further testing of the extent to which coping actually does moderate the effect of stressors on well-being. The idea that one also needs to take into account the perceived controllability of the stressor (the goodness of fit hypothesis) remains intuitively appealing.

As regards the attributional research, the interactive effects of the attributional dimensions constitute a new finding which merits further exploration. In particular the role of the stability dimension merits detailed consideration. The adaptation of Weiner's (1986) model, incorporating efficacy expectations and intentions rather than success expectations, merits further testing, perhaps focusing on single behaviours. There is also a need for comparative testing of models to determine whether success and failure should be incorporated in a single model or kept separate.

Methodologically, there is a need for readily accessible methods for handling interactions between latent variables in structural equation modelling. So much of this research, and so much of social science in general, involves interactions.

It is hoped that future generations of software will take this into account.

There is room for a follow-up to the current study, looking at what predicts the long-term outcome in terms of well-being and health behaviour. There is also enough information to design an intervention study. However, the writer of this thesis is most convinced of the need for some basic qualitative research to illuminate some of the cognitive processes that go on in coping with stressful situations, and attributing for behaviour change.

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APPENDIX A

MAIN QUESTIONNAIRE

These are reproduced overleaf. All sections were used in Year 1. Sections B, C, D, F, H, and M only were repeated in Year 2.

DATE:

NUMBER:

STUDY ON HEALTH, STRESS AND WELL-BEING

PRIVATE AND CONFIDENTIAL

Don't put your name on this questionnaire, so there is no way anyone except the researchers could know who has filled it in. The completed questionnaire will not be seen by anyone except the researchers.

This research has been cleared by an ethical committee, with guarantees of confidentiality. The report of this study will not identify any individual. This is a University, not a Health Authority, project.

It is important to us that you answer every question. If there is something that you don't understand, please say so. If there is a question that you don't like, please answer it anyway; you can always put comments in the margin!

Please be as honest as you can in your answers. This is not a test and there are no right or wrong answers.

Thank you very much for participating in this survey.

David Ingledew
University College of North Wales

SECTION A: ABOUT YOURSELF

First, could you please answer some basic questions about yourself.

1. What is your age (last birthday)?
[WRITE IN]

___ years

2. Your sex?
[TICK ONE]

___ Male
___ Female

3. Your marital status?
[TICK ONE]

___ Single
___ Married or living as married
___ Divorced or separated
___ Widowed

4. IF MARRIED OR LIVING AS MARRIED:
Does your partner also work?
[TICK ONE]

___ No
___ Yes

5. IF YOUR PARTNER ALSO WORKS:
Does your partner also work at this Hospital?
[TICK ONE]

___ No
___ Yes

6. How many children do you have?
[WRITE IN]

___ children

7. IF YOU HAVE CHILDREN:
How many of those children still live with you?
[WRITE IN]

___ children

8. Do you work full time or part time?
[TICK ONE]

___ Full time
___ Part time

9. Do you mostly work ...?
[TICK ONE]

___ days
___ nights
___ evenings
___ a mixture

10. What is the highest level of education you have completed?
[TICK ONE]

___ University or other degree course
___ Other professional or technical qualification or diploma gained after leaving school
___ Secondary school or earlier

11. How many years in total have you worked at North Wales Hospital?
[WRITE IN]

___ years ___ months

12. IF YOU HAD A BREAK FROM WORKING AT NORTH WALES HOSPITAL:
How many years have you been working at North Wales Hospital this time round?
[WRITE IN]

___ years ___ months

13. How far away from work do you live?
[WRITE IN]

___ miles

14. How do you usually get to work (most days, the main part of the journey)?
[TICK ONE]

___ Car or van (driver)
___ Car or van (passenger)
___ Motor cycle (driver)
___ Motor cycle (passenger)
___ Bus
___ Train
___ Bicycle
___ On foot

15. Do you have a (full) driving licence?
[TICK ONE]

___ No
___ Yes

16. IF YOU HAVE A DRIVING LICENCE:
Do you have the regular use of a car or other private motor transport (ie that you do or could use to travel to work)?
[TICK ONE]

___ No
___ Yes

17. Do you ...?
[TICK ONE]

___ Own your own home (including buying on a mortgage)
___ Rent from the Council
___ Rent from the Health Authority
___ Rent from Housing Association
___ Rent from private landlord
___ Live in relatives' home
___ Other -> PLEASE SPECIFY: ____________________

Please check that you have answered all the questions in this section.

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SECTION D: YOUR LIFESTYLE

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SECTION F: YOUR GENERAL HEALTH

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SECTION H: HOW ARE YOU?

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SECTION L: WHAT IS IMPORTANT TO YOU?

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SECTION X: HOW YOU SEE YOURSELF

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SECTION Y: HOW YOU INTERPRET EVENTS AT WORK

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APPENDIX B

ATTRIBUTION AND EMOTION QUESTIONNAIRES

These are reproduced overleaf.

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APPENDIX C

HEALTH BEHAVIOUR ITEMS ADDED TO COPE QUESTIONNAIRE

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APPENDIX D

REGRESSION ANALYSES FOR SUCCESS AND FAILURE CONDITIONS, EXAMINING THE EFFECT OF ATTRIBUTIONS ON AFFECTS, EFFICACY EXPECTATIONS, AND INTENTIONS

Equation[a]	δR^2 [b]	F	$p(F)$	b [c]	t	$p(t)$	r [d]
			Success (N = 89)				
Calm/							
+ Stability	.04	3.62	.06	.23	1.97	.05	.20
+ Locus	.01	.60	.44	-.08	-.78	.44	-.04
+ Product	.00	.01	.91	-.01	-.12	.91	-.03
Calm/							
+ Stability	.04	3.62	.06	.24	1.96	.05	.20
+ Personal Control	.00	.14	.71	-.06	-.55	.58	.02
+ Product	.01	1.12	.29	-.10	-1.06	.29	-.11
Calm/							
+ Stability	.04	3.62	.06	.19	1.70	.09	.20
+ External Control	.03	2.35	.13	.21	2.03	.05	.17
+ Product	.08	7.63	.01	-.30	-2.76	.01	-.26
Calm/							
+ Locus	.00	.17	.68	-.08	-.78	.44	-.04
+ Stability	.04	4.03	.05	.23	1.97	.05	.20
+ Product	.00	.01	.91	-.01	-.12	.91	-.03
Calm/							
+ Locus	.00	.17	.68	-.06	-.51	.61	-.04
+ Personal Control	.00	.16	.69	.09	.76	.45	.02
+ Product	.02	1.54	.22	.11	1.24	.22	.12
Calm/							
+ Locus	.00	.17	.68	.02	.17	.86	-.04
+ External Control	.03	2.53	.12	.18	1.55	.12	.17
+ Product	.00	.09	.77	-.03	-.30	.77	-.06
Calm/							
+ Personal Control	.00	.05	.82	-.06	-.55	.58	.02
+ Stability	.04	3.68	.06	.24	1.96	.05	.20
+ Product	.01	1.12	.29	-.10	-1.06	.29	-.11

(table continues)

Equation[a]	δR^2[b]	F	p(F)	b[c]	t	p(t)	r[d]
Calm/							
+ Personal Control	.00	.05	.82	.09	.76	.45	.02
+ Locus	.00	.28	.60	-.06	-.51	.61	-.04
+ Product	.02	1.54	.22	.11	1.24	.22	.12
Calm/							
+ Personal Control	.00	.05	.82	.09	.80	.43	.02
+ External Control	.03	2.87	.09	.21	1.92	.06	.17
+ Product	.04	3.41	.07	-.24	-1.85	.07	-.16
Calm/							
+ External Control	.03	2.72	.10	.21	2.03	.05	.17
+ Stability	.04	3.24	.08	.19	1.70	.09	.20
+ Product	.08	7.63	.01	-.30	-2.76	.01	-.26
Calm/							
+ External Control	.03	2.72	.10	.18	1.55	.12	.17
+ Locus	.00	.01	.91	.02	.17	.86	-.04
+ Product	.00	.09	.77	-.03	-.30	.77	-.06
Calm/							
+ External Control	.03	2.72	.10	.21	1.92	.06	.17
+ Personal Control	.00	.23	.63	.09	.80	.43	.02
+ Product	.04	3.41	.07	-.24	-1.85	.07	-.16
Cheerful/							
+ Stability	.00	.04	.84	.03	.25	.81	.02
+ Locus	.00	.12	.73	-.04	-.36	.72	-.03
+ Product	.00	.03	.88	-.01	-.16	.88	-.01
Cheerful/							
+ Stability	.00	.04	.84	.00	.01	.99	.02
+ Personal Control	.01	.93	.34	.05	.50	.63	.11
+ Product	.09	8.84	.00	-.29	-2.97	.00	-.32
Cheerful/							
+ Stability	.00	.04	.84	.02	.17	.86	.02
+ External Control	.01	.50	.48	.07	.64	.53	.08
+ Product	.00	.10	.75	.04	.32	.75	.05

(table continues)

Equation[a]	δR^2 [b]	F	$p(F)$	b [c]	t	$p(t)$	r [d]
Cheerful/							
+ Locus	.00	.09	.76	-.04	-.36	.72	-.03
+ Stability	.00	.07	.79	.03	.25	.81	.02
+ Product	.00	.03	.88	-.01	-.16	.88	-.01
Cheerful/							
+ Locus	.00	.09	.76	-.08	-.70	.48	-.03
+ Personal Control	.02	1.37	.25	.13	1.02	.31	.11
+ Product	.00	.08	.78	-.03	-.28	.78	-.06
Cheerful/							
+ Locus	.00	.09	.76	-.01	-.11	.91	-.03
+ External Control	.01	.43	.51	.08	.67	.51	.08
+ Product	.00	.04	.85	.02	.19	.85	.01
Cheerful/							
+ Personal Control	.01	.98	.33	.05	.49	.63	.11
+ Stability	.00	.01	.92	.00	.01	.99	.02
+ Product	.09	8.84	.00	-.29	-2.97	.00	-.32
Cheerful/							
+ Personal Control	.01	.98	.33	.13	1.02	.31	.11
+ Locus	.01	.49	.48	-.08	-.70	.48	-.03
+ Product	.00	.08	.78	-.03	-.28	.78	-.06
Cheerful/							
+ Personal Control	.01	.98	.33	.15	1.38	.17	.11
+ External Control	.01	.78	.38	.12	1.07	.29	.08
+ Product	.03	2.57	.11	-.21	-1.60	.11	-.14
Cheerful/							
+ External Control	.01	.52	.47	.07	.64	.53	.08
+ Stability	.00	.02	.88	.02	.17	.86	.02
+ Product	.00	.10	.75	.04	.32	.75	.05
Cheerful/							
+ External Control	.01	.52	.47	.08	.67	.51	.08
+ Locus	.00	.01	.94	-.01	-.11	.91	-.03
+ Product	.00	.04	.85	.02	.19	.85	.01

(table continues)

Equation[a]	δR^2[b]	F	$p(F)$	b[c]	t	$p(t)$	r[d]
Cheerful/							
+ External Control	.01	.52	.47	.12	1.07	.29	.08
+ Personal Control	.01	1.23	.27	.15	1.38	.17	.11
+ Product	.03	2.57	.11	-.21	-1.60	.11	-.14
Grateful/							
+ Stability	.00	.15	.70	.04	.35	.73	.04
+ Locus	.00	.01	.94	-.01	-.14	.89	-.00
+ Product	.00	.17	.68	-.03	-.41	.68	-.05
Grateful/							
+ Stability	.00	.15	.70	.03	.26	.80	.04
+ Personal Control	.00	.25	.62	.03	.32	.75	.06
+ Product	.01	1.07	.31	-.10	-1.03	.31	-.12
Grateful/							
+ Stability	.00	.15	.70	.03	.24	.81	.04
+ External Control	.05	4.20	.04	.21	2.03	.05	.22
+ Product	.00	.01	.92	-.01	-.10	.92	.02
Grateful/							
+ Locus	.00	.00	1.00	-.01	-.14	.89	-.00
+ Stability	.00	.16	.69	.04	.35	.73	.04
+ Product	.00	.17	.68	-.03	-.41	.68	-.05
Grateful/							
+ Locus	.00	.00	1.00	-.03	-.24	.81	-.00
+ Personal Control	.00	.41	.52	.05	.46	.65	.06
+ Product	.00	.25	.62	-.04	-.50	.62	-.07
Grateful/							
+ Locus	.00	.00	1.00	.09	.86	.39	-.00
+ External Control	.05	4.80	.03	.23	2.10	.04	.22
+ Product	.01	.73	.40	-.07	-.85	.40	-.11
Grateful/							
+ Personal Control	.00	.36	.55	.03	.32	.75	.06
+ Stability	.00	.05	.83	.03	.26	.80	.04
+ Product	.01	1.07	.31	-.10	-1.03	.31	-.12

(table continues)

Equation[a]	δR^2 [b]	F	$p(F)$	b [c]	t	$p(t)$	r [d]
Grateful/							
+ Personal Control	.00	.36	.55	.05	.46	.65	.06
+ Locus	.00	.06	.81	-.03	-.24	.81	-.00
+ Product	.00	.25	.62	-.04	-.50	.62	-.07
Grateful/							
+ Personal Control	.00	.36	.55	.12	1.14	.26	.06
+ External Control	.05	4.84	.03	.24	2.34	.02	.22
+ Product	.02	1.53	.22	-.15	-1.24	.22	-.09
Grateful/							
+ External Control	.05	4.34	.04	.21	2.03	.05	.22
+ Stability	.00	.06	.81	.03	.24	.81	.04
+ Product	.00	.01	.92	-.01	-.10	.92	.02
Grateful/							
+ External Control	.05	4.34	.04	.23	2.10	.04	.22
+ Locus	.01	.48	.49	.09	.86	.39	-.00
+ Product	.01	.73	.40	-.07	-.85	.40	-.11
Grateful/							
+ External Control	.05	4.34	.04	.24	2.34	.02	.22
+ Personal Control	.01	.88	.35	.12	1.14	.26	.06
+ Product	.02	1.53	.22	-.15	-1.24	.22	-.09
Confident/							
+ Stability	.06	5.30	.02	.26	2.16	.03	.24
+ Locus	.00	.19	.67	.05	.44	.66	.09
+ Product	.00	.01	.94	.01	.08	.94	-.03
Confident/							
+ Stability	.06	5.30	.02	.19	1.66	.10	.24
+ Personal Control	.06	6.17	.02	.21	2.06	.04	.31
+ Product	.08	8.50	.01	-.26	-2.92	.00	-.32
Confident/							
+ Stability	.06	5.30	.02	.25	2.19	.03	.24
+ External Control	.00	.16	.69	.06	.59	.56	.06
+ Product	.01	1.29	.26	-.13	-1.14	.26	-.12

(table continues)

Equation[a]	δR^2[b]	F	$p(F)$	b[c]	t	$p(t)$	r[d]
Confident/							
+ Locus	.01	.68	.41	.05	.44	.66	.09
+ Stability	.05	4.73	.03	.26	2.16	.03	.24
+ Product	.00	.01	.94	.01	.08	.94	-.03
Confident/							
+ Locus	.01	.68	.41	-.03	-.27	.79	.09
+ Personal Control	.09	8.67	.00	.30	2.58	.01	.31
+ Product	.01	.52	.47	-.06	-.72	.47	-.17
Confident/							
+ Locus	.01	.68	.41	.13	1.18	.24	.09
+ External Control	.01	.75	.39	.09	.80	.43	.06
+ Product	.01	.50	.48	-.07	-.70	.48	-.06
Confident/							
+ Personal Control	.10	9.45	.00	.21	2.06	.04	.31
+ Stability	.02	2.20	.14	.19	1.66	.10	.24
+ Product	.08	8.50	.01	-.26	-2.92	.00	-.32
Confident/							
+ Personal Control	.10	9.45	.00	.30	2.58	.01	.31
+ Locus	.00	.07	.80	-.03	-.27	.79	.09
+ Product	.01	.52	.47	-.06	-.72	.47	-.17
Confident/							
+ Personal Control	.10	9.45	.00	.34	3.24	.00	.31
+ External Control	.01	1.13	.29	.12	1.12	.27	.06
+ Product	.00	.34	.56	-.07	-.58	.56	.00
Confident/							
+ External Control	.00	.31	.58	.06	.59	.56	.06
+ Stability	.06	5.08	.03	.25	2.19	.03	.24
+ Product	.01	1.29	.26	-.13	-1.14	.26	-.12
Confident/							
+ External Control	.00	.31	.58	.09	.80	.43	.06
+ Locus	.01	1.12	.29	.13	1.18	.24	.09
+ Product	.01	.50	.48	-.07	-.70	.48	-.06

(table continues)

Equation[a]	δR^2 [b]	F	p(F)	b[c]	t	p(t)	r[d]
Confident/							
+ External Control	.00	.31	.58	.12	1.12	.27	.06
+ Personal Control	.11	10.25	.00	.34	3.24	.00	.31
+ Product	.00	.34	.56	-.07	-.58	.56	.00
Kindly/							
+ Stability	.06	5.63	.02	.28	2.38	.02	.25
+ Locus	.00	.30	.59	-.06	-.56	.58	-.01
+ Product	.00	.03	.87	-.01	-.16	.87	-.04
Kindly/							
+ Stability	.06	5.63	.02	.32	2.65	.01	.25
+ Personal Control	.01	1.23	.27	-.14	-1.30	.20	-.03
+ Product	.02	1.43	.24	-.11	-1.19	.24	-.11
Kindly/							
+ Stability	.06	5.63	.02	.24	2.20	.03	.25
+ External Control	.07	6.97	.01	.28	2.71	.01	.28
+ Product	.00	.45	.50	-.07	-.67	.50	-.03
Kindly/							
+ Locus	.00	.01	.92	-.06	-.56	.58	-.01
+ Stability	.06	5.87	.02	.28	2.38	.02	.25
+ Product	.00	.03	.87	-.01	-.16	.87	-.04
Kindly/							
+ Locus	.00	.01	.92	.00	.01	.99	-.01
+ Personal Control	.00	.08	.78	-.02	-.14	.89	-.03
+ Product	.00	.20	.66	.04	.45	.65	.06
Kindly/							
+ Locus	.00	.01	.92	.08	.75	.46	-.01
+ External Control	.09	8.18	.01	.32	2.85	.01	.28
+ Product	.00	.03	.86	.02	.17	.86	-.01
Kindly/							
+ Personal Control	.00	.10	.76	-.14	-1.30	.20	-.03
+ Stability	.07	6.77	.01	.32	2.65	.01	.25
+ Product	.02	1.43	.24	-.11	-1.19	.24	-.11

(table continues)

Equation[a]	δR^2[b]	F	$p(F)$	b[c]	t	$p(t)$	r[d]
Kindly/							
+ Personal Control	.00	.10	.76	-.02	-.14	.89	-.03
+ Locus	.00	.00	1.00	.00	.01	.99	-.01
+ Product	.00	.20	.66	.04	.45	.65	.06
Kindly/							
+ Personal Control	.00	.10	.76	.01	.08	.94	-.03
+ External Control	.08	7.39	.01	.29	2.67	.01	.28
+ Product	.00	.01	.93	.01	.09	.93	.04
Kindly/							
+ External Control	.08	7.57	.01	.28	2.71	.01	.28
+ Stability	.05	5.07	.03	.24	2.20	.03	.25
+ Product	.00	.45	.50	-.07	-.67	.50	-.03
Kindly/							
+ External Control	.08	7.57	.01	.32	2.85	.01	.28
+ Locus	.01	.66	.42	.08	.75	.46	-.01
+ Product	.00	.03	.86	.02	.17	.86	-.01
Kindly/							
+ External Control	.08	7.57	.01	.29	2.67	.01	.28
+ Personal Control	.00	.01	.93	.01	.08	.94	-.03
+ Product	.00	.01	.93	.01	.09	.93	.04
Proud/							
+ Stability	.01	.63	.43	.10	.85	.40	.08
+ Locus	.00	.00	.98	.01	.09	.93	.01
+ Product	.01	.53	.47	.06	.73	.47	.07
Proud/							
+ Stability	.01	.63	.43	.07	.55	.59	.08
+ Personal Control	.01	.66	.42	.07	.60	.55	.11
+ Product	.02	1.41	.24	-.12	-1.19	.24	-.14
Proud/							
+ Stability	.01	.63	.43	.10	.82	.41	.08
+ External Control	.00	.01	.94	-.01	-.05	.96	.01
+ Product	.01	.56	.46	.09	.75	.46	.08

(table continues)

Equation[a]	δR^2[b]	F	$p(F)$	b[c]	t	$p(t)$	r[d]
Proud/							
+ Locus	.00	.01	.91	.01	.09	.93	.01
+ Stability	.01	.61	.44	.10	.85	.40	.08
+ Product	.01	.53	.47	.06	.73	.47	.07
Proud/							
+ Locus	.00	.01	.91	-.03	-.27	.79	.01
+ Personal Control	.01	1.09	.30	.10	.82	.41	.11
+ Product	.00	.31	.58	-.05	-.56	.58	-.09
Proud/							
+ Locus	.00	.01	.91	.01	.07	.94	.01
+ External Control	.00	.03	.86	.03	.22	.83	.01
+ Product	.00	.20	.66	.04	.45	.66	.05
Proud/							
+ Personal Control	.01	1.05	.31	.07	.60	.55	.11
+ Stability	.00	.25	.62	.07	.55	.59	.08
+ Product	.02	1.41	.24	-.12	-1.19	.24	-.14
Proud/							
+ Personal Control	.01	1.05	.31	.10	.82	.41	.11
+ Locus	.00	.07	.79	-.03	-.27	.79	.01
+ Product	.00	.31	.58	-.05	-.56	.58	-.09
Proud/							
+ Personal Control	.01	1.05	.31	.12	1.03	.30	.11
+ External Control	.00	.08	.77	.03	.29	.77	.01
+ Product	.00	.00	.97	-.00	-.04	.97	.02
Proud/							
+ External Control	.00	.02	.90	-.01	-.05	.96	.01
+ Stability	.01	.61	.44	.10	.82	.41	.08
+ Product	.01	.56	.46	.09	.75	.46	.08
Proud/							
+ External Control	.00	.02	.90	.03	.22	.83	.01
+ Locus	.00	.03	.87	.01	.07	.94	.01
+ Product	.00	.20	.66	.04	.45	.66	.05

(table continues)

Equation[a]	δR^2[b]	F	$p(F)$	b[c]	t	$p(t)$	r[d]
Proud/							
+ External Control	.00	.02	.90	.03	.29	.77	.01
+ Personal Control	.01	1.10	.30	.12	1.03	.30	.11
+ Product	.00	.00	.97	.00	-.04	.97	.02
Efficacy/							
+ Stability	.00	.35	.56	.04	.33	.75	.06
+ Locus	.01	.88	.35	.09	.82	.42	.11
+ Product	.01	.51	.48	-.06	-.72	.48	-.10
Efficacy/							
+ Stability	.00	.35	.56	.01	.11	.92	.06
+ Personal Control	.03	2.72	.10	.16	1.43	.16	.19
+ Product	.02	1.44	.23	-.12	-1.20	.23	-.16
Efficacy/							
+ Stability	.00	.35	.56	.08	.65	.52	.06
+ External Control	.01	.44	.51	-.08	-.71	.48	-.07
+ Product	.00	.10	.76	.04	.31	.76	.02
Efficacy/							
+ Locus	.01	1.07	.30	.09	.82	.42	.11
+ Stability	.00	.17	.68	.04	.33	.75	.06
+ Product	.01	.51	.48	-.06	-.72	.48	-.10
Efficacy/							
+ Locus	.01	1.07	.30	.05	.45	.65	.11
+ Personal Control	.02	2.19	.14	.19	1.62	.11	.19
+ Product	.01	.50	.48	.06	.70	.48	.01
Efficacy/							
+ Locus	.01	1.07	.30	.13	1.13	.26	.11
+ External Control	.00	.10	.76	-.05	-.42	.67	-.07
+ Product	.02	1.68	.20	-.12	-1.30	.20	-.10
Efficacy/							
+ Personal Control	.03	3.11	.08	.16	1.43	.16	.19
+ Stability	.00	.00	.95	.01	.11	.92	.06
+ Product	.02	1.44	.23	-.12	-1.20	.23	-.16

(table continues)

Equation[a]	δR^2 [b]	F	$p(F)$	b [c]	t	$p(t)$	r [d]
Efficacy/							
+ Personal Control	.03	3.11	.08	.19	1.62	.11	.19
+ Locus	.00	.19	.66	.05	.45	.65	.11
+ Product	.01	.50	.48	.06	.70	.48	.01
Efficacy/							
+ Personal Control	.03	3.11	.08	.18	1.65	.10	.19
+ External Control	.00	.14	.71	-.04	-.36	.72	-.07
+ Product	.00	.00	.96	-.01	-.05	.96	.02
Efficacy/							
+ External Control	.00	.39	.54	-.08	-.71	.48	-.07
+ Stability	.00	.41	.53	.08	.65	.52	.06
+ Product	.00	.10	.76	.04	.31	.76	.02
Efficacy/							
+ External Control	.00	.39	.54	-.05	-.42	.67	-.07
+ Locus	.01	.77	.38	.13	1.13	.26	.11
+ Product	.02	1.68	.20	-.12	-1.30	.20	-.10
Efficacy/							
+ External Control	.00	.39	.54	-.04	-.36	.72	-.07
+ Personal Control	.03	2.82	.10	.18	1.65	.10	.19
+ Product	.00	.00	.96	-.01	-.05	.96	.02
Intention/							
+ Stability	.03	2.26	.14	.13	1.16	.25	.16
+ Locus	.01	.98	.33	.08	.81	.42	.13
+ Product	.01	1.30	.26	-.09	-1.14	.26	-.16
Intention/							
+ Stability	.03	2.26	.14	.13	1.16	.25	.16
+ Personal Control	.02	1.71	.20	.10	.90	.37	.18
+ Product	.07	6.27	.01	-.23	-2.50	.01	-.28
Intention/							
+ Stability	.03	2.26	.14	.18	1.56	.12	.16
+ External Control	.00	.24	.62	-.06	-.60	.55	-.04
+ Product	.01	.44	.51	.07	.66	.51	.05

(table continues)

Equation[a]	δR^2[b]	F	$p(F)$	b[c]	t	$p(t)$	r[d]
Intention/							
+ Locus	.02	1.54	.22	.08	.81	.42	.13
+ Stability	.02	1.69	.20	.13	1.16	.25	.16
+ Product	.01	1.30	.26	-.09	-1.14	.26	-.16
Intention/							
+ Locus	.02	1.54	.22	.07	.66	.51	.13
+ Personal Control	.02	1.81	.18	.12	1.04	.30	.18
+ Product	.01	.60	.44	-.07	-.77	.44	-.14
Intention/							
+ Locus	.02	1.54	.22	.16	1.51	.14	.13
+ External Control	.00	.00	.99	-.01	-.13	.90	-.04
+ Product	.03	2.73	.10	-.15	-1.65	.10	-.14
Intention/							
+ Personal Control	.03	2.92	.09	.10	.90	.37	.18
+ Stability	.01	1.07	.31	.13	1.16	.25	.16
+ Product	.07	6.27	.01	-.23	-2.50	.01	-.28
Intention/							
+ Personal Control	.03	2.92	.09	.12	1.04	.30	.18
+ Locus	.01	.46	.50	.07	.66	.51	.13
+ Product	.01	.60	.44	-.07	-.77	.44	-.14
Intention/							
+ Personal Control	.03	2.92	.09	.17	1.61	.11	.18
+ External Control	.00	.02	.90	-.02	-.14	.89	-.04
+ Product	.00	.02	.90	.02	.12	.90	.04
Intention/							
+ External Control	.00	.14	.71	-.06	-.60	.55	-.04
+ Stability	.03	2.34	.13	.18	1.56	.12	.16
+ Product	.01	.44	.51	.07	.66	.51	.05
Intention/							
+ External Control	.00	.14	.71	-.01	-.13	.90	-.04
+ Locus	.02	1.38	.24	.16	1.51	.14	.13
+ Product	.03	2.73	.10	-.15	-1.65	.10	-.14

(table continues)

Equation[a]	δR^2[b]	F	$p(F)$	b[c]	t	$p(t)$	r[d]
Intention/							
+ External Control	.00	.14	.71	-.02	-.14	.89	-.04
+ Personal Control	.03	2.76	.10	.17	1.61	.11	.18
+ Product	.00	.02	.90	.02	.12	.90	.04
Intention/							
+ Confident	.03	2.88	.09	.04	.37	.71	.18
+ Stability	.01	1.30	.26	.13	1.07	.29	.16
+ Personal Control	.01	.97	.33	.09	.79	.43	.18
+ Product	.05	5.12	.03	-.22	-2.26	.03	-.28
Intention/							
+ Cheerful	.00	.23	.63	-.05	-.46	.65	.05
+ Stability	.03	2.21	.14	.13	1.16	.25	.16
+ Personal Control	.02	1.59	.21	.10	.92	.36	.18
+ Product	.07	6.31	.01	-.24	-2.51	.01	-.28
			Failure (N = 94)				
Surprised/							
+ Stability	.02	1.58	.21	.12	1.15	.25	.13
+ Locus	.01	.51	.48	-.04	-.43	.67	-.05
+ Product	.05	4.75	.03	-.19	-2.18	.03	-.24
Surprised/							
+ Stability	.02	1.58	.21	.11	1.07	.29	.13
+ Personal Control	.08	8.29	.01	-.28	-2.81	.01	-.29
+ Product	.00	.32	.57	-.05	-.57	.57	-.09
Surprised/							
+ Stability	.02	1.58	.21	.10	1.03	.31	.13
+ External Control	.03	3.21	.08	.13	1.29	.20	.18
+ Product	.04	4.40	.04	.18	2.10	.04	.26
Surprised/							
+ Locus	.00	.26	.61	-.04	-.43	.67	-.05
+ Stability	.02	1.83	.18	.12	1.15	.25	.13
+ Product	.05	4.75	.03	-.19	-2.18	.03	-.24
Surprised/							
+ Locus	.00	.26	.61	.13	1.04	.30	-.05
+ Personal Control	.09	9.48	.00	-.35	-3.03	.00	-.29
+ Product	.00	.03	.86	.01	.17	.86	.06

(table continues)

Equation[a]	δR^2[b]	F	$p(F)$	b[c]	t	$p(t)$	r[d]
Surprised/							
+ Locus	.00	.26	.61	.07	.53	.60	-.05
+ External Control	.04	3.50	.07	.24	1.78	.08	.18
+ Product	.00	.39	.53	.06	.63	.53	.07
Surprised/							
+ Personal Control	.09	8.66	.00	-.28	-2.81	.01	-.29
+ Stability	.01	1.30	.26	.11	1.07	.29	.13
+ Product	.00	.32	.57	-.05	-.57	.57	-.09
Surprised/							
+ Personal Control	.09	8.66	.00	-.35	-3.03	.00	-.29
+ Locus	.01	1.09	.30	.13	1.04	.30	-.05
+ Product	.00	.03	.86	.01	.17	.86	.06
Surprised/							
+ Personal Control	.09	8.66	.00	-.26	-2.40	.02	-.29
+ External Control	.01	.68	.41	.09	.80	.43	.18
+ Product	.00	.06	.81	-.02	-.25	.81	-.06
Surprised/							
+ External Control	.03	3.20	.08	.13	1.29	.20	.18
+ Stability	.02	1.62	.21	.10	1.03	.31	.13
+ Product	.04	4.40	.04	.18	2.10	.04	.26
Surprised/							
+ External Control	.03	3.20	.08	.24	1.78	.08	.18
+ Locus	.01	.58	.45	.07	.53	.60	-.05
+ Product	.00	.39	.53	.06	.63	.53	.07
Surprised/							
+ External Control	.03	3.20	.08	.09	.80	.43	.18
+ Personal Control	.06	5.95	.02	-.26	-2.40	.02	-.29
+ Product	.00	.06	.81	-.02	-.25	.81	-.06
Disgruntled/							
+ Stability	.00	.36	.55	.06	.55	.58	.06
+ Locus	.00	.33	.57	-.04	-.40	.69	-.05
+ Product	.02	1.52	.22	-.11	-1.23	.22	-.14

(table continues)

Equation[a]	δR^2[b]	F	$p(F)$	b[c]	t	$p(t)$	r[d]
Disgruntled/							
+ Stability	.00	.36	.55	.03	.32	.75	.06
+ Personal Control	.08	8.35	.01	-.28	-2.79	.01	-.29
+ Product	.02	1.85	.18	-.11	-1.36	.18	-.16
Disgruntled/							
+ Stability	.00	.36	.55	.06	.62	.54	.06
+ External Control	.04	3.63	.06	.20	1.88	.06	.20
+ Product	.00	.03	.86	-.02	-.17	.86	.04
Disgruntled/							
+ Locus	.00	.22	.64	-.04	-.40	.69	-.05
+ Stability	.01	.46	.50	.06	.55	.58	.06
+ Product	.02	1.52	.22	-.11	-1.23	.22	-.14
Disgruntled/							
+ Locus	.00	.22	.64	.07	.58	.56	-.05
+ Personal Control	.09	9.53	.00	-.37	-3.24	.00	-.29
+ Product	.02	2.17	.14	-.12	-1.47	.14	-.09
Disgruntled/							
+ Locus	.00	.22	.64	.14	1.00	.32	-.05
+ External Control	.04	4.23	.04	.28	2.09	.04	.20
+ Product	.00	.24	.62	-.05	-.49	.62	-.04
Disgruntled/							
+ Personal Control	.09	8.60	.00	-.28	-2.79	.01	-.29
+ Stability	.00	.21	.65	.03	.32	.75	.06
+ Product	.02	1.85	.18	-.11	-1.36	.18	-.16
Disgruntled/							
+ Personal Control	.09	8.60	.00	-.37	-3.24	.00	-.29
+ Locus	.01	1.16	.28	.07	.58	.56	-.05
+ Product	.02	2.17	.14	-.12	-1.47	.14	-.09
Disgruntled/							
+ Personal Control	.09	8.60	.00	-.26	-2.44	.02	-.29
+ External Control	.01	.93	.34	.11	1.05	.30	.20
+ Product	.01	.87	.35	.08	.94	.35	.05

(*table continues*)

Equation[a]	δR^2[b]	F	$p(F)$	b[c]	t	$p(t)$	r[d]
Disgruntled/							
+ External Control	.04	3.65	.06	.20	1.88	.06	.20
+ Stability	.00	.36	.55	.06	.62	.54	.06
+ Product	.00	.03	.86	-.02	-.17	.86	.04
Disgruntled/							
+ External Control	.04	3.65	.06	.28	2.09	.04	.20
+ Locus	.01	.81	.37	.14	1.00	.32	-.05
+ Product	.00	.24	.62	-.05	-.49	.62	-.04
Disgruntled/							
+ External Control	.04	3.65	.06	.11	1.05	.30	.20
+ Personal Control	.06	5.68	.02	-.26	-2.44	.02	-.29
+ Product	.01	.87	.35	.08	.94	.35	.05
Anxious/							
+ Stability	.05	4.61	.03	.19	1.92	.06	.22
+ Locus	.00	.01	.94	.03	.26	.80	.03
+ Product	.06	5.85	.02	-.21	-2.42	.02	-.26
Anxious/							
+ Stability	.05	4.61	.03	.19	1.96	.05	.22
+ Personal Control	.07	7.00	.01	-.25	-2.56	.01	-.27
+ Product	.01	.87	.35	-.08	-.94	.35	-.14
Anxious/							
+ Stability	.05	4.61	.03	.19	1.93	.06	.22
+ External Control	.04	3.62	.06	.14	1.37	.17	.19
+ Product	.05	5.15	.03	.19	2.27	.03	.29
Anxious/							
+ Locus	.00	.07	.80	.03	.26	.80	.03
+ Stability	.05	4.50	.04	.19	1.92	.06	.22
+ Product	.06	5.85	.02	-.21	-2.42	.02	-.26
Anxious/							
+ Locus	.00	.07	.80	.18	1.50	.14	.03
+ Personal Control	.11	10.96	.00	-.39	-3.38	.00	-.27
+ Product	.01	.77	.38	-.07	-.88	.38	-.06

(table continues)

Equation[a]	δR^2[b]	F	p(F)	b[c]	t	p(t)	r[d]
Anxious/							
+ Locus	.00	.07	.80	.21	1.57	.12	.03
+ External Control	.07	6.90	.01	.33	2.53	.01	.19
+ Product	.00	.33	.57	.05	.58	.57	.09
Anxious/							
+ Personal Control	.07	7.39	.01	-.25	-2.56	.01	-.27
+ Stability	.04	4.26	.04	.19	1.96	.05	.22
+ Product	.01	.87	.35	-.08	-.94	.35	-.14
Anxious/							
+ Personal Control	.07	7.39	.01	-.39	-3.38	.00	-.27
+ Locus	.03	3.45	.07	.18	1.50	.14	.03
+ Product	.01	.77	.38	-.07	-.88	.38	-.06
Anxious/							
+ Personal Control	.07	7.39	.01	-.24	-2.21	.03	-.27
+ External Control	.01	.98	.33	.11	1.04	.30	.19
+ Product	.00	.47	.50	.06	.69	.49	.03
Anxious/							
+ External Control	.04	3.49	.07	.14	1.37	.17	.19
+ Stability	.05	4.74	.03	.19	1.93	.06	.22
+ Product	.05	5.15	.03	.19	2.27	.03	.29
Anxious/							
+ External Control	.04	3.49	.07	.33	2.53	.01	.19
+ Locus	.03	3.39	.07	.21	1.57	.12	.03
+ Product	.00	.33	.57	.05	.58	.57	.09
Anxious/							
+ External Control	.04	3.49	.07	.11	1.04	.30	.19
+ Personal Control	.05	4.73	.03	-.24	-2.21	.03	-.27
+ Product	.00	.47	.50	.06	.69	.49	.03
Unashamed/							
+ Stability	.00	.21	.65	.07	.63	.53	.05
+ Locus	.01	.86	.36	-.10	-.96	.34	-.09
+ Product	.00	.11	.74	.03	.33	.74	.02

(table continues)

Equation[a]	δR^2[b]	F	p(F)	b[c]	t	p(t)	r[d]
Unashamed/							
+ Stability	.00	.21	.65	.05	.46	.65	.05
+ Personal Control	.00	.00	.98	.00	.02	.98	.00
+ Product	.00	.01	.94	.01	.08	.94	.00
Unashamed/							
+ Stability	.00	.21	.65	.04	.37	.71	.05
+ External Control	.00	.21	.65	-.06	-.60	.55	-.05
+ Product	.01	.45	.50	.06	.67	.50	.06
Unashamed/							
+ Locus	.01	.71	.40	-.10	-.96	.34	-.09
+ Stability	.00	.36	.55	.07	.63	.53	.05
+ Product	.00	.11	.74	.03	.33	.74	.02
Unashamed/							
+ Locus	.01	.71	.40	-.05	-.39	.70	-.09
+ Personal Control	.00	.22	.64	.08	.65	.52	.00
+ Product	.03	3.15	.08	.15	1.78	.08	.20
Unashamed/							
+ Locus	.01	.71	.40	-.14	-.98	.33	-.09
+ External Control	.02	1.60	.21	-.15	-1.11	.27	-.05
+ Product	.02	1.73	.19	-.13	-1.32	.19	-.17
Unashamed/							
+ Personal Control	.00	.00	1.00	.00	.02	.98	.00
+ Stability	.00	.21	.65	.05	.46	.65	.05
+ Product	.00	.01	.94	.01	.08	.94	.00
Unashamed/							
+ Personal Control	.00	.00	1.00	.08	.65	.52	.00
+ Locus	.01	.93	.34	-.05	-.39	.70	-.09
+ Product	.03	3.15	.08	.15	1.78	.08	.20
Unashamed/							
+ Personal Control	.00	.00	1.00	-.01	-.05	.96	.00
+ External Control	.00	.24	.62	-.07	-.67	.51	-.05
+ Product	.04	3.33	.07	-.15	-1.82	.07	-.18

(table continues)

Equation[a]	δR^2 [b]	F	p(F)	b[c]	t	p(t)	r[d]
Unashamed/							
+ External Control	.00	.21	.65	-.06	-.60	.55	-.05
+ Stability	.00	.21	.65	.04	.37	.71	.05
+ Product	.01	.45	.50	.06	.67	.50	.06
Unashamed/							
+ External Control	.00	.21	.65	-.15	-1.11	.27	-.05
+ Locus	.02	2.10	.15	-.14	-.98	.33	-.09
+ Product	.02	1.73	.19	-.13	-1.32	.19	-.17
Unashamed/							
+ External Control	.00	.21	.65	-.07	-.67	.51	-.05
+ Personal Control	.00	.03	.86	-.01	-.05	.96	.00
+ Product	.04	3.33	.07	-.15	-1.82	.07	-.18
Efficacy/							
+ Stability	.02	1.88	.17	-.15	-1.44	.15	-.14
+ Locus	.00	.10	.75	-.01	-.13	.90	-.05
+ Product	.02	1.90	.17	-.12	-1.38	.17	-.13
Efficacy/							
+ Stability	.02	1.88	.17	-.14	-1.37	.18	-.14
+ Personal Control	.04	3.44	.07	.20	1.92	.06	.20
+ Product	.01	.82	.37	-.08	-.90	.37	-.06
Efficacy/							
+ Stability	.02	1.88	.17	-.16	-1.56	.12	-.14
+ External Control	.01	.73	.40	.05	.49	.63	.09
+ Product	.02	2.31	.13	.13	1.52	.13	.15
Efficacy/							
+ Locus	.00	.28	.60	-.01	-.13	.90	-.05
+ Stability	.02	1.68	.20	-.15	-1.44	.15	-.14
+ Product	.02	1.90	.17	-.12	-1.38	.17	-.13
Efficacy/							
+ Locus	.00	.28	.60	-.19	-1.57	.12	-.05
+ Personal Control	.07	6.41	.01	.30	2.52	.01	.20
+ Product	.00	.02	.88	.01	.15	.88	.01

(table continues)

Equation[a]	δR^2 [b]	F	$p(F)$	b [c]	t	$p(t)$	r [d]
Efficacy/							
+ Locus	.00	.28	.60	-.01	-.07	.94	-.05
+ External Control	.00	.44	.51	.08	.63	.53	.09
+ Product	.00	.06	.81	.02	.24	.81	.01
Efficacy/							
+ Personal Control	.04	3.70	.06	.20	1.92	.06	.20
+ Stability	.02	1.64	.20	-.14	-1.37	.18	-.14
+ Product	.01	.82	.37	-.08	-.90	.37	-.06
Efficacy/							
+ Personal Control	.04	3.70	.06	.30	2.52	.01	.20
+ Locus	.03	2.92	.09	-.19	-1.57	.12	-.05
+ Product	.00	.02	.88	.01	.15	.88	.01
Efficacy/							
+ Personal Control	.04	3.70	.06	.26	2.40	.02	.20
+ External Control	.03	2.86	.09	.18	1.69	.10	.09
+ Product	.00	.02	.89	.01	.14	.89	.02
Efficacy/							
+ External Control	.01	.72	.40	.05	.49	.63	.09
+ Stability	.02	1.87	.17	-.16	-1.56	.12	-.14
+ Product	.02	2.31	.13	.13	1.52	.13	.15
Efficacy/							
+ External Control	.01	.72	.40	.08	.63	.53	.09
+ Locus	.00	.00	1.00	-.01	-.07	.94	-.05
+ Product	.00	.06	.81	.02	.24	.81	.01
Efficacy/							
+ External Control	.01	.72	.40	.18	1.69	.10	.09
+ Personal Control	.06	5.88	.02	.26	2.40	.02	.20
+ Product	.00	.02	.89	.01	.14	.89	.02
Intention/							
+ Stability	.00	.26	.61	-.06	-.58	.57	-.05
+ Locus	.00	.10	.75	-.02	-.16	.88	-.04
+ Product	.02	1.44	.23	-.11	-1.20	.23	-.12

(table continues)

Equation[a]	δR^2[b]	F	$p(F)$	b[c]	t	$p(t)$	r[d]
Intention/							
+ Stability	.00	.26	.61	-.06	-.53	.60	-.05
+ Personal Control	.00	.02	.89	-.01	-.12	.91	-.01
+ Product	.00	.03	.86	-.02	-.18	.85	-.01
Intention/							
+ Stability	.00	.26	.61	-.07	-.65	.52	-.05
+ External Control	.00	.03	.86	-.01	-.09	.93	.02
+ Product	.01	1.33	.25	.10	1.15	.25	.11
Intention/							
+ Locus	.00	.16	.69	-.02	-.16	.88	-.04
+ Stability	.00	.21	.65	-.06	-.58	.57	-.05
+ Product	.02	1.44	.23	-.11	-1.20	.23	-.12
Intention/							
+ Locus	.00	.16	.69	-.07	-.56	.58	-.04
+ Personal Control	.00	.01	.92	.01	.04	.97	-.01
+ Product	.00	.35	.55	-.05	-.59	.55	-.04
Intention/							
+ Locus	.00	.16	.69	.02	.11	.91	-.04
+ External Control	.00	.01	.93	.01	.09	.92	.02
+ Product	.02	2.23	.14	-.14	-1.49	.14	-.16
Intention/							
+ Personal Control	.00	.01	.92	-.01	-.12	.91	-.01
+ Stability	.00	.27	.61	-.06	-.53	.60	-.05
+ Product	.00	.03	.86	-.02	-.18	.85	-.01
Intention/							
+ Personal Control	.00	.01	.92	.01	.04	.97	-.01
+ Locus	.00	.16	.69	-.07	-.56	.58	-.04
+ Product	.00	.35	.55	-.05	-.59	.55	-.04
Intention/							
+ Personal Control	.00	.01	.92	-.01	-.09	.93	-.01
+ External Control	.00	.02	.88	.03	.22	.83	.02
+ Product	.01	.53	.47	.06	.73	.47	.07

(table continues)

Equation[a]	δR^2[b]	F	p(F)	b[c]	t	p(t)	r[d]
Intention/							
+ External Control	.00	.03	.86	-.01	-.09	.93	.02
+ Stability	.00	.26	.61	-.07	-.65	.52	-.05
+ Product	.01	1.33	.25	.10	1.15	.25	.11
Intention/							
+ External Control	.00	.03	.86	.01	.09	.92	.02
+ Locus	.00	.13	.72	.02	.11	.91	-.04
+ Product	.02	2.23	.14	-.14	-1.49	.14	-.16
Intention/							
+ External Control	.00	.03	.86	.03	.22	.83	.02
+ Personal Control	.00	.00	.97	-.01	-.09	.93	-.01
+ Product	.01	.53	.47	.06	.73	.47	.07

[a]All variables are Year 2. The dependent variable precedes the slash. The plus sign signifies addition of a variable to those already in the equation. All variables are standardised except for the product term which is the product of standardised variables. [b]Stepwise change in R^2. [c]Unstandardised regression coefficient in the final equation. [d]Zero-order correlation with the independent variable.