BEYOND SOCIAL COGNITION MODELS:

A Mixed Methods Investigation of Influences on Attempts to Adopt Health Behaviours

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DECLARATION

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ABSTRACT

In explorations of the nature and operation of influences on attempts to adopt health behaviours, health psychologists have largely concentrated on developing models incorporating statistically predictive combinations of measures of social cognitions. However, this body of work is flawed by theoretical, methodological and performance-based limitations. Three different approaches are reported here to moving beyond the social cognition models in order to address current gaps in knowledge and understanding. In the first approach, behaviour-specific predictors were found to contribute significantly to the explanation of variance in intentions once key social cognitions had been accounted for, but a ceiling appeared to have been reached in studies of this kind and the need to consider cognitive and emotional links between past and future behaviour was identified. The second approach therefore involved an evaluation of the Idealised Process Model of Cognitive-Affective Responses to Repeated Failure (Jerusalem and Schwarzer, 1992). Persistent, negative patterns of change in cognitive stress appraisals were found to result from repeated failure experiences in relation to cognitive tasks but the model did not generalise to health behaviour performance. A longitudinal, multiple case study was conducted in the third approach in order to explore meanings associated with experiences of trying to adopt health behaviours, together with the implications of these for outcomes. The desire to act as a positive role model emerged as a key motivating factor, while both having experienced a small number of past failures and having engaged in advanced, strategic planning were identified as beneficial to the maintenance of health behaviour change. The latter is particularly recommended in order to ensure the receipt of early, positive reinforcement in relation to the key motives for change, foster appropriate anticipatory action against potentially difficult situations and in order to identify a range of practical and psychological strategies likely to foster sustained change, alternative sources of support and relief to the original behaviour and ways in which lapses might be prevented from becoming relapses.

ABBREVIATIONS

AG	Arts and General version of the AH6 intelligence test
B-C	Benefits minus costs
BD	Body Dissatisfaction
BMDP	Bio Medical Data Package
BMI	Body Mass Index
C	Challenge (a type of Cognitive Stress Appraisal)
CHD	Coronary Heart Disease
CSA(Q)	Cognitive Stress Appraisal (Questionnaire)
CVA	Cerebrovascular Accident
DIY	"Do-it-Yourself"
DoH	Department of Health
DT	Drive for Thinness
E	"Ellie" (a participant in the study reported in Chapter 6)
EDI-2	Eating Disorder Inventory-2
FSA	Food Standards Agency
G-G	Greenhouse-Geisser
GSE(S)	Generalised Self-Efficacy (Scale)
HAPA	Health Action Process Approach
HBM	Health Belief Model
HIV	Human Immunodeficiency Virus
HSE	Health Survey for England
IDDM	Insulin Dependent Diabetes Mellitus
IMI	Implementation Intention
IPA	Interpretative Phenomenological Analysis
IPM	Idealised Process Model
K-S	Kolmogorov-Smirnov
L	Loss (a type of Cognitive Stress Appraisal)
M	"Meatloaf" (a participant in the study reported in Chapter 6)
(M)ANOVA	(Multiple) Analysis of Variance
NHS	National Health Service
ONS	Office of National Statistics
p	Statistical probability
PASTBEH	Past Weight Loss Behaviour
PBC	Perceived Behavioural Control
S	"Stench" (a participant in the study reported in Chapter 6)
S.D.	Standard Deviation
SCM	Social Cognition Model
SELFEFF	Self-Efficacy for Weight Control
SEM	Science, Engineering and Mathematics version of the AH6
SNs	Subjective Norms
SOCINF	Social Influence for Weight Loss
SPSS	Statistical Package for the Social Sciences
WTPERC	Weight Perceptions
T	Threat (a type of Cognitive Stress Appraisal)
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TTM	Transtheoretical Model
UK	United Kingdom
US(A)	United States (of America)
WHO	World Health Organisation

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CHAPTER ONE

Introduction

1.1 THE IMPORTANCE OF BEHAVIOUR TO HEALTH

1.1.1 CHANGES ACROSS THE TWENTIETH CENTURY

Over the course of the twentieth century, major changes were observed in the nature of the leading causes of death in Western countries. At the beginning of the century only a minority of these were significantly influenced by the behaviour of the individual but, by its end, around 50% of all deaths from the ten leading causes were being attributed to lifestyle factors (Centers for Disease Control and Prevention, 1994; Hamburg, Elliott and Parron, 1982). Table 1.1.1a, below, illustrates this change using figures from the United States of America (USA) in 1900 and 1998[1] and from England and Wales in 2000[2]:-

TABLE 1.1.1a Twentieth Century Changes in the Leading Causes of Death

	1900 (USA)	1998 (USA)	2000 (England & Wales)
1	Influenza/Pneumonia	Coronary Heart Disease	Coronary Heart Disease
2	Tuberculosis	Cancer	Cancer
3	Gastroenteritis	Cerebrovascular Accidents	Pneumonia
4	Coronary Heart Disease	Chronic Obstructive Airways Disease	Cerebrovascular Accidents
5	Vascular Lesions of the Central Nervous System	Accidents	Chronic Obstructive Airways Disease
6	Chronic Nephritis	Influenza/Pneumonia	Suicide
7	Accidents	Diabetes Mellitus	Liver Disease
8	Cancer	Suicide	Diabetes Mellitus
9	Certain Diseases of Early Infancy	Nephritis	Motor Vehicle Traffic Accidents
10	Diphtheria	Liver Disease	Gastrointestinal Ulcers

It can be seen that, in 1900, the top three causes of death in the US were all acute infectious disorders, as was the tenth. However, of these, only influenza and/or pneumonia remained on the lists by the end of the century, reflecting a general decline in the impact of such disorders over the course of the century. On the other hand, while

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[1] from Taylor (2003)

[2] derived from provisional figures provided by the Office of National Statistics (ONS, 2001)

lifestyle factors are strongly associated with just three of the top ten 1900 causes (Coronary Heart Disease [CHD], accidents and cancer) they are heavily implicated in the development of an additional three and four of those listed for 1998 and 2000, respectively (Cerebrovasular Accident [CVA], chronic obstructive airways disease, liver disease and, for 2000 alone, gastrointestinal ulcers). They are also relevant in some cases of diabetes mellitus[3]. The impact of behaviourally-related causes of death is highlighted by the fact that, taking England alone, 110,000 people die from CHD each year, 127,000 from cancer and 104,000 from CVA (DoH, 1999).

As well as having an increasing impact on mortality, behaviour is now also being held increasingly responsible for individual differences in health status. For example, Kaplan, Sallis and Peterson (1995) nominate behaviour as the single greatest influence on health, claiming it to contribute to 40% of the variance in this, which is double the 20% contribution they ascribe to genetic factors and four times the 10% they claim to be attributable to medical treatment. A collection of other factors are proposed to make up the remaining 30%. A different kind of illustration of the importance that is now being placed on behavioural factors comes from Taylor (2003), who provides a description of the roles of various agents involved in the promotion of health in which, as Table 1.1.1b shows, the emphasis in each case is placed on activities aimed at fostering healthy lifestyles in individuals:-

TABLE 1.1.1b Proposed Roles of Key Agents of Health Promotion

Agents	Role
Individuals	To develop positive health habits when young and maintain them throughout adulthood and old age
Medical Practitioners	To teach people, especially those at risk of particular health problems, how best to achieve a healthy lifestyle
Psychologists	To develop interventions to help people to practice healthy behaviours and avoid those which pose risks to health
Policy-makers	To make available information, resources and facilities aimed at helping people to develop and maintain healthy lifestyles
Mass Media	To provide information about behaviours posing risks to health
Legislators	To mandate certain activities which reduce risks to health (such as the wearing of seat belts)

[3] These claims will be substantiated in Sections 1.1.2i to 1.1.2iv, below.

It is clear, therefore, that health status is currently viewed as being primarily determined by individuals' performance of those behaviours considered likely to benefit their health and by their avoidance of those believed to put it at risk - behaviours which have been collectively defined as *health behaviours* (Kasl and Cobb, 1966).

If the energies and resources of those attempting to promote health in Western societies are to be appropriately directed, then those behaviours which have the strongest health-promoting effects and those which are the most likely to compromise health must clearly be identified. Pursuing this aim in an investigation of 7000 participants, Belloc and Breslow (1972) found strong associations between seven health behaviours and health status, with individuals of more than 75 years of age who routinely carried out all seven behaviours being shown to be in comparable states of health to those aged 35 to 44 years who carried out less than three. Furthermore, a study by Belloc (1973) found the behaviours to be associated with reduced mortality and, in a ten-year follow-up, Breslow and Enstrom (1980) showed mortality rates to be significantly lower in people who performed all seven behaviours compared to those who carried out no more than three. The seven behaviours identified in these studies were:-

- abstinence from smoking
- drinking no more than one or two alcoholic drinks per day
- being no more than 10% overweight[4]
- taking regular exercise
- sleeping seven to eight hours per day
- eating breakfast
- only rarely, if ever, eating between meals

Whilst relatively little attention has been paid to the last three of these behaviours, the first four bear strong similarities to those now widely accepted as being the most heavily implicated in the current leading causes of death, namely: smoking, alcohol (mis)use, poor nutritional intake and lack of physical exercise (e.g. Bennett and Murphy, 1997; Sarafino, 2002; Taylor, 2003). Although Bennett and Murphy point out that unsafe sexual practices

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[4] It should be noted that, although a state of being to which behaviour undoubtedly makes some contribution, the proportion to which someone is overweight is not, in itself, a behaviour.

have also become the target of health promoters since the emergence of Human Immunodeficiency Virus (HIV), the impact of the virus in this country has not, as yet at least, become sufficient for its associated causes of death to have reached the top ten list. Sexual practices will not therefore be given any individual attention in this chapter. However, the health-related consequences of the four areas of behaviour which have the most widespread impact on both health status and mortality rates (i.e. smoking, [mis]use of alcohol, poor nutritional intake and a lack of physical exercise) and the prevalence of each, will now be briefly outlined in order to more fully demonstrate the importance of attempting to identify those factors which might have a bearing on their performance and on their avoidance.

1.1.2 THE IMPACT AND PREVALENCE OF SPECIFIC BEHAVIOURS

1.1.2i SMOKING

Smoking has been shown to exert the greatest toll on health of any individual behaviour (Sarafino, 2002) and is now the single greatest cause of otherwise preventable death (Taylor, 2003). By far the most widespread and well-documented health-related consequences of smoking are diseases of the respiratory and cardiovascular systems, of which it is the prime cause (DoH, 1998): smoking has been implicated in 84 to 90% of deaths associated with lung cancer, 80 to 83% of cases of chronic obstructive airways disease and 15 to 25% of those associated with CHD (DoH, 1998; Bennett and Murphy, 1997). Furthermore, Wald, Nanchahal, Thompson and Cuckle (1986) found 25% of cases of lung cancer in non-smokers to be attributable to passive smoking. As well as lung cancer, smoking has also been associated with increased incidences of cancers of the mouth, larynx, oesophagus, stomach, pancreas, kidney and bladder (DoH, 1998; Smith and Jacobson, 1988) and is considered responsible for between 25 and 30% of all deaths from cancer (Taylor, 2003; Doll and Peto, 1981).

The risks of developing a range of non-malignant digestive disorders, including peptic ulcers, Crohn's disease and gallstones, are also greater in those who smoke (National Institute of Diabetes and Digestive and Kidney Disorders, 2003). In the light of all these

findings, it is not surprising that smoking-related disorders currently result in around four million deaths world-wide per year (Sarafino, 2002) and are expected to cause approximately 450 million deaths over the next 50 years (Myers and Frost, 2002). Overall, smoking is implicated in 120,000 deaths in the United Kingdom (UK) per annum and smoking-related disorders cost the National Health Service (NHS) up to £1.7 billion each year (DoH, 1998).

The risks to health associated with smoking increase with the extent to which the behaviour is practised (Sarafino, 2002) and it has been proposed that each cigarette costs the person who smokes it approximately 11 minutes of life (Shaw, Mitchell and Dorling, 2000). On average, those who smoke regularly and die of a smoking-related condition meet their deaths approximately 16 years earlier than non-smokers (DoH, 1998). In a further illustration of the impact of smoking on life expectancy, Peto, Lopez, Boreham, Thun and Heath (1994) claim that, of one thousand 20-year-olds in the UK who smoke cigarettes regularly, approximately one will be murdered and six will die in road traffic accidents, but no fewer than 500 will die from smoking-related disorders and 250 of these will do so between the ages of 35 and 69. Although it is the case that, if an individual gives up smoking, the associated risks to his or her health can regain the levels of those who have never smoked, they can take up to 15 years to do so (Sarafino, 2002).

Twenty seven percent of the current population of the UK are smokers and, although this figure represents a significant improvement on the highest ever recorded levels of smoking in the UK (which were 82% for males, in 1948, and 45% for females, in 1966; Wald and Nicolaides-Bouman, 1991), no significant reductions have been observed since the beginning of the 1990s (Office of National Statistics [ONS], 2002; DoH, 1998). Longstanding differences in cross-gender rates mean that smoking has traditionally been regarded as a predominantly male problem: however, decreases in smoking which took place during the 1970s and 1980s were greater amongst men than women and current rates in the two groups are now almost equivalent, at 28% and 26%, respectively (ONS, 2002). Given the multiplicity and severity of the health consequences associated with smoking, it is evident that both the length and the quality of life of more than a quarter of the UK population remain at serious risk from this single aspect of their behaviour.

1.1.2ii (MIS)USE OF ALCOHOL

The second behaviour of major importance to health status concerns the use, or misuse, of alcohol. Before discussing the consequences and prevalence of alcohol consumption, however, it is necessary to clarify whether or not there exist thresholds of intake beyond which this behaviour is considered to pose a threat to health and below which it can be considered safe. The UK Government has provided guidelines which include such thresholds: originally, these suggested that males' weekly alcohol consumption should not exceed 21 units while that of women should not exceed 14 units, but the limits were relaxed at the end of 1996 to 28 units for men and 21 units for women (Prescott-Clarke and Primatesta, 1996). This relaxation was made without new evidence having come to light, however, and many health promotion and alcohol agencies have been reluctant to adopt the new guidelines (Bennett & Murphy, 1997) with some making recommendations which span both sets: the Food Standards Agency (FSA), for example, advocates maximum daily intakes of two to three units per day (14 to 21 per week) for women and three to four units per day (21 to 28 per week) for men (FSA, 2003). Since the existence of fixed thresholds below which an intake of alcohol is entirely risk-free and beyond which it suddenly becomes hazardous to health seems unlikely, the exact limits recommended in such guidelines could, however, be considered somewhat arbitrary and it is more logical to suppose that, as with smoking, the risks to health increase with the extent to which the behaviour is performed - in this case, with the amount of alcohol consumed. One piece of advice which has been consistently applied is that discouraging the intake of large quantities of alcohol on any single occasion (binge drinking).

A linear, or even a monotonic relationship of this kind has, however, been called into question by the results of some studies which imply that risks to health might not only result from heavy alcohol consumption but also from only drinking very small amounts or from abstaining completely (e.g. Friedman and Kimball, 1986; Grønbæk, Becker, Johansen, Gottschau, Schnohr, Hein, Jensen & Sørensen, 2000); Sacco, Elkind, Boden-Albala, Lin, Kargman, Hauser, Shea & Paik, 1999). Unfortunately, these studies have tended to include, within their samples of 'non-drinkers', some formerly heavy drinkers who had become teetotal in response to having developed alcohol-related health problems. The reliability of their findings have therefore been called into question (Marks, Murray, Willig and Evans, 2000; Ogden, 2000; Sarafino, 2002). Despite this problem, the

FSA does claim some advantage of drinking between one and two units per day, but only in men aged over 40 and in post-menopausal women (FSA, 2003), and it has been concluded that there is insufficient evidence to recommend the observance of any minimum level of alcohol consumption (Royal Colleges of Physicians, 1995).

Regardless of general levels of alcohol consumption, various risks to health are associated with individual occasions of heavy intake (Taylor, 2003; Sarafino, 2002). These arise from associated increases in aggression (e.g. domestic, and other, violence), decreases in inhibitions (e.g. sexually transmitted diseases and unwanted pregnancies) and from decreases in co-ordination combined with a reduced capability for making sound judgements (e.g. road traffic accidents). Heavy drinking in pregnancy can result in spontaneous abortion, low birth weight or fœtal alcohol syndrome (Marks et al, 2000).

The risks of developing any of a number of disorders have been found to increase when the use of alcohol is both heavy and regular. These disorders include: hypertension and CHD; CVA; cancers of the mouth, throat and pancreas; and a range of cognitive impairments resulting from irreversible neurological damage (Bennett and Murphy, 1997; Marks et al, 2000; Ogden, 2000; Taylor, 2003). The disease most commonly associated with a high intake of alcohol, however, is cirrhosis of the liver (Anderson, Cremona, Paton, Turner and Wallace, 1993) and those with this condition often go on to develop liver cancer, which is the leading cause of death resulting from alcohol use (Schmidt, 1977; Anderson et al, 1993). Overall, Doll and Peto (1981) estimate alcohol to be responsible for 3% of all deaths caused by cancer but, as Schmidt (1977) points out, since most heavy drinkers also smoke cigarettes, it is difficult to establish the exact proportion of cancer deaths which can be attributed to the effects of alcohol over and above those of smoking. A combination of the two behaviours can be shown to have severe consequences, however, and a clear example of such a magnification of effect is provided by Smith and Jacobsen (1988) who report a 44-fold increase in cancer of the oesophagus in those who both drink heavily and smoke. Similar escalations of risk might be expected in the other disorders in which both alcohol consumption and smoking are implicated, such as coronary heart disease, for example.

Consumption of alcohol is prevalent in the UK, as can be seen by some key findings of the 2001 General Household Survey (ONS, 2002), presented in Table 1.1.2, below,

relating to the weekly drinking behaviour of males and females in the UK. The authors of the survey point out that it is difficult to obtain reliable information about drinking behaviour and that social surveys consistently record lower levels than would be expected from alcohol sales. This problem is attributed to social desirability effects (in the case of deliberate under-reporting) and from accidental under-estimation of the quantities of alcohol consumed at home where, in contrast to the normal practice at licensed premises, measures are not generally dispensed in multiples of exact units of alcohol. Even if the results presented below are taken merely at face value, however, they show the prevalence and extent of alcohol consumption in the UK to be sufficient to give cause for concern.

While some of the health problems in which alcohol has been implicated are irreversible, stopping drinking altogether has been shown to result in a gradual decrease in the risks of premature death over a period of several years (Sarafino, 2002). However, if it is accepted that any intake of alcohol poses some threat to the majority of the population, then up to three-quarters of males and up to three-fifths of females are risking their health for the sake of a drink. Even if this claim is not accepted, it is still clearly the case that around a quarter of men and up to a seventh of women are at risk from their drinking behaviour.

TABLE 1.1.2ii Drinking Behaviour in the UK in 2001

Weekly Drinking Behaviour	% of Males	% of Females
Consumption of at least one alcoholic drink	75	59
Consumption of alcohol on at least 5 days	22	13
Consumption leading to intoxication on at least one day	21	10
Consumption in excess of 21 or 14 units*	27	15
Consumption in excess of 50 or 35 units*	6	3

* these figures refer to the limits about which males and females, respectively, were asked

1.1.2iii POOR NUTRITIONAL INTAKE

Dietary intake has a central role in the promotion of health and the prevention of illness and nutritionally-related health problems can result not only from deficiency but also from excess (DoH, 1991). Diet has been estimated to account for more than 40% of the incidence of cancer (Fitzgibbon, Stolley, Avellone, Sugerman and Chavez, 1996) and for between a quarter and a third of all cancer deaths (Bejekal, Primatesta & Prior, 2003;

Austoker, 1994; Doll and Peto, 1981). The cancers most strongly associated with nutritional intake, unsurprisingly, originate in the gastrointestinal tract (in the colon, stomach and pancreas), but diet has also been shown to play a part in the incidence of oral, pharyngeal, oesophageal, breast and prostate cancers (Sarafino, 2002; Thomas, 1996; Steinmetz, Kushi, Bostick, Folsom & Potter, 1994; WHO, 1990; Kannel & Eaker, 1986). In addition to these associations with cancer, poor nutritional intake has also been attributed with causing up to a third of all UK deaths from CHD (DoH, 2002) and is strongly implicated in the development of hypertension, CVA, bowel disorders, obesity, diabetes and arthritis (Taylor, 2003; Bennett and Murphy, 1997; Thomas, 1996).

The precise relationships in operation between particular types of food and particular health problems are not necessarily straightforward, however, and foods may act in combination as well as individually in order to exert their influence. For example, while high-fat foods (such as eggs, dairy products and fatty meats) have been implicated in raising serum cholesterol and thereby also in increasing the risks of hypertension and CHD (Sarafino, 2002), diets which are high in fat but which are also low in both fibre and anti-oxidants (found in fruit and vegetables) are associated with increased incidence of diet-related cancers (Sarafino, 2002; Austoker, 1994; WHO, 1990). In general terms, Thomas (1996) claims that, particularly when combined with a sedentary lifestyle and smoking, diets high in fat, sugar and salt and low in starchy carbohydrates, fibre, vitamins and minerals have a considerable influence on the development of CHD, CVA, some forms of cancer and obesity. Further magnification of risks to health, however, can arise from a combination of detrimental dietary factors with other health-compromising behaviours: when a low intake of fruit and vegetables occurs in conjunction with smoking and heavy drinking, for example, the risk of oral, pharyngeal and oesophageal cancers is markedly increased (WHO, 1990).

Thomas (1996) has claimed that, despite a sense among the general public that expert opinion is in a state of flux, a consensus does exist with respect to the mix of nutrients in the diet most likely to foster optimum health. The guidelines provided by the Food Standards Agency (FSA, 2003), which are presented in Table 1.1.2iiia, overleaf, are in line with this consensus:-

TABLE 1.1.2iiia Food Standards Agency Advice About Different Food Types

Food Type	Advice
Bread and Cereals	Should comprise about one-third of daily diet
Fruit and Vegetables	5 portions should be eaten daily
Fats and Sugars	Intake of these should be kept to a minimum
Dairy Foods	Lower fat versions should be consumed
Salt	Less than 6g should be eaten daily
Meat, Fish, Eggs and Pulses	High-fat products should be avoided; fat should be removed from meat and the skin from poultry; two portions of fish should be eaten weekly, one from an oily fish

Data regarding the extent to which diets deviate from these recommendations is not always readily available. However, some useful information can be found in the reports of the annual Health Survey for England (HSE) which, in some years, has focused on nutritional, or nutritionally-related concerns. The 1991 HSE, for example found serum cholesterol levels to be raised in more than two-thirds of the population (White, Nicholaas, Foster, Browne and Carey, 1993), suggesting a prevalence of high-fat intakes. In addition, the 2001 HSE shows that only 24% of males and 28% of females eat the recommended five daily portions of fruit and vegetables. It is clear from these data that diets of those resident in England are deviating in at least some respects from those recommended for optimum health. Similar deviations would be expected across modern Western societies. Further evidence that Western diets do not conform with recommendations comes from findings relating to obesity, which is "an excessive accumulation of body fat" (Taylor, 2003, p.116). Although the exact causes of obesity are not clear and genetic predisposition plays a substantial part, an excessive dietary intake of fat is also known to be associated with the condition (Ogden, 2000) and many people's intake of calories now far exceeds their needs (Thomas, 1996), which must also have a bearing. The speed of recent increases in the incidence of obesity (presented in Table 1.1.2iiib, below) seem unlikely to have resulted from similarly rapid increases in genetic predispositions over the same period of time.

The most commonly used method of classification of obesity and overweight is currently Body Mass Index (BMI = weight divided by squared height[5]). The following categories of

[5] where weight is measured in kilograms and height in metres

BMI have been agreed: underweight = less than 20; healthy weight = 20 - 24.9; overweight = 25 - 29.9; obese = 30 - 39.9; very obese = 40 and above. However, since only very small proportions have been classified as being very obese in the UK, the last category is rarely used and figures given for obesity usually incorporate those who would fall within it. This practice will also be followed here.

In the UK, 6% of men and 8% of women were obese in 1980 (Ogden, 2000) but these rates increased significantly over the decade which followed (White et al, 1993), resulting in the formation of one of the key aims stated in *The Health of the Nation*, which was that the 1980 rates should be regained by 2005 (DoH, 1991). However, only four years later, this expectation had been shown to be unrealistic and, in a revised prediction, it was anticipated that by 2005 the actual incidences of obesity would be 18% for men and 24% for women (DoH, 1995). As the figures presented in Table 1.1.2iiib show, even these revised estimates were overly conservative: obesity has trebled in women since 1980 and, by 2001, was already at the level predicted for 2005, while the proportion of the male population which was obese in 2001 had already exceeded that anticipated for 2005 and there were, by then, 3.5 times as many obese men than in 1980:-

TABLE 1.1.2iiib Trends in Weight in England, 1993 to 2001*

		Bi-annual Percentages				
		1993	**1995**	**1997**	**1999**	**2001**
Obese	**Males**	13	15	17	19	21
	Females	*16*	*18*	*20*	*21*	*24*
Overweight	**Males**	44	44	45	44	47
	Females	*32*	*33*	*33*	*33*	*33*
Healthy Weight	**Males**	38	36	34	33	28
	Females	*44*	*43*	*40*	*39*	*38*
Underweight	**Males**	5	4	4	5	4
	Females	*7*	*7*	*7*	*7*	*7*

* Source: Bejekal, Primatesta & Prior (2003)

It can be seen that, alongside the steady increases which occurred in obesity between 1993 and 2001, equivalent decreases occurred in the proportions of males and females who were of healthy weight, with just 28% of males and 38% of females falling into this latter category by 2001. A further trend, towards an increasing incidence of overweight in men, might be indicated by the 3% increase which was observed between 1999 and 2001,

although no firm conclusion can be made about this until further figures are reported. While it can be seen that the trends in this country are far from ideal, the problem is greater elsewhere, with 60% of the population of the US, for example, currently being overweight and a further 27% being obese (Koretz, 2001). If the proportions of the US population who are underweight are similar to those in the UK, then only about 7% are likely to be of healthy weight.

These figures are clearly not acceptable, particularly when it is considered that obesity has been held responsible for more than 300,000 deaths per annum in the United States alone (Allison, Fontaine, Manson, Stevens and VanItallie, 1999) and Kopelman (2000) has proposed it to be overtaking malnutrition as the key dietary contributor to poor health across the world. Disorders with a raised incidence in obese individuals include vascular disease, diabetes, joint problems, back pain, some cancers, hypertension, kidney disease, gallbladder disease and arthritis (Taylor, 2003; Ogden, 2000) and the condition also results in raised risks associated with surgery, anaesthesia, and childbirth (Thomas, 1996; Brownell and Wadden, 1992). The greatest risks, though, come from significantly increased mortality from CHD, CVA, diabetes and some cancers (Thomas, 1996). However, the usual treatment of obesity and overweight, which is attempting to restrict dietary intake, can itself pose a range of threats to both physical and psychological health (Taylor, 2003; Ogden, 2000; Brownell, 1991), so the top priority of health promoters must be to prevent healthy weight individuals from becoming overweight or obese. One step towards achieving this is to identify the influences on eating behaviours.

1.1.2iv LACK OF PHYSICAL EXERCISE

A sedentary lifestyle has consistently being associated with decreased life expectancy (e.g. Taylor, 2003; Sarafino, 2002; DoH, 2001; Ogden, 2000; ONS, 1998) and the regular performance of exercise has been shown to confer major benefits on both physical and psychological health and to increase expected length of life by between one and three years by the age of 80 (Taylor, 2003; Sarafino, 2002; DoH, 2001; Ogden, 2000; ONS, 1998; Bennett and Murphy, 1997; Blair, Piserchia, Wilbur and Crowder, 1986; Paffenbarger, Hyde, Wing and Hsieh, 1986). It is generally recommended that, in order to achieve the full benefits of exercise, at least 30 minutes of moderately intense activity

(such as brisk or fast walking, heavy housework, heavy gardening or DIY, swimming, cycling, jogging and skipping) on at least five days each week are required (Taylor, 2003; Sarafino, 2002; DoH, 2001; ONS, 1998). Table 1.1.2iv, below, gives details of the wide range of the benefits which have been shown to be associated with adherence to these recommendations.

TABLE 1.1.2iv Benefits of Exercise to Health*

Features Increased/Improved in Those Who Follow Recommendations	Features Decreased/Less Likely in Those Who Follow Recommendations
Cardiovascular fitness and efficiency	CHD (about $^1/_3$ of cases could be prevented)
Respiratory system efficiency	Myocardial infarction
Muscle power and tone	CVA (about $^1/_4$ of cases could be prevented)
Stamina	Hypertension
Soft tissue and joint flexibility	Serum Cholesterol
Weight control	Overweight and obesity
Glucose tolerance	Diabetes
Self-esteem	Osteoporosis
Self-efficacy	Cancers of the colon, breast and prostate
Ability to cope with stress	Smoking and alcohol intake
Work performance	Anxiety
Mood and general well-being	Depression

* Sources: Taylor (2003), Sarafino (2002); DoH (2001), Ogden (2000), ONS (1998), McDonald and Hodgson, (1991); Blair et al (1986)

However, the Caerphilly study (Yu, Yarnell, Sweetnam and Murray, 2003) has recently provoked some controversy with respect to these guidelines: the authors found that, in men aged 49-64 years who had neither a history nor clinical evidence of CHD at baseline, leisure time physical activity of "moderate intensity" had no bearing on the risk of premature death over an average follow-up period of 10.5 years. On the other hand, short daily bursts of "heavy intensity" activity were significantly associated with lower levels of risk. While initially appearing to invalidate the generally accepted guidelines, however, the study exhibits a number of methodological flaws which bring the value of its findings into question. Firstly, some of the activities classified as "heavy intensity" (such as jogging, swimming and heavy digging, for example) are more commonly considered to be only moderately intense (e.g. Taylor, 2003; ONS, 1998), making it difficult to conclude that meaningful differences exist between the findings of this study and those of the existing literature. Secondly, the measure of participants' energy expenditure covered only the 12 months immediately prior to the study – a period of time which represents a very small

proportion of participants' adult life and which fails to take into account any recent changes in previously habitual behaviour. The study cannot therefore be said to have assessed the long-term benefits of engaging in activity of different frequencies and/or levels. Finally, the sample used in this study was highly restricted, consisting entirely of males residing in Caerphilly, South Wales, and the immediate surrounding area. Overall, therefore, the results of the study cannot be considered to represent a conclusive challenge to existing recommendations with respect to the frequency and intensity of exercise required in order that health and longevity be optimised.

General population participation in leisure time physical activity has traditionally been low. Until the early 1960s, this was because sport and exercise were widely viewed as elitist activities, appropriate only for those who were, or who were aiming to become, among the best in their field (Ogden, 2000). However, with mounting awareness of the benefits which can follow from taking regular exercise, it has now become seen as an activity for all (Ogden, 2000) and the proportion of the populace who engage in it has increased substantially, such as in the US, for example, where the proportion doubled between 1960 and 1980 (Serfass and Gerberich, 1984). Doubling a very small proportion does not lead to large increases in numbers, though, and the majority of those living in the developed world still undertake only minimal and/or irregular exercise and lead mainly sedentary lifestyles (Sallis and Owen, 1999; USBC, 1999). For example, it has consistently been estimated that about a quarter of the American population engage in no physical activity at all in their leisure time and that up to another third of the population fail to do so to recommended levels (e.g. Taylor, 2003; Ivancevich and Matteson, 1989). The most recent statistics for the UK come from 1998, and are even worse than these estimates for the US population: in this country, at that time, over three-quarters (76%) of women and just under two-thirds (64%) of men failed to exercise to recommended levels (ONS, 1998). Again, the behavioural choices made by significant proportions of the UK population can be seen to have serious implications for the health of the individuals concerned.

1.1.3 IMPLICATIONS FOR HEALTH PSYCHOLOGISTS

The information presented above shows that, in both the UK and other developed countries, there are currently high incidences of behaviours associated with high health risks and low incidences of those known to foster good health. It also demonstrates the clear and substantial risks to both health and longevity which many individuals are facing, or will face in the future, as a result of their behaviour. It is therefore vital that every effort be made both to identify those factors which have a significant bearing on the initiation and maintenance of health-promoting behaviours and the elimination of health-compromising ones and to develop an understanding of the ways in which these exert their influence. Only then will it be possible to develop reliably effective intervention strategies.

A question that might be raised, though, is whether this is an appropriate area for health psychologists to be concerning themselves with or whether it ought to be left to health promoters and/or other health care professionals. The definition of health psychology which has been adopted by the Health Psychology divisions of both the American and British Psychological Societies (Matarazzo, 1982, p.4) strongly suggests the former to be the case, as it states that:-

> *Health psychology is the aggregate of the specific educational, scientific, and professional contributions of the discipline of psychology to the promotion and maintenance of health, the prevention and treatment of illness, the identification of aetiologic and diagnostic correlates of health, illness, and related dysfunction and to the analysis and improvement of the health care system and health policy formation.*

Recently, however, this definition has been criticised as being over-inclusive and the proposal has been raised that health psychology be confined to the area of 'behavioural health' (McDermott, 2001). Here, again, Matarazzo has provided a definition, describing behavioural health as being: "...specifically concerned with the maintenance of health and the prevention of illness and dysfunction in currently healthy persons." (Matarazzo, 1980, p.807). Since even this restricted definition retains those features of the original which are most closely allied with the identification and understanding of influences on health

behaviour performance, it merely serves to strengthen the case in favour of health psychologists concerning themselves with this issue. It is not surprising, then, that health psychologists have already been highly active in this field. Since there was a general move, in the latter part of the twentieth century, towards a greater focus on intra-active (i.e. internal) aspects of the individual than on either environmental (i.e. external) factors or on an interaction between the two (Ogden, 1995a,b), it is also not surprising that these health psychologists have concentrated their efforts largely on investigating the influence of certain cognitive factors on health behaviour performance. The particular subset of cognitive factors which have received most attention are known as social cognitions.

Social cognitions are concerned with how individuals perceive and explain their social environment and the events which occur within it, including their own actions and those of others (Conner & Norman, 1996; Stainton Rogers, 1991). Since health and illness are states of being which both affect and are affected by individuals' social environments, the perceptions and explanations people develop about them are a specific sub-group of social cognitions. Social cognitions are now widely believed to exert a strong influence over behaviour (Conner and Norman, 1996; Ajzen, 1985) and have therefore received consideration attention in investigations of influences on the performance of health behaviours. Examples of cognitions commonly explored in this area include:-

- perceptions of personal susceptibility to develop particular conditions and beliefs about the severity of these conditions;
- beliefs about the likely outcomes of health-related behaviours and evaluations of these outcomes;
- barriers to, and costs associated with, particular health behaviours;
- social norms concerning specific health behaviours and motivation to comply with these;
- behavioural intentions;
- a range of personal control beliefs, including self-efficacy and perceived behavioural control.

While some investigators have employed such social cognitions singly, or in *ad hoc* combinations, the vast majority have utilised one of a number of Social Cognition Models (SCMs) which have been developed in recent years. SCMs can be subdivided into two

distinct types (Conner & Norman, 1996): the first type, Attribution Models, which are concerned with the causal explanations formed by individuals in relation to health-related events, have generally been applied in investigations of how people respond to the development of serious illnesses; it is the second type, those concerned with explaining and predicting variations in the performance of health-related behaviours and outcomes, which is of interest here and which will now be evaluated.

1.2 Social Cognition Models & the Performance of Health Behaviours

King and Wright (1991) found a total of 14 SCMs to have been used in attempts to account for variations in the performance of health behaviours, including:-

- The Health Belief Model (Rosenstock, 1966; Becker, 1974; Becker & Rosenstock, 1987);
- Protection Motivation Theory (Rogers, 1975);
- The Theory of Reasoned Action (Fishbein & Ajzen, 1975);
- The Theory of Planned Behaviour (Ajzen, 1985);
- The Theory of Trying (Bagozzi & Warshaw, 1990).

Although there are differences across these models in terms of the variables they incorporate, the ways in which these are measured and the ways in which they are proposed to combine together in order to predict and explain outcomes, there are also some common fundamental assumptions:-

- that rational processes are in operation in human decision-making;
- that the cognitive structures underlying expressions of attitudes and beliefs are both stable and accessible by means of self-report questionnaires;
- that the relationships between predictor and outcome variables are linear.

These assumptions will be raised in later sections of this thesis. First, though, the degree to which the SCM approach has succeeded in identifying and understanding influences on the performance of health behaviour will be evaluated. Since it is beyond the scope of the thesis to evaluate all of the models, two will be reviewed as exemplars: the Health Belief Model (HBM) and the Theory of Planned Behaviour (TPB). The HBM has been selected for inclusion here because it was the first model which explicitly linked social cognitions and the performance of health behaviours and because it has been extensively used over a period of almost 40 years. The TPB has been chosen both because has it has fared well in comparisons with other models, with respect to explaining and predicting outcomes, and also because it has become, over the past few years, the most widely used of all the SCMs.

1.2.1 THE HEALTH BELIEF MODEL

The Health Belief Model was initially developed by Rosenstock (1966) and is based on the assumption that people become motivated to engage in preventive behaviour when faced with a perceived threat to their health. The model incorporated the following five cognitive influences on the performance of such behaviour:-

- a perception of personal susceptibility in relation to a given health problem
- the perception of this problem as being severe
- the perceived benefits of a relevant health behaviour
- the perceived barriers to this behaviour, including any associated costs
- cues to action (either internal, such as physical symptoms, or external, such as advice received from a doctor)

According to Rosenstock's outline of the model, the first two cognitions combine together in order to give a perception of personal threat in relation to the health problem in question, while the second two are weighed against each other in a cost-benefit analysis of the health behaviour considered likely to reduce or remove the threat. Cues to action are proposed to increase the chances of the behaviour being performed in cases where the combined effects of the above influences are insufficiently powerful to ensure this will occur. A sixth predictor, general health motivation, was added in a revision of the model

by Becker (1974), who argued this to be essential for the other variables to be considered to have personal salience.

While early applications of the HBM tended to focus on circumscribed preventive health behaviours, such as the uptake of immunisations (Rosenstock, Strecher & Becker, 1988), it has since been much more widely applied (Sheeran & Abraham, 1996). The breadth of application of the model was demonstrated by the results of a literature search for papers with *Health Belief Model* in the title[6]. Sixty empirical papers with one or more health-related behaviours as outcome variables were elicited by the search and, although HIV-related behaviours were the subject of a full third of these (e.g. Winfield & Whaley, 2002; Volk & Koopman, 2001; Lollis, Johnson & Antoni, 1997; Neff & Crawford, 1998; Lux & Petosa, 1994a, 1994b), many other types of action were also targeted, including:-

- compliance with medical treatment regimens, including those for: psychiatric conditions (Cohen, Parikh & Kennedy, 2000; Kelly, Mamon & Scott, 1987), insulin-dependent diabetes mellitus (IDDM; Bond, Aiken & Somerville, 1992) and CHD (Oldridge & Streiner, 1990);
- a range of screening behaviours, including: mammography (Pakentham, Pruss & Clutton, 2000; Stein, Fox, Murata & Morisky, 1992), cervical smear tests (Bish, Sutton & Golombok, 2000; Burak & Meyer, 1997), amniocentesis (French, Kurczynski, Weaver & Pituch, 1992) and preventive dental care (Chen & Land, 1986);
- cycle helmet use in children (Quine, Rutter & Arnold, 1998; Witte, Stokols, Ituarte & Schneider, 1993);
- breast self-examination (Millar, 1997; Champion, 1987);
- skin cancer protective behaviours (Carmel, Shani & Rosenberg, 1996, 1994);
- coronary heart disease preventive behaviours (Ali, 2002);
- breast feeding practices (Sweeney & Gulino, 1987).

Interestingly, the four key behaviours discussed earlier in this chapter were represented in only 18% of the studies elicited by the search, with seven papers including aspects of nutritional intake as dependent variables (e.g. Chew, Palmer & Soohong, 1998; Sapp & Jensen, 1998; Schafer, Keith & Schafer, 1995), two relating to exercise (Silver Wallace,

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[6] using the PsycInfo databases and covering the period from 1966 to the end of July 2003

2002; O'Connell et al, 1985) and just one each concerning smoking (Knight & Hay, 1989) and the misuse of alcohol (Bardsley & Beckman, 1988).

Most of the studies raised by the search provided at least some support for the HBM and, in the first major review of the model, Janz and Becker (1984) provide a largely favourable evaluation, citing much empirical evidence in its favour and recommending that consideration of its dimensions form part of future health education programmes. Other authors have made less positive comments in relation to the model, however. For example, Oliver and Berger (1979) describe it as...: "more a collection of variables than a formal theory or model" (p.113) and Herold (1983) reinforces this point by arguing that studies have failed to demonstrate that the HBM, as an integral model, has anything to add over and above the individual influences of its component variables. More recently, a meta-analytic review by Harrison, Mullen and Green (1992) found only relatively weak relationships to exist between the core component variables of the HBM and behavioural outcomes. Evaluations of the model provided by the authors of health psychology textbooks are also generally quite guarded. Taylor (2003), for example, suggests that it explains health habits "quite well" (p.67) and Ogden (2000, p.26) concludes only that "elements" of the model "may predict" certain health-related behaviours.

The reasons that the HBM has not received more uniformly positive evaluations fall into three categories: first, it has been criticised on theoretical grounds; second, applications of the model suffer from some important methodological limitations; and finally, a number of difficulties have arisen in relation to the performance of the model in practice.

On a theoretical level, the most fundamental criticism that has been lodged against the HBM is that neither Rosenstock nor Becker provided clear operational definitions of exactly how its component variables might combine to exert their joint influence over the performance of health behaviours (Quine et al, 1998; Sheeran & Abraham, 1996; Harrison et al, 1992). This omission has forced researchers into interpreting the model for themselves, with the inevitable result that various different working versions have been adopted. The most common of these is an additive model, in which the combined weight of the component variables is used to predict outcomes (e.g. Ali, 2002; Sage, Southcott & Brown, 2001; Volk & Koopman, 2001). While this is by far the most straightforward approach to take and, given the lack of clear directions to the contrary, arguably also the

most sensible, it is also this practice which has left the HBM vulnerable to questions, such as those of Oliver and Berger (1979) and Herold (1983), concerning the extent to which, if any, the model as a whole is able to add to the explanations of health behaviour performance provided by its component variables.

Other researchers, taking a different approach, have chosen to pair component variables together in order to produce joint predictors of outcomes. In some cases, for example, the proposed 'weighing up' of perceived benefits and perceived barriers/costs has been operationalised by the subtraction of scores on a measure of the latter construct from those on a measure of the former (e.g. Bond et al, 1992; Wyper, 1990; Oliver and Berger, 1979). The other common pairing that can be observed has been made in order to achieve a composite variable of the perception of threat. In this instance, two alternative approaches have been taken to the formation of a composite measure: while some researchers have simply summed participants' susceptibility and severity scores (e.g. Witte et al, 1993; Bond et al, 1992; Wyper, 1990), others have multiplied each individuals' scores on the two measures together (e.g. Schafer et al, 1995; Conner & Norman, 1994; Hill, Gardner & Rassaby, 1985). Overall, although combining variables to produce joint predictors reduces the risk that the HBM will be accused of having no added value in comparison to that of its component parts, the existence of a variety of practices in connection with the operationalisation of the model do make cross-study comparisons more difficult and, as Harrison et al (1992) claim, the lack of homogeneity has also significantly weakened the status of the HBM as a coherent model of the influences on health behaviours.

In addition to these criticisms, a number of authors have argued that the model is overly restricted in scope, with many pointing particularly to the lack of explicit attention paid to sociocultural and economic factors, which are only mentioned as background influences on the component variables (e.g. Taylor, 2003; Winfield & Whaley, 2002; Ogden, 2000; Neff & Crawford, 1998; Vanlandingham, Suprasert, Gandjhean & Sittitrai, 1995; Petosa & Jackson, 1991). Behavioural intentions and self-efficacy have both also been raised as important omissions (Sheeran & Abraham, 1996; Schwarzer, 1992b). With respect to intentions, Becker, Maiman, Kirscht, Haefner and Drachman (1977) suggest that these might mediate between the component variables of the HBM and outcome measures. However, although some researchers have incorporated measures of intention in their

studies, most of these have used it in place of, rather than in addition to, a behavioural outcome as the dependent variable (e.g. Munley, McLoughlin & Foster, 1999; Kloeben & Batish, 1999; Bakker, Buunk, Siero & van den Eijnden, 1997; Lux & Petosa, 1994a, 1994b; Petosa & Jackson, 1991). In the few cases where both intentions and behaviour have been included, rather than attempting to establish a possible mediating effect of intentions, researchers have tended simply to treat the two variables as separate dependent measures (e.g. Burak & Meyer, 1997; Edem & Harvey, 1994; Stein et al, 1992).

Taking note of the criticisms relating to the absence of self-efficacy in the model, Rosenstock et al (1988) did suggest that this variable be added as an additional component. However, in a repeat of Rosenstock's previous vagueness over operational definitions, there was no clear direction for how it was expected to combine with the other component variables in predicting and explaining outcomes and, possibly as a result of this, few researchers have taken up the suggestion. In those cases where they have done so (e.g. Silver Wallace, 2002; Chew et al, 1998) self-efficacy has simply been included as an independent predictor in analyses, adding further fuel to the arguments that the HBM is no more than the sum of its parts.

In a final criticism of the model from a theoretical perspective, Schwarzer (1992b) argues against the lack of attention paid, within the model, to process issues. This criticism could be lodged against any of the SCMs, however, and will be addressed in a wider discussion of this issue which is presented in Chapter 3.

Moving on to methodology, a number of difficulties were raised in the meta-analytic review of original, peer-reviewed papers incorporating the HBM which was carried out by Harrison et al (1992). Having identified 147 such papers, the authors then rejected from their review any which failed to include measures of the core component variables of susceptibility, severity, benefits and barriers[7] as well as any which did not provide details of the reliability of the measures used and/or which did not use a behavioural outcome as the dependent variable. These important limitations were found in all but 16 of the original pool of 147 papers, highlighting some major deficiencies in HBM research. Having carried out their review of these 16 papers, Harrison et al then raised concerns about the extent to

[7] Cues to action were not considered to have been sufficiently addressed by the literature to warrant a separate mention in this criterion, but no reason was given for the absence of general health motivation.

which the component variables, as assessed in practice, are equivalent across studies. One reason underlying this problem may relate to the lack of standard measuring instruments for the component variables which was highlighted by Sarafino (2002) and which further emphasises the difficulties inherent in attempting to make reliable cross-study comparisons with respect to the HBM.

A further methodological failing with the research in this area concerns the design adopted in studies: 40 out of the 60 papers elicited by the aforementioned literature search reported cross-sectional studies and a further three were retrospective. Only 15% of the studies were either prospective (n = 9) or longitudinal (n = 3) and the results of these differ widely, raising important questions about the ability of the HBM and its components to predict future behaviour, rather than merely explaining current or past activities.

Taking the longitudinal studies first, Chew et al (1998) found behaviour to be influenced by susceptibility and efficacy (mediated by health motivation and salience), but Sage et al (2001) found only perceived benefits and barriers to have significant effects and, in the third study, severity was the only component variable to be predictive of long-term behavioural outcomes (Montgomery, Joseph, Becker, Ostrow et al, 1989)[8]. In the prospective studies by Nexoe, Kragstrup and Sogaard (1999), Jones, Jones and Katz (1988), Calnan and Moss (1984) and Becker et al (1977), HBM variables showed significant relationships with behavioural outcomes[9], but the results of some other studies adopting this design failed to support the model. Hyman et al (1994), for example, showed perceived barriers to positively influence uptake of mammography screening when, according to the model, this relationship should have been negative. Witte et al (1993) found cues to action to have no bearing on cycle helmet use, and, in Bish et al (2000), no significant account of cervical screening was provided.

Several difficulties with the performance of the HBM are evident regardless of the type of research design employed in studies. These can be divided into the following broad areas: the direction of relationships between the component variables of the model and

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[8] The target behaviours of these three studies, respectively, were: nutritional behaviour, continuous positive airway pressure in individuals with obstructive sleep apnoea and HIV-preventive behaviours.

[9] The respective outcomes of these studies were: acceptance of influenza vaccinations; compliance with Emergency Department follow-up attendance recommendations; attendance at, and compliance with, a breast self-examination class; and mothers' adherence to diets prescribed for their obese children.

behavioural outcomes; the extent to which the model can be generalised across different sub-groups; the degree of consistency with which the component variables predict outcomes; and, finally, the proportions of variance in outcomes which the model has generally explained.

With respect to the relationships between the component variables and behavioural outcomes, these have sometimes been found to occur in the opposite direction to that proposed under the HBM. One example of this is the positive relationship between barriers and behaviour, mentioned earlier, which was found by Hyman et al (1994). Another can be observed in the studies reported by Langlie (1977) and Becker, Kaback, Rosenstock and Ruth (1975), both of which identify a negative, rather than a positive, relationship between perceived susceptibility and behaviour. In Bond et al (1992), several findings cast doubt on the relationships proposed under the terms of the HBM. For example, high scores on a joint measure of benefits minus costs (B-C) were associated with both high and low levels of self-reported compliance with treatment for IDDM, rather than just the former. In addition, compliance scores were observed to be the greatest where high B-C scores were combined with low (rather than high) perceived threat while a combination of both high B-C and high threat (instead of low scores on each) were present in those with the poorest compliance. When a measure of metabolic control was used to assess compliance objectively, high perceived threat scores were again evident in those with the poorest levels of compliance but, in this case, only when in combination with high scores on the cues to action measure, which should also have been predictive of more, rather than less, compliance. Cues were (as would be predicted) strongly in evidence in those with the best metabolic control but, in these cases, perceived threat was low, again going against the proposals of the model. Taken together, Bond et al's findings suggest, firstly, that the modes of operation of the relationships proposed under the terms of the HBM may vary according to the outcome under investigation and, secondly, that they might also be far more complex than either Rosenstock or Becker have appreciated.

The second area of difficulty in the performance of the HBM relates to the extent to which it may be generalised across various sub-groups, with differences in its performance having been observed according to age, ethnicity and gender. In relation to age, for example, Carmel et al (1994) found the model to explain skin cancer protective behaviours of older kibbutzniks (aged 45 years and above) much better than those of a younger group (aged 15

to 29 years). Conversely, Petosa and Jackson (1991), report the model to account for reducing proportions of variance in adolescents' intentions to adopt safer sex behaviours with increasing age: while it explained 43% of the variance in the intentions of those in the seventh grade, it accounted for just 17% of that of eleventh grade pupils.

Racial-ethnic differences were highlighted by Neff and Crawford (1998) in their investigation of influences on the performance of HIV-risk behaviours by African-, Anglo- and Mexican-Americans. They found that, while HBM component variables explained 16% of the variance in the performance of such behaviours in Mexican-Americans, they accounted for only 5% in African-Americans. When the different variables were considered individually, perceived benefits were related to HIV-risk behaviours in Mexican-American females alone, while perceived barriers were predictive in Mexican-Americans and Anglo-American males, but not in either the African-American group or in Anglo-American females. Further cross-ethnic differences were found by Quah (1985) in relation to three Singaporean ethnic groups: Chinese, Indian and Malay. For example, while perceived benefits and barriers explained 42% of preventive practices and 21% of regular exercise in the Indian group, the maximum explanation of any of five health behaviours in Malays was the 5% of variance in the taking of regular exercise which was explained by perceived susceptibility. Overall, Quah was led to conclude that: "...the explanatory power of the HBM weakens considerably when it is tested in different cultures and among different ethnic groups" (p.357).

Several studies have demonstrated differences in the predictive utility of the model across the sexes. As well as those findings just outlined from Neff and Crawford's study, Lollis et al (1997) found both the model overall and its component variables to be more predictive of variance in women's sexual risk behaviours than in those of men and Rosenthal, Hall and Moore (1992) found that while the HBM was able to predict sexual risk taking with respect to casual partners in women, it failed to do so in men. In addition, the studies by Munley et al (1999) and Schafer et al (1995) both show different component variables to be predictive of the behavioural outcomes of males and females[10]. Generally speaking, therefore, the HBM appears to have limited generalisability across different age and ethnic groups and to function better in predicting the behaviour of women than of men.

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[10] Re: health check attendance and the proportion of dietary calories obtained from fat, respectively.

The third difficulty highlighted by studies using the HBM is that the component variables do not consistently predict behavioural outcomes, with the exception of perceived severity which has been shown to be a consistently weak predictor (e.g. Neff & Crawford, 1997; Bond et al, 1992; Quine et al, 1998; Kelly et al, 1987; Janz & Becker, 1984). In their review, Janz and Becker (1984) concluded that the strongest predictions are provided by perceived barriers and Quine et al (1998) have recently found these to be significantly predictive of cycle helmet use. In Lollis et al (1997), however, barriers provided non-significant explanations of the variance of behaviour in males and only inconsistently significant ones in females. Similarly, significance was only achieved in Neff and Crawford (1998) in relation to the behaviour of the African-American group but not when that of either the Anglo- or Mexican-Americans was under consideration. In Kelly et al (1987), outcomes were not predicted by barriers at all.

Results relating to the other component variables have been similarly inconsistent, both in the studies just discussed and across a number of others as well (e.g. Winfield & Whaley, 2002; Volk & Koopman, 2001; Pakentham et al, 2000; Munley et al, 1999; Schafer et al, 1995; Bardsley & Beckman, 1988; Champion, 1987). This lack of reliable predictive ability on the part of the HBM component variables is a major limitation of the model, particularly in the light of the lack of operational definitions regarding how they should be defined and combined: if the model is no greater than the sum of its parts but those parts are not consistently effective in serving their purpose, then serious questions must arise as to what exactly the model has to offer.

The final area in which the HBM has been shown to fall down is in relation to the proportions of variance that it has generally been found to explain in the performance of health-related behaviours. Even though many authors have concluded that the HBM has some value in this respect, their findings have clearly demonstrated that the achievement of statistically significant explanations does not preclude small effect sizes (Sheeran and Abraham, 1996) and can still leave very large proportions of variance unaccounted for. Table 1.2.1I provides some typical examples which illustrate this point (since, although small, all proportions of variance explained were significant) and which, in doing so, raise further serious doubts about the practical value of the HBM:-

TABLE 1.2.1i Proportions of Variance Left Unexplained by the HBM

Study	Target Behaviour(s)	% Variance Unexplained
Quine et al (1998)	Cycle helmet use	82
Sapp & Jensen (1998)	Perceived nutritious food behaviour	72
	Quality of dietary intake (7 measures)	96*
Burak & Meyer (1997)	Cervical screening behaviour	85
Lollis et al (1997)	Various sexual risk behaviours	78#
Neff & Crawford (1998)	HIV-risk behaviours in 3 ethnic groups	84#
Bond et al (1992)	Compliance with treatment for IDDM	74#

* on average # minimum

In summary, the HBM has been criticised for an absence of clear operational definitions, resulting in varying interpretations of the model, a lack of standard measures, and difficulties in making reliable cross-study comparisons. Some potentially important predictor variables, such as sociocultural and economic factors and behavioural intentions, are missing from the model and although another, self-efficacy, has been proposed as an addition by Rosenstock et al (1988), its mode of operation in relation to the other component variables has not been defined and its use in HBM studies has been limited. Studies using the HBM have been predominantly cross-sectional in design and have mostly provided only partial support for the model and/or its component variables, with its performance having been shown to be inadequate in several respects: relationships between predictors and outcomes have not always occurred in the proposed direction; there have been discrepant findings according to age, ethnicity and gender, calling into question the extent to which the model can be generalised across sub-groups; the component variables have not been reliably predictive of outcomes; and the proportions of variance in behaviour which have been explained or predicted have been consistently low, leaving a great deal still remaining to be accounted for.

The question of whether or not these problems might be surmountable is perhaps unlikely to be answered, however, since several studies have compared the performance of the HBM with that of other SCMs and found it to be the weaker in each case. In the first of these studies, Vandlingham et al (1995) compared the HBM with the Theory of Reasoned Action (TRA; Fishbein & Ajzen, 1975). Under the TRA, it is proposed that intentions predict behaviour and are themselves predicted by both attitudes and subjective norms relating to the behaviour. Vandlingham et al concluded that, particularly because of the

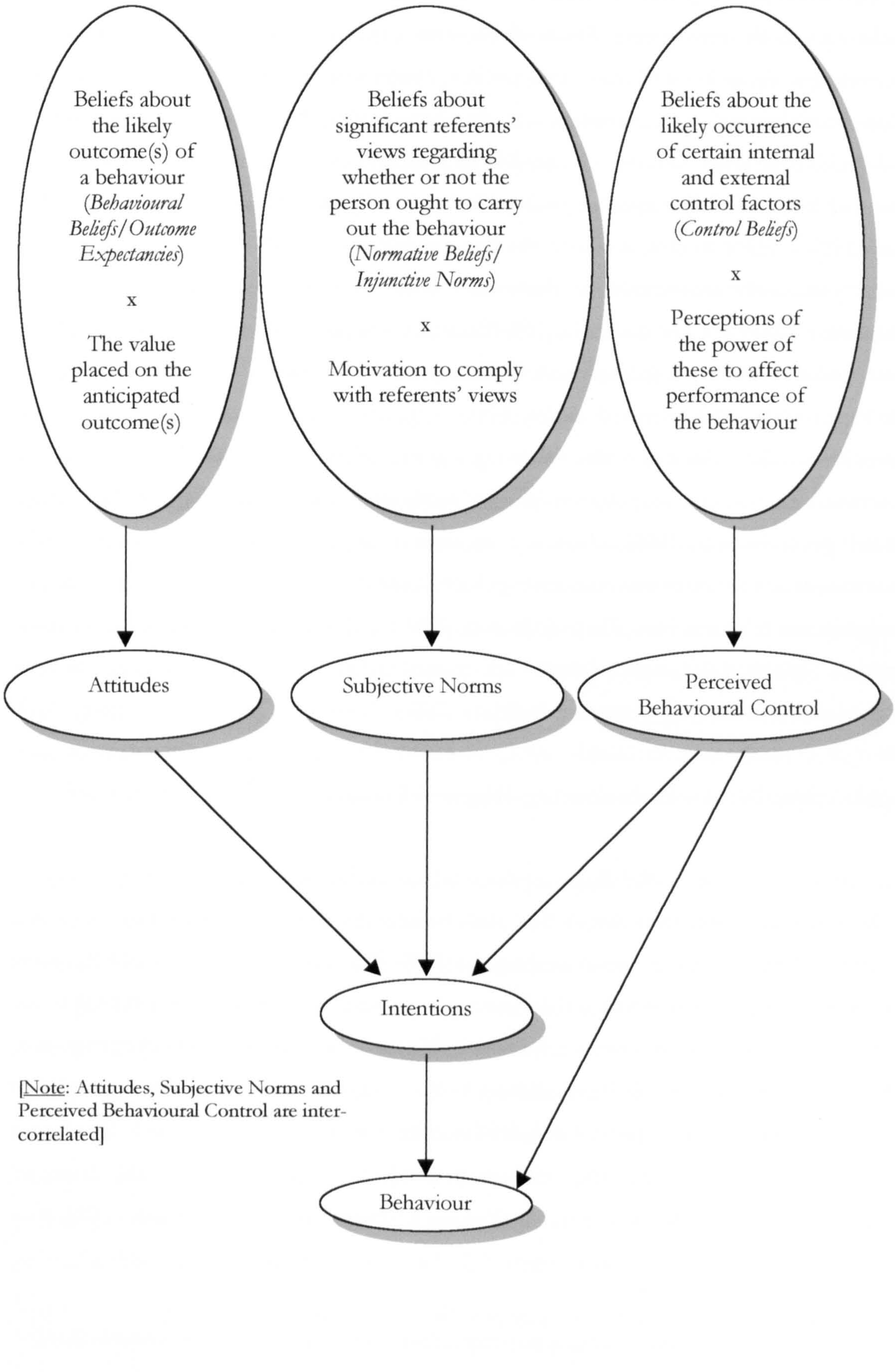
latter component, the TRA was the more plausible model to use in investigations concerning risky sexual practices.

However, the TRA has now been largely superseded by its extension, the Theory of Planned Behaviour (TPB; Ajzen, 1985), which was developed with the aim of providing better explanations and predictions of behaviours which are not under the complete volitional control of the individual (see Figure 1.2.2, below, for a full outline of this model). The TPB adds one variable to the TRA, the construct of Perceived Behavioural Control, which is proposed to have both a direct bearing on behaviour and also an indirect one, by means of an influence on intentions. Studies by Ajzen and Madden (1986) and Netemeyer, Burton and Johnston (1991) have both demonstrated the superiority of the TPB over the TRA in explaining variance in behaviours over which the individual does not have complete volitional control – a category which includes the majority of health behaviours. This being the case, and given the findings of Vandlingham et al (1995), it is not surprising that both Bish et al (2000) and Quine et al (1998) found the TPB to explain greater proportions of variance in target behaviours than the HBM nor that, in the latter example, it did so with greater economy and less redundancy. On the basis of this evidence, the TPB appears to offer a way forward for work in this area which is potentially more productive than that which might be provided by the HBM.

1.2.2 THE THEORY OF PLANNED BEHAVIOUR

As outlined above, the Theory of Planned Behaviour rests on two key assumptions: that attitudes, subjective norms (SNs) and perceived behavioural control (PBC) combine to determine the formation of behavioural intentions and that intentions and PBC both have a direct influence on behaviour (Ajzen, 1985). Figure 1.2.2 depicts these proposed relationships as well as providing details of factors claimed to underlie the three distal predictors (after Ajzen, 1985 and Fishbein & Ajzen, 1975):-

FIGURE 1.2.2 Diagrammatic Representation of the Theory of Planned Behaviour



[Note: Attitudes, Subjective Norms and Perceived Behavioural Control are inter-correlated]

The results of a literature search for papers with *Theory of Planned Behaviour/Behavior* in the title[11] demonstrate that this model has proved considerably more popular among researchers than the HBM, particularly in recent years: 88 peer-reviewed, empirical papers were elicited by this search, 84 of which were published in the decade immediately preceding it. In addition to this difference in the volume of studies relating to each model, further differences can be observed in the frequency with which various behavioural outcomes have been the subject of studies employing each[12]. The most notable relates to the four key health behaviours outlined earlier in this chapter: while these were targeted in only 18% of HBM studies, they were the focus of two-thirds of those using the TPB. The most commonly represented of these four behaviours was exercise, which was the dependent variable in 29 studies (e.g. Rhodes & Courneya, 2003a,b&c; Rise, Thompson & Verplanken 2003; Bryan & Rocheleau, 2002; Conner & Abraham, 2001; Kerner, Grossman & Kurrant, 2001). Nutritional intake, being targeted in 20 studies, was the next most popular key behaviour and the following aspects of this have been investigated: the purchase and/or consumption of low-fat foods (e.g. Pierro, Mannetti & Livi, 2003; Armitage & Conner, 1999); restriction of sugar intake (e.g. Masalu & Astrom, 2003); consumption of fruit and vegetables (e.g. Lien, Lytle & Komro, 2002); the use of dietary supplements (Conner, Kirk, Cade & Barrett, 2001); and general dietary restraint (Conner, Martin, Silverdale & Grogan, 1996). Ten studies included alcohol consumption as their dependent variable (e.g. Johnston & White, 2003; Armitage, Norman & Conner, 2002; Murgraff, McDermott & Walsh, 2001) while six investigated the links between TPB predictors and smoking behaviour (e.g. Higgins & Conner, 2003; Hu & Lanese, 1998).

In contrast to this increased focus on the four key health behaviours, a number of others which had frequently been targeted in studies using the HBM were found to be far less commonly represented in those applying the TPB. For example, while sexual behaviours were the subject of two-thirds of the former group of studies, they were represented in just 12% of the latter (e.g. Hogben, St. Lawrence, Hennessy & Eldridge, 2003; Armitage et al, 2002; Fekadu & Kraft, 2002). Screening behaviours, including those relating to breast cancer (e.g. Steadman, Rutter & Field, 2002; Godin, Gagne, Maziade, Moreault, Beaulieu & Morel, 2001), cervical cancer (e.g. Bish et al, 2000), testicular cancer (McCaul, Sandgren, O'Neill & Hinsz, 1993) and general health (e.g. Sheeran, Conner & Norman, 2001), were

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[11] using the PsycInfo database and covering the period between 1985 and July 2003
[12] A number of papers reported more than one study and/or included more than one behavioural outcome

targeted in only 14% of TPB studies, while compliance with medical treatment, which was explored in a large proportion of HBM studies, was represented in just one of those applying the TPB (Conner, Black & Stratton, 1998). The remaining TPB studies elicited by the search addressed such diverse behaviours as hand hygiene (Jenner, Watson, Miller, Jones & Scott, 2002), cannabis use (Armitage, Conner, Loach & Willetts, 1999; Conner & McMillan, 1999), breast feeding (Duckett, Henly, Avery, Potter, Hills-Bonczyk, Hulden & Svik, 1998), cycle helmet use (Quine et al, 1998), sun exposure behaviours (Hillhouse, Adler, Drinnon & Turrisi, 1997) and dental flossing (McCaul et al, 1993).

In general, the TPB has been well received in textbooks and review articles, with Taylor (2003), Sarafino (2002), Armitage and Conner (2001), Ogden (2000), Conner and Sparks (1996) and Godin and Kok (1996) all citing research lending support to the model and all concluding it to have made a valuable contribution to our understanding of influences on the performance of health behaviours. Ogden outlines those specific features which she considers to render the TPB a superior model to the HBM. These are: the evaluation component (for allowing for a degree of irrationality in human, behaviour-related decision-making); the subjective norm component (for representing an attempt to address social and environmental factors); and finally, the provision of a role, albeit a distal one, for past behaviour (which is proposed to contribute to the formation of control beliefs). Despite these positive comments and the volume of studies generated by the model, however, support for the TPB has not been complete and a number of important theoretical, methodological and performance-based limitations can be observed in relation to it.

As with the HBM, an important theoretical difficulty with the TPB relates to the nature of its component variables. In this case, though, this has not arisen because of a lack of clear operational definitions of the predictors, but rather from disagreements about the value of those provided. The attitude component has been relatively free from controversy in this regard, but the natures of both the subjective norm construct and that of perceived behavioural control have been debated. SNs have been less consistent in the provision of significant explanations of variance in outcomes than the other predictors[13] and, while at least part of the reason for this may be attributed to a wide use of single-item measures (Armitage & Conner, 2001), another factor may be the narrow focus of the construct, with several authors having suggested ways in which it might be expanded.

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[13] Details of the performance of each predictor are provided on pp.58-59, below.

Trafimow (1994), for example, argues for the inclusion of a measure of confidence in normative beliefs, as he found those who were more confident displayed stronger SNs-intentions relationships. In another example, Fekadu and Kraft (2002) found a combination of SNs, descriptive norms (what significant others are perceived to do) and group norms (beliefs about significant others' evaluations of the behaviour) to explain more variance in intentions than attitudes and PBC combined. Further support for the inclusion of descriptive norms comes from De Vries, Backbier, Kok and Dijkstra (1995) as, in their study, these contributed an extra 14% to the explanation of variance in teenagers' intentions to smoke which was provided by SNs. Direct pressure from significant others was another valuable contributor in this study, explaining a further 4% of the variance in intentions once both SNs and descriptive norms had been taken into account. SNs, descriptive norms and direct pressure collectively explained 33%, 34% and 24% of the variance in behaviour at six, twelve and eighteen months after baseline, respectively – an achievement on a par with that of the TPB itself (according to the reviews by Godin and Kok, 1996, and Armitage and Conner, 2001, full details of which will be provided later in this section). The contributions made by descriptive norms and direct pressure to the prediction of behaviour were each both independent and significant. Taken together, these findings all lend support to the case for expanding the assessment of social influences beyond the restricted measure of SNs proposed under the TPB.

Far greater debate than that which has arisen in relation to SNs, however, has centred around the nature of the PBC construct but, in this instance, the debate has arisen for a somewhat different reason. The difficulty here is the existence of overlapping control constructs – a problem highlighted in Godin and Kok's (1996) review of studies applying the TPB to health in which, in addition to the standard PBC measure, three further ways of operationalising control beliefs were noted to have been used, either singly or in combination: self-efficacy (defined by Bandura, 1979, as the degree of confidence an individual holds in his or her ability to perform a behaviour despite potential obstacles); the number of perceived barriers to the behaviour considered to be present (after Ajzen and Madden, 1986); and perceived facilitating conditions/constraints (after Triandis, 1980). While there are methodological issues surrounding the difficulties that the use of several different types of measure present for effective cross-study comparisons and valid testing of the model, a more fundamental issue relates to whether PBC and self-efficacy do, in

fact, differ in any meaningful sense and, if so, which would be the better of the two to combine in a model with attitudes and SNs.

Schwarzer (1992b) has claimed the distinction between self-efficacy and PBC to be so minor as to be irrelevant and Ajzen and Madden (1986, p.457) cite a number of studies which: "have provided evidence showing that people's behavior is strongly influenced by their confidence in their ability to perform it" which, despite the direct equivalence of their definition of PBC with Bandura's of self-efficacy, they describe as PBC. Strangely, when assessing this measure, Ajzen and Madden operationalised it in a different way entirely - in terms of the frequency of occurrence of a number of potential obstacles to the behaviour in question, the amount of personal control believed to be present in relation to the behaviour, the ease or difficulty of performing the behaviour and the likelihood that the behaviour could be performed should the desire to perform it be present. A contradiction is therefore present between the theoretical and operational definitions of PBC put forward by these two authors. Other researchers, such as Conner and Norman (1996) have presented arguments for a meaningful (rather than an apparently accidental) difference between PBC and self-efficacy and this view is so prevalent among researchers in mainland Europe that an alternative model to the TPB has been developed - the Determinants of Behavior (or ASE) Model – in which attitudes and SNs are combined with self-efficacy, rather than PBC, in order to predict intentions. This model has been used with success in a number of studies (e.g. Kok, De Vries, Mudde & Strecher, 1991; De Vries, Dijkstra & Kuhlman, 1988; De Vries & Kok, 1986).

Unfortunately, the common practice of selecting either PBC or self-efficacy in preference to the other when trying to explain or predict behavioural outcomes means that direct comparisons of their respective effectiveness in this regard are rare. However, in a review of 20 studies relating to condom use, Bennett and Bozionelos (2000) found that, of the two, only self-efficacy was able to provide significant explanations of variance in intentions when assessed alone: PBC could only do this when confounded with the former construct. Taking these various findings and arguments together, the evidence appears to point more towards PBC and self-efficacy being two distinct constructs and towards the latter being the variable of choice to be combined with attitudes and SNs in studies of social cognitive influences on health behaviour performance.

Methodologically, the body of TPB-related literature shows some clear improvements over that relating to the HBM. With respect to design, for example, almost half of studies applying the TPB adopted either prospective (38%) or longitudinal (9%) designs, compared to just 15% of HBM studies, while the proportion of cross-sectional designs fell from two-thirds of studies using the earlier model to just over half (51%) of those using the later one. However, these figures still fall a long way short of the ideal, particularly as, although a minority of the prospective and longitudinal studies have covered some months (occasionally even up to a year or more), far more have spanned only a few weeks – a period which is very short compared to the time required for changes in health-related behaviours to become reliably established. Neither is the design of studies the only example of methodological inadequacy evident in this body of research. 25% of the studies elicited by the literature search focussed on behavioural intentions as their outcome measure, rather than on behaviour itself, and 91% of those which did take behaviour into account relied on self-reports, rather than on objective measures, in order to assess this - a practice which can result in notable over-estimations of the proportions of variance in behaviour which the TPB is able to explain (Armitage & Conner, 2001).

Recently, the method of measurement of the three distal component variables proposed under the terms of the model has also been criticised. As shown in Figure 1.2.2, above, Ajzen (1985) clearly outlined these predictors as being product terms and both he and many other researchers have used multiplicatory measurement algorithms in their assessment. Godin and Kok (1996), who stress the need for very careful assessment of these predictors, have devoted three full pages of their paper to a description of ways in which questionnaires following such algorithms might be designed. However, both Armitage et al (1999) and Sutton et al (1999) have argued that the use of multiplicatory measures is not necessarily the best approach and the latter found that the practice did not produce any change in the squared correlation coefficient arrived at by the use of additive measures, suggesting that the more complex type of measurement may not be warranted.

The TPB has been shown to surpass the HBM in several aspects of practical performance. For example, only Kerner et al (1998) have questioned the direction of relationships between the component variables of the model and an outcome measure, while just three others raised issues concerned with the generalisability of the model (Rhodes & Courneya, 2003b; Hansen, 1997; Corby, Schneider Jamner & Wolitski, 1996). One area of weakness

common to both models, though, relates to inconsistencies in the predictive abilities of component variables. While attitudes have performed relatively well in this respect, having explained significant proportions of the variance in intentions in 85% of the studies reviewed by Bennett and Bozionelos (2000) and 82% of those reviewed by Godin and Kok (1996), the other predictors have performed less well. For example, although PBC predicted intentions in 86% of the studies reviewed by Godin and Kok (1996) and explained an average of 15% of the variance in behaviour, it should be remembered that four different operational definitions of the construct were allowed in their review and that Bennett and Bozionelos (2000) found that PBC only effectively predicted intentions when confounded with self-efficacy: it is therefore unlikely that all, or even most, of the variance explained in the studies cited by Godin and Kok can be reliably attributed to PBC as originally defined by Ajzen. With respect to the power of intentions to predict behaviour, in Godin and Kok's review the average correlation coefficient between the two variables was .46, suggesting that intentions explained an average of only around 20% of the variance in behaviour. In addition, Bennett and Bozionelos (2000) found the proportion of variance in behaviour explained by intentions to reach significant levels in only just over a third (35%) of the studies they reviewed. The lack of provision of an explanation of the intention-behaviour gap is a clear weakness of the TPB, therefore, and will be discussed further in Chapter 3, below.

The least consistent performance of any of the predictors is that of the SNs component. While this variable was predictive of intentions in 70% of the studies reviewed by Bennett and Bozionelos (2000) it achieved significance in less than half (47%) of those considered by Godin and Kok (1996). This discrepancy may be related to the nature of the behaviours in question. Those covered in the former review were all concerned with actual or intended condom use – a behaviour in which the perceived opinion of at least one significant other, together with the extent of motivation to comply with this, is necessarily going to play an important part. By contrast, Godin and Kok's review included studies directed at a wide range of behaviours, including some in which the individual is far more at liberty to ignore the wishes of significant others (such as having a health check, using a seat belt and eating fruit), which could well provide at least a partial explanation for the poorer performance observed in SNs here. Looking at the performance of this variable overall, it has been a far less effective predictor of outcomes than either attitudes or PBC (Armitage & Arden, 2002) and the main reason that has been put forward in

explanation of this is the narrow focus of the construct, as discussed above. However, the common practice of using single-item measures is a further weakness, with Armitage and Conner (2001) having shown this to reduce the predictive power of the construct by as much as 10%.

The proportions of variance in outcomes which have typically been explained by the TPB have often been greater than those accounted for by the HBM, although the fact that so many TPB studies offer explanations of variance in intentions rather than in behaviour can make the difference seem greater than it really is, since these can sometimes reach proportions of more than 50%, as can be seen in Table 1.2.2, below:-

TABLE 1.2.2 Proportions of Variance in Intentions Explained by the TPB

Study	Behaviour(s) which are the Subject of the Intentions	% Variance
Godin et al (2001)	mammography clinical breast examination	81 65
Blue, Wilbur & Marston-Scott (2001)	exercise	62
Astrøm & Rise (2001)	healthy eating	52
Conner et al (2001)	use of dietary supplements	70
Godin, Valois, LePage & Desharnais (1992)	smoking (in pregnant women)	54
Schifter & Ajzen (1985)	weight loss intentions	55

Where explanations of behaviour, rather than intentions, are concerned, the results most favourable to the TPB have produced explanations of around 40-50% of the variance: Blue et al (2001), for example, found the model to explain 51% of the variance in exercise, Quine et al (1998) accounted for 43% of that in cycle helmet use and Godin et al (1992) explained 46% of smoking behaviour in post-partum women. Several other studies, though, have only achieved proportions of less than 20%. In Norman, Conner and Bell (2000), for example, the model accounted for only 15% of the variance in health check attendance, Lien et al (2002) found it to explain just 7% of the variance in fruit and vegetable intake and, in Wambach (1997), a mere 4% of that in breastfeeding could be attributed to the TPB predictors.

The two meta-analytic reviews which have already been referred to provide useful summary information regarding this aspect of the performance of the TPB. In Godin and

Kok's (1996) paper, which considered 56 studies, the average explanations of variance in intentions and behaviour were 41% and 34%, respectively. However, Armitage and Conner's (2001) results were weaker than this. Across 185 tests of the model taken from 161 papers, the average proportion of variance in intentions explained was 39% while the average for behaviour was only 27% - almost a fifth less than that reported by Godin and Kok. Furthermore, when Armitage and Conner confined their analysis to just those studies which had used objective measures of behaviour, the average proportion of variance explained was reduced even further, to just 21%. Therefore, although the TPB has improved upon the HBM in a number of respects and performs better in direct comparisons (such as those by Bish et al, 2000, and Quine et al, 1998, which were outlined above), it still leaves averages of around 60% of the variance in intentions and 80% of that in demonstrated behaviour unexplained. Clearly, much remains to be understood regarding the key factors and processes underlying the performance of health-related behaviours.

As with the HBM, the limited ability of the TPB to explain greater proportions of outcomes has been partly attributed to its restricted scope, promoting the testing of factors which might supplement the standard TPB variables in investigations in this area. Self-identity is one such factor, with Astrøm and Rise (2001), Armitage and Conner (1999) and Godin and Kok (1996) all claiming it to have a bearing on behaviour, and Conner and Armitage (1998) arguing for it to be added to the TPB as a new component variable. However, although self-identity has been shown to have a significant influence on outcomes, its effect size is small - Conner and Armitage found it to explain only around 1% of variance in intentions after the TPB had been taken into consideration - so the case for its inclusion is only weak. Both personal (Bozionelos & Bennett, 1999; Conner & Armitage, 1998; Quine et al, 1998) and moral norms (Conner et al, 1999; Conner & Armitage, 1998; Godin & Kok, 1996) have also been put forward as potential additions to the TPB but neither have received more than very modest empirical support.

More promisingly, a number of researchers have found past behaviour to have a notable bearing on both intentions and future behaviour (e.g. Masalu & Astrøm, 2001; Conner, Graham & Moore, 1999; Sutton, McVey & Glanz, 1999; Norman & Conner, 1996a). In a detailed exploration of its influence, Norman et al (2000) found that past behaviour alone was able to explain more variance in exercise than intentions and PBC together after these

two variables had been taken into account and also that the interaction of past behaviour and PBC added a further 11% to explanations provided by the two variables individually: where past behaviour was low, PBC did not predict future behaviour, but where it was moderate or high, greater PBC was associated with greater amounts of exercise being performed in the future. The authors propose that past behaviour causes greater accuracy of outcome predictions by virtue of increasing the accuracy of perceptions of control. Conner and Armitage's (1998) review paper reflects the importance of past behaviour as a predictor which has been highlighted in the above studies by demonstrating that, once the standard TPB predictors have been taken into account, this variable is able to explain, on average, an additional 7% of the variance in intentions and 13% of that in behaviour. The greater predictive ability found with respect to behaviour suggests that the direct influence of control beliefs on behaviour may be more affected by factors associated with past behaviour experiences than the indirect route of influence which operates via intentions.

Taking a different approach, Bozionelos and Bennett (1999) considered the respective contributions of past behaviour and the TPB by taking the former into account first. They found that, entered alone into a regression equation, past behaviour explained 42% of the variance in exercise intentions. When the TPB component variables were added in the second stage of the analysis, PBC added a further 15% to the explanation and attitudes just 4%, while SNs made a non-significant contribution. These findings raise the question of the relative importance of TPB variables and past behaviour since the latter is far more commonly entered after the model components. Since past behaviour is proposed to be a distal influence on the formation of control beliefs it is arguably more logical to follow Bozionelos and Bennett's approach and ask what the TPB might have to offer over and above explanations provided by past behaviour rather than *vice versa*. However, regardless of which of these practices is used, little is yet conclusively known about the processes by which past behaviour exerts its influence over either the TPB components or future behaviour (Conner and Armitage, 1998) including the role, if any, of individuals' reactions to the outcomes of their past attempts to change health-related behaviours. This issue will also be discussed further in Chapter 3, below.

In summary, the TPB has been shown to represent an improvement over the HBM in several respects, but it has also generated various debates concerning theoretical and methodological issues and it suffers from a number of performance-related limitations.

The nature of two of the three distal component variables, SNs and PBC has been the subject of considerable discussion, with the former being widely viewed as overly narrow in its focus and the latter arguably needing to be replaced by self-efficacy. There are problems relating to the methods employed by researchers using the TPB, including both inadequacies of design and doubts regarding the value of the multiplicatory measurement algorithms in common use. The relationships between the component variables and outcome measures have not been consistent in strength and SNs have been particularly weak in this respect - although the use of multiple-item measures of this predictor produces demonstrably better results and expanding the scope of the construct seems likely to improve matters further. Although the model has, on occasion, explained quite high proportions of variance in outcomes, meta-analytic reviews show it leaves an average of around 60% to 80% unaccounted for, depending on the type of outcome targeted and how it is assessed. Several possible additions to the model have been proposed as having the potential to reduce these proportions, but only past behaviour appears to merit serious consideration and the processes by which this might operate are not yet clear. Overall, although the TPB has been widely adopted by researchers, its use has so far provided only a limited account of variations in the performance of health behaviours.

1.3 THEORETICAL IMPLICATIONS & AIMS OF THE THESIS

This review of relevant literature has shown that social cognition models have some value in terms of their ability to explain and predict health behaviour. However, a number of weaknesses have also been identified and the performance of the models has been limited in practice. There is now a clear need, in the light of these findings, for new theories to be developed to supplement the SCM approach and enable more comprehensive explanations to be generated. The overarching aim of this thesis is therefore to move beyond the SCMs in order to address the gaps they have left in knowledge and understanding of the nature and operation of influences on attempts to adopt health behaviours. Three different approaches to making such a move are outlined briefly below. Full reports of each and a discussion of their combined implications are provided in the remaining chapters of the thesis.

The first approach, reported in Chapter 2, comprises a questionnaire-based study aimed at improving upon the extent of variance in outcomes generally explained by the SCMs. Three strategies in particular were adopted in the attempt to achieve this improvement: model predictors were selected for inclusion on the basis of having been found to perform well in the reviewed studies or because they were expected to do so following some modification; behaviour-specific variables were included in addition to the more general predictors; and additive, rather than multiplicatory measurement tools were used.

The findings generated by this first approach suggested that reactions to past failure(s) to adopt a health behaviour might impact upon future performance of the same behaviour and that further investigation of the nature and consequences of such reactions was warranted. Literature concerned with temporal influences on health behaviour change was reviewed (in Chapter 3) and Jerusalem and Schwarzer's (1992) Idealised Process Model of Cognitive-Affective Reactions to Repeated Failure was identified as being of potential value in relation to this issue. The aim of the second approach to moving beyond SCMs was therefore to explore this potential by means of the replication and extension of Jerusalem and Schwarzer's original work (in which cognitive task performance was the target behaviour) followed by the application of the IPM to attempts to adopt health behaviours. This body of work is reported in Chapters 4, 5 and 6.

The outcome of the work relating to the IPM led to a brief review being conducted of literature concerned with the original development of the HBM and the TRA/TPB. As a result of this review, an exploration of the meanings associated with trying to adopt health behaviours (including, but not exclusive to, those relating to past failed attempts) was considered the appropriate third approach to take in moving beyond the SCMs. The final study of the thesis therefore comprised a longitudinal, multiple case study in which three people's experiences of the process of making an attempt to change health-related behaviours were explored by means of Interpretative Phenomenological Analysis. This study is reported in Chapter 7.

A final summary of the work conducted towards this thesis is presented in Chapter 8, together with a discussion of relevant methodological considerations, the theoretical implications of its key findings and suggested directions for future research.

CHAPTER TWO

Breaking Free from the Constraints of the Social Cognition Models

2.1 INTRODUCTION TO THE FIRST STUDY

In the light of the limitations of the SCMs which were outlined in Chapter 1, above, it is clear that alternative approaches need to be taken if knowledge and understanding of the key factors influencing attempts to change health-related behaviours are to be increased. While (as will be evident in the later chapters of this thesis) some of the available alternatives represent quite wide departures from the SCM approach, the first logical step is to see what can be achieved by staying more closely allied to it. The study to be reported in this chapter explores the potential of taking such a step.

The fact that certain constructs have consistently been found to predict and explain outcomes, despite the limitations of the SCM framework(s) within which they have been operationalised, serves only to strengthen the evidence in their favour. Further support is provided by their apparent ability to transcend the constraints of any single model and to demonstrate their influence across studies in which a variety of definitions, measures and theoretical frameworks have been adopted, i.e. without recourse to the algorithms of any particular SCM. Studies by Budd, Hughes and Smith (1996), Hoppé and Ogden, 1995; Murray and McMillan (1993) and Bagozzi and Warshaw (1990), for example, incorporated a range of definitions, measures and combinations of variables but, despite this, all found constructs allied to attitudes (such as beliefs and values) to be significantly related to outcomes. A similar picture can be seen with respect to self-efficacy in studies by Kaplan, Ries, Prewitt and Eakin (1994), Kok, den Boer, de Vries, Gerards, Hospers and Mudde (1992), Netemeyer, Burton and Johnston (1991) and Seeman and Seeman (1983). Even measures relating to social influence and/or pressure (despite the difficulties relating to the SN measure of the TPB) have been shown to provide significant results when operationalised in a variety of ways (e.g. De Vries, Backbier, Kok & Dijkstra, 1995; Fisher, Fisher & Rye, 1995; Trafimow, 1994). Although the importance of these broad constructs (which will be referred to as 'model predictors') to behavioural intentions has been established, their similarity to those commonly used within the TPB suggests that, however operationalised, their potential to improve substantially on the 40% of variance in intentions typically explained to date (Armitage & Conner, 2001; Godin & Kok, 1996) is likely to be limited. A search for some additional means of improving upon this average is therefore warranted.

By virtue of the aims of the SCMs (to provide a common framework for the explanation and prediction of behavioural outcomes) their components are all general in nature and the related variables just discussed are equally broadly applicable. However, some researchers, such as Fazekas, Senn and Ledgerwood (2001), Norman et al (1999), Wall, Hinson and McKee (1998) and Wambach (1997), have chosen to incorporate extra predictors within their studies which are highly specific to the behaviour under investigation and, with the exception of Wambach (1997), have all found these to add significant contributions to the predictions of outcomes provided by model predictors. In Norman et al's study, for example, the length of the longest recent attempt to quit smoking predicted a significant proportion of the variance in length of abstinence in a current quit attempt despite both intentions and PBC having failed to do so. There appears to be some potential, therefore, for considering behaviour-specific variables in attempts to explain behaviour change, as well as more general ones and, since it does not seem likely that all important influences on behavioural outcomes are necessarily psychological in nature, the addition of relevant non-cognitive variables as well as social cognitions specific to the outcome in question is also justified. The study reported in this chapter was therefore designed in order to investigate the relative explanatory power of model, non-model and non-cognitive predictors. As improvements in the proportion of variation explained in behaviour are unlikely to follow unless such improvements are observable with respect to intentions, these were selected as the outcome measure. The specific intentions chosen were those relating to weight loss in a target population of healthy weight women.

Despite the increasing levels of obesity which have been observed in the Western world in recent years (noted in Section 1.1.2iii, above), the current aesthetic ideal for the female form is extremely lean (Brownell, 1991) and women are under considerable pressure to conform to this ideal (Tiggeman, Winefield, Winefield & Goldney, 1994). Women's resulting body dissatisfaction is now so widespread as to have been termed 'normative discontent' (Rodin, Silberstein & Striegel-Moore, 1984) and it has not just been found in those who are overweight or obese but also in healthy weight women. For example, Hetherington & Burnett (1994) found that, although 12% of a sample of such woman expressed a desire for their weight to remain the same and a further 3% would have liked to have increased in weight, almost two-thirds (66%) reported a desire to lose at least five pounds.

Weight loss behaviour is a noted consequence of body dissatisfaction (Garner, 1991) and may, especially when taking the form of dietary restraint, adversely affect both physical and psychological health (Ogden, 1995; Tiggeman, 1994; Lissner, Sjostrom, Bengtsson, Bouchard & Larsson, 1994; Cash & Hicks, 1990). The decision to explore the relative predictive power of the different types of variable in relation to weight loss intentions was therefore made for two reasons: first, because intentions to lose weight were expected to be readily accessible in a sample of healthy weight women; and, second, because an improved understanding of influences on the strength of weight loss intentions in women whose health is not directly at risk from their weight could ultimately help in the prevention of the adverse consequences of unnecessary weight loss behaviour. However, since Jasper (1997) had shown measures of determination to be more discriminating than those of intentions alone, the former was selected as the dependent variable for this study.

Non-model cognitions (to be known as "non-model predictors") considered to be important to the development of weight loss intentions are primarily those concerned with perceptions and evaluations of the body's size and shape (e.g. Cash & Hicks, 1990; Hetherington & Burnett, 1994; Lee, Leung, Lee, Yu & Leung, 1996), so measures of weight perception and both weight and body dissatisfaction were selected for use in this study. Two relevant non-cognitive predictors were also included: Body Mass Index (BMI) and past behaviour. BMI has consistently been found to relate to intentions to lose weight and to actual weight loss behaviour (e.g. Garner, Garner & Vanegeren, 1992; Thelen & Cormier, 1995; Lee et al, 1996; Huon, Hayne, Gunewardene, Strong, Lunn, Piira & Lim, 1999) and, as shown in Chapter 1, past performance of health-related behaviours is strongly predictive of their future performance (e.g. Masalu & Astrom, 2001; Bozionelos & Bennett, 1999; Conner, Graham & Moore, 1999; Sutton, McVey & Glanz, 1999, Conner & Armitage, 1998; Norman & Conner, 1996a).

The main aim of the study[1] was to explore the relative explanatory power of the different types of predictor variable. The following hypotheses were therefore generated for testing:-

[1] This study originally formed part of a wider investigation which also included causal beliefs relating to weight and weight loss, but only those parts relevant to this thesis will be reported.

1. The non-model predictors of Weight Perceptions, Body Dissatisfaction and Weight Dissatisfaction will add significantly to the explanation of variance in Determination once the model predictors of Drive for Thinness[2], Social Influence and Self-efficacy have been accounted for.

2. The non-cognitive variables of BMI and Past Weight Loss Behaviour will add significantly to the explanation of variance in Determination to Lose Weight once both the model and non-model predictors have been taken into consideration.

2.2 METHOD

2.2.1 DESIGN

This investigation was a cross-sectional questionnaire study with Determination to Lose Weight as the dependent variable. There were three model predictors (Drive for Thinness, Social Influence and Self-efficacy), three non-model predictors (Weight Perceptions, Weight Dissatisfaction and Body Dissatisfaction) and two non-cognitive predictors (BMI and Past Weight Loss Behaviour). Data was analysed using correlations and regression techniques.

2.2.2 PARTICIPANTS

All new female students embarking on courses provided by the Psychology department of a London university were asked to participate in this study (n = 159). Of those approached, 2 refused to take part, while another 19 were excluded because their BMI scores fell outside the healthy weight range: 8 were underweight, 9 were overweight and 2 were obese.

[2] a measure of beliefs and values specific to weight

The final sample consisted of a total of 138 healthy weight women (44 undergraduates and 94 postgraduates) with a mean BMI of 21.6. The age of the sample ranged from 18 to 48 years (median = 24.9 years). 17% were married, 14% were co-habiting, 4% were separated or divorced and 65% were single. Most participants (73%) were white and the majority were either Christian (40%) or held no religious convictions (42%)[3].

2.2.3 MEASURES

The questionnaires used in this study included single-item, survey-type questions and both established and recently constructed scales. Details of the psychometric properties of these are given below. The questionnaire and full reliability analyses are provided in Appendix A (pp.237-252).

2.2.3i DEMOGRAPHIC INFORMATION

Participants were initially asked to provided details of their age, height, current weight, religion, marital status and ethnic background. BMI scores were calculated on the basis of participants' self-reported height and weight[4].

2.2.3ii SINGLE-ITEM SCALES

Weight Perceptions, Weight Dissatisfaction and Past Weight Loss Behaviour were each assessed by means of single-item scales with five response options. Details of the range of options for each scale and the meaning of higher scores are provided in Table 2.2.3ii, overleaf:-

[3] Throughout this thesis, missing cases have been excluded before the calculation of percentages.

[4] Self-reported weight has been shown to be sufficiently accurate for studies involving non-clinical populations (Bowman & de Lucia, 1992).

TABLE 2.2.3ii Details of Single-Item Scales

Scale	Range of Response Options	The Meaning of Higher Scores
Weight Perceptions	'very underweight' to 'very overweight'	greater perceptions of overweight
Weight Dissatisfaction	'very satisfied' to 'very dissatisfied'	greater weight dissatisfaction
Past Weight Loss Behaviour	'never' to 'many times'	more attempts to lose weight in the previous five years

2.2.3iii ESTABLISHED SCALES

Two subscales of the Eating Disorder Inventory-2 (EDI-2; Garner, 1991) were used in this study: the Drive for Thinness and Body Dissatisfaction subscales. The former taps beliefs and values concerned with eating, dieting, and weight loss and gain, while the latter addresses thoughts and feelings with respect to different areas of the body. Respondents are asked to indicate the frequency with which each applies to them, with options ranging from 'always' to 'never'. Some items in each are scored in a reverse direction to minimise social desirability effects. Higher scores denote stronger Drive for Thinness and greater Body Dissatisfaction. Garner (1991) provides information on reliability and validity of the subscales (α = .83 for Drive for Thinness and .92 for Body Dissatisfaction) as well as normative data from a female college sample and an eating disordered group. Researchers have shown that subscales of the EDI-2 can be used individually without compromising their reliability (e.g. Beren, Hayden, Wilfley & Grilo, 1996; Cattarin & Thompson, 1994; Dionne, Davis, Fox & Gurevich, 1995).

2.2.3iv SCALES DEVELOPED OR AMENDED FOR THIS STUDY

One scale was developed specifically for this study and two more were amended in order to become applicable to it. Each offers five response options, ranging from 'strongly agree' to 'strongly disagree' and, for each, item scores are summed to provide the overall total. A brief description of each scale is provided below and is followed, in Table 2.2.3iv, by a summary of their psychometric properties in comparison with ideals (full details can be found in Appendix A, pp.240-252):-

Determination to Lose Weight Scale ('Determination')

A three-item scale to assess Determination to Lose Weight was adapted from Jasper's (1997) Determination to Diet scale. The revised version of the scale used here incorporates three statements relating to a desire to lose weight in the near future, the intention to try to do so and a belief in actually doing so.

Self-efficacy for Weight Control Scale ('Self-efficacy')

This scale was adapted from Jasper's 'Self-Efficacy for Dieting' scale. The stem statement of the original scale reads: "I am confident I can keep to my weight loss programme even if...." but, for the purpose of this study, the phrase 'keep to my weight loss programme' was replaced with 'control my weight'. The items which followed this stem dealt with a variety of situations which might compromise participants' attempts to take or maintain action aimed at controlling their weight, such as: feeling bored, being away from home, or having relationship problems.

Social Influence Scale ('Social Influence')

In line with studies following the Theory of Planned Behaviour, this measure addresses participants' perceptions of injunctive norms (what important referents think they ought to do) and motivation to comply with these. However, in line with de Vries et al (1995), items have also been added which ask about direct pressure that referents place participants under to lose weight. Other items tap perceptions of referents' views of participants' weight. There are eight items in total.

TABLE 2.2.3iv Psychometric Properties of Scales

SCALE / PROPERTY	Determination	Self-Efficacy	Social Influence	IDEAL VALUES
Cronbach's α	.95	.87	.83	≥ .7
Item Means	3.02-3.43	2.64-3.43	1.57-2.31	2.5-3.5
Item-total Correlations	.88-.92	.49-.69	.38-.71	≥ .2
Kolmogorov-Smirnov Z (p)	1.72 (.006)	1.04 (.229)	1.29 (.07)	p > .05

It can be seen from Table 2.2.3b that the psychometric properties of the measures are generally good. All Cronbach's alphas are well in excess of the ideal minimum of .7, all item-total correlations are well above the ideal minimum of .2 and no Kolmogorov-Smirnov test for deviation from a normal distribution reached significance except for that relating to the Determination scale. Further exploration with respect to this scale showed this deviation to have little bearing with respect to the testing of the main hypotheses, although one participant with an outlying score was removed from the analysis at this point (see Section 2.3.2 for full details of these diagnostic explorations).

The item means for the Determination and Self-efficacy scales all fall comfortably within the ideal range. Those for the Social Influence scale are low but, since all participants were in the healthy weight range, and the scale taps issues concerned with the views of their friends and family regarding the need for participants' to lose weight, this finding is not unexpected. Overall, the measures were considered to demonstrate satisfactory psychometric qualities for valid analyses to be carried out with respect to the aims and the hypotheses of this study.

2.2.4 PROCEDURE

Data collection was conducted during lectures in participants' first week at the university. A brief outline of the study was given to the female students in each class and it was explained that, should they agree to participate, but did not know either their height or weight, they would be required to measure these. Any student who preferred not to take part was given the opportunity to leave at this point. Those who agreed to take part were each given a copy of the questionnaire to complete. A set of scales and a height chart were provided for those who needed to check their height and/or weight and were used by approximately a third of the sample (participants were asked to give each other privacy while taking these measurements). Completion of the questionnaire took between 15 and 30 minutes, following which participants were debriefed.

2.3 RESULTS

2.3.1 WEIGHT-RELATED CONCERNS & BEHAVIOUR[5]

Seventy three percent of participants had tried to lose weight at least once during the previous five years and 66% had made two or more attempts. They had clearly not been successful in achieving their aims, though, since levels of dissatisfaction with current weight were high (especially considering this was a sample composed entirely of healthy weight women), with 51% of the sample describing themselves as either overweight or very overweight and 31% expressing dissatisfaction with their current weight. Only 11% of participants were very satisfied with their weight and less than half (45%) correctly viewed themselves as being neither under- nor overweight. 34% of the women were in agreement with all three of the statements comprising the Determination to Lose Weight Scale and 56% scored above its mid-point. Surprisingly, given the above figures, Drive for Thinness scores were lower for this sample than those reported by Garner (1991) for a female college group, with mean scores being 3.1 and 5.5, respectively ($z = 5.06$, $p<.0001$), but levels of Body Dissatisfaction for the two groups did not differ and the scores of 34% of participants on the latter scale fell within or above the normative range presented by Garner for an eating disordered sample.

Despite the fact that past weight loss attempts had clearly not resulted in the majority of women having reached or maintained physiques they considered satisfactory, levels of Self-efficacy for Weight Control were not notably low, with approximately half of the sample ($n = 68$) scoring on or above the mid-point of the scale (which is 30) and the mean falling close to this score (29.26). Scores on the Social Influence measure were generally quite low, with the maximum score for any participant being 34 out of a possible 40 and the mean being just 15.98 ($SD = 5.41$). 90% of those who responded fully to this measure (111 out of 123) scored below the mid-point of the scale.

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[5] All data, descriptive statistics and main analyses can be found in Appendix A (pp.253-8, 259-65 & 266-71, respectively)

2.3.2 MAIN ANALYSES

It was predicted, in the first hypothesis of this study, that the non-model predictors of Weight Perceptions, Body Dissatisfaction and Weight Dissatisfaction would add significantly to the explanation of variance in Determination once the model predictors of Drive for Thinness, Social Influence and Self-efficacy had been accounted for. In the second hypothesis, it was predicted that the non-cognitive variables of BMI and Past Weight Loss Behaviour would add significantly to the explanation of variance in Determination to Lose Weight once both the model and non-model predictors had been taken into consideration. Before carrying out the regression analysis required to test these hypotheses, however, it was first necessary to explore the extent of influence of the non-normal distribution of scores on the Determination to Lose Weight scale (identified in Section 2.2.3, above).

Casewise diagnostics showed that the value of one participant's residual was more than three standard deviations from the mean (-3.71). This person was therefore excluded from the analysis. No other residuals were indicative of outlying cases, so all other participants were therefore retained. Further diagnostic assessments included Cook's Distance Test, both a frequency histogram and a normal probability plot of the standardised residuals and, finally, a scatterplot of predicted Determination scores with the standardised residuals. Cook's Distance values were all at acceptable levels, ranging from .000 to .081 (mean = .010); the frequency histogram (Figure 2.3.2a) shows the distribution of the standardised residuals to be acceptably close to normal; the normal probability plot (Figure 2.3.2b) shows the standardised residuals to fall acceptably close to the 45° line; and the scatterplot of predicted Determination scores with the standardised residuals (Figure 2.3.2c) shows an acceptable distribution of variance across the range of scores:-

FIGURE 2.3.2a Frequency Histogram of Standardised Residuals

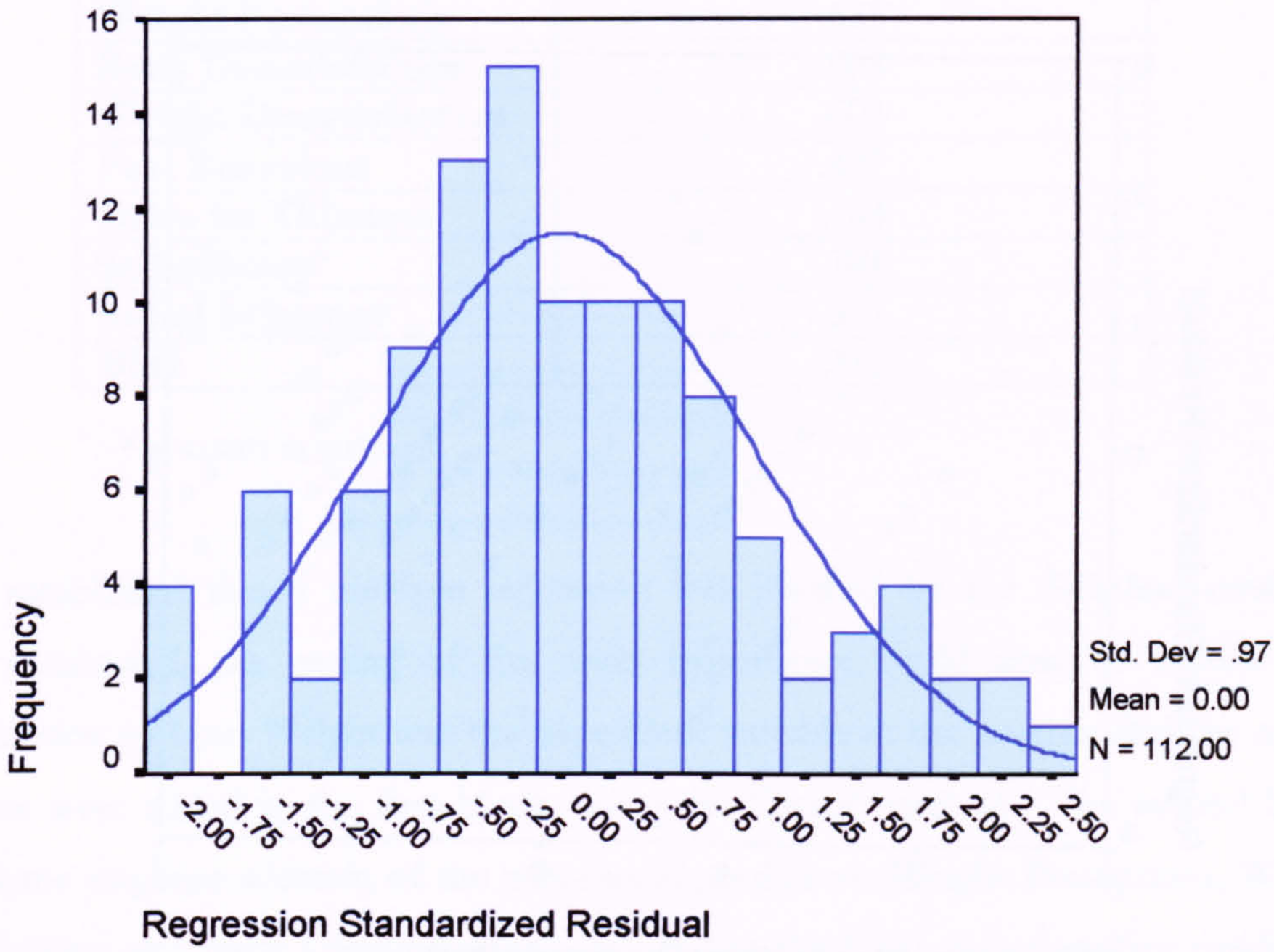


FIGURE 2.3.2b Normal Probability Plot of Standardised Residuals for Determination

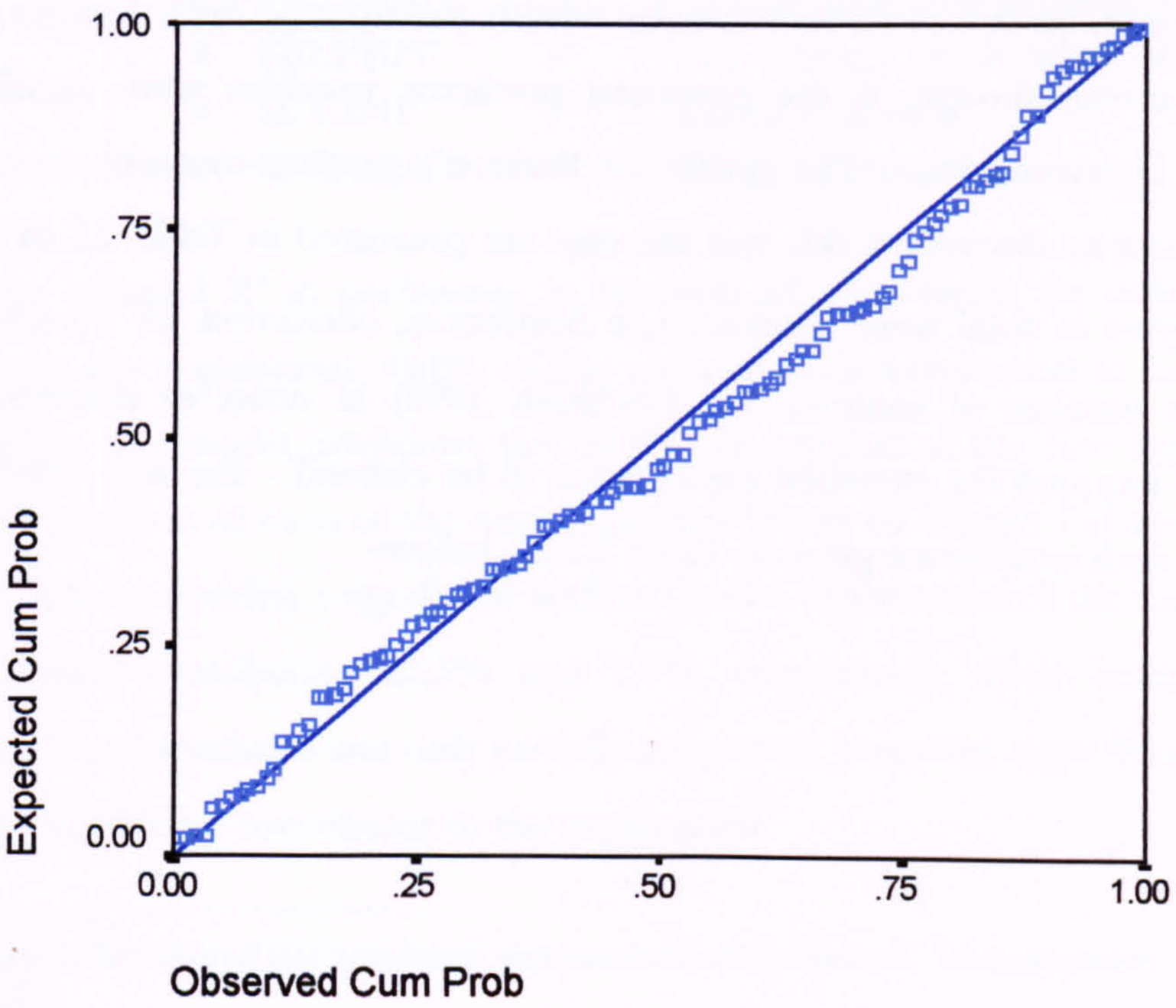
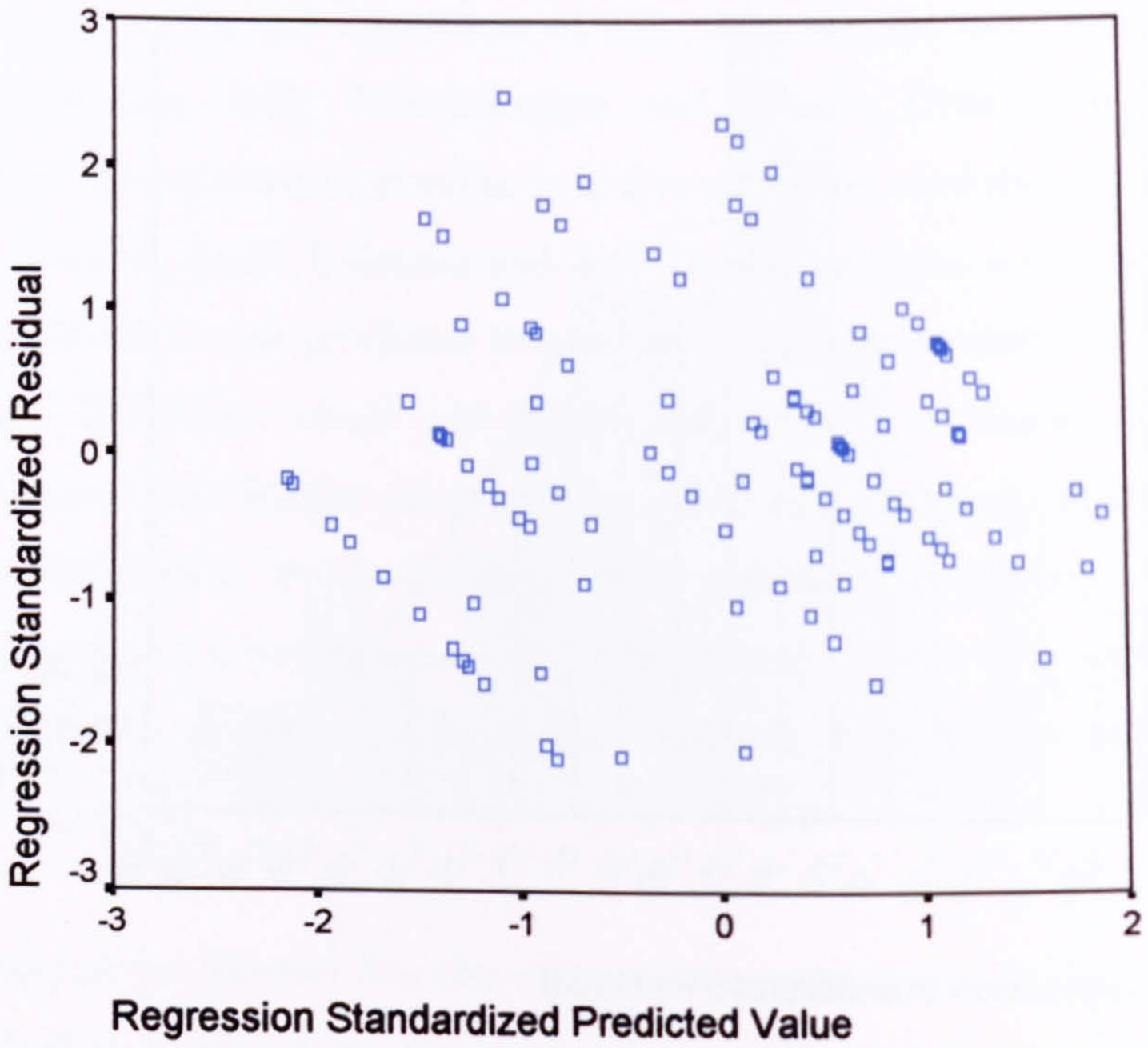


FIGURE 2.3.2c **Scatterplot of Predicted Determination Scores with Standardised Residuals**



Taken together, the results of these diagnostic tests indicated that, after having removed the one case with an outlying residual, the non-normal distribution of Determination scores was not likely to have any notable effect on the regression analysis required to test the main hypotheses, so this could therefore be reliably performed. Such analysis would only be worth doing, though, if the proposed predictor variables were significantly associated with Determination. The results of Pearson's product-moment correlation analyses carried out to discover if this was the case are presented in Table 2.3.2a below. Since eight analyses in total were conducted, a Bonferroni correction of $^{\alpha}/_{k}$ was used (where k = the number of analyses; see Lockhart, 1998) in order to determine the probability level required for statistical significance to be claimed - this was .0063. The co-efficients for each analysis are given in Table 2.3.2a, below:-

TABLE 2.3.2a Correlations of Predictor Variables with Determination

Variable	Correlation Co-efficient (r)*
Weight Perceptions	.625
Body Dissatisfaction	.608
Weight Dissatisfaction	.603
Past Behaviour	.497
Drive for Thinness	.464
Self-efficacy[6]	-.460
Social Influence	.387
BMI	.312

* $p < .0001$ in each case

Having established that a multiple regression was justified by the data and could be reliably conducted, the testing of the main hypotheses could now be carried out. Determination to Lose Weight was the dependent variable in the analysis and the model predictors were added in the first block, using the 'Enter' method. The second block involved the stepwise addition of the non-model predictors (Weight Perceptions, Weight Dissatisfaction and Body Dissatisfaction) and, in the third, the non-cognitive predictors (BMI and Past Weight Loss Behaviour) were added, also stepwise. The results are summarised in Table 2.3.2b below, where the following key to variable labels applies:-

- BD = Body Dissatisfaction
- DT = Drive for Thinness
- PASTBEH = Past Weight Loss Behaviour
- SELFEFF = Self-efficacy for Weight Control
- SOCINF = Social Influence
- WTPERC = Weight Perceptions

Using the adjusted R^2 in preference to the non-adjusted figure (in order to provide a better fit to the population), 40.8% of the variance in Determination to Lose Weight was explained by the model predictors ($p<.0001$). In support of the first hypothesis of this study, the addition of each of the non-model predictors of Weight Perceptions and Body Dissatisfaction provided a significant addition to the explanation of the variance, with the two variables contributing 23.5% and 1.7%, respectively, when both were entered stepwise. The hypothesis was only partially supported, however, since Weight Satisfaction was not a significant contributor to the explanation.

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[6] The negative direction of this correlation was unusual and unexpected. Its implications will be discussed in Section 2.4.

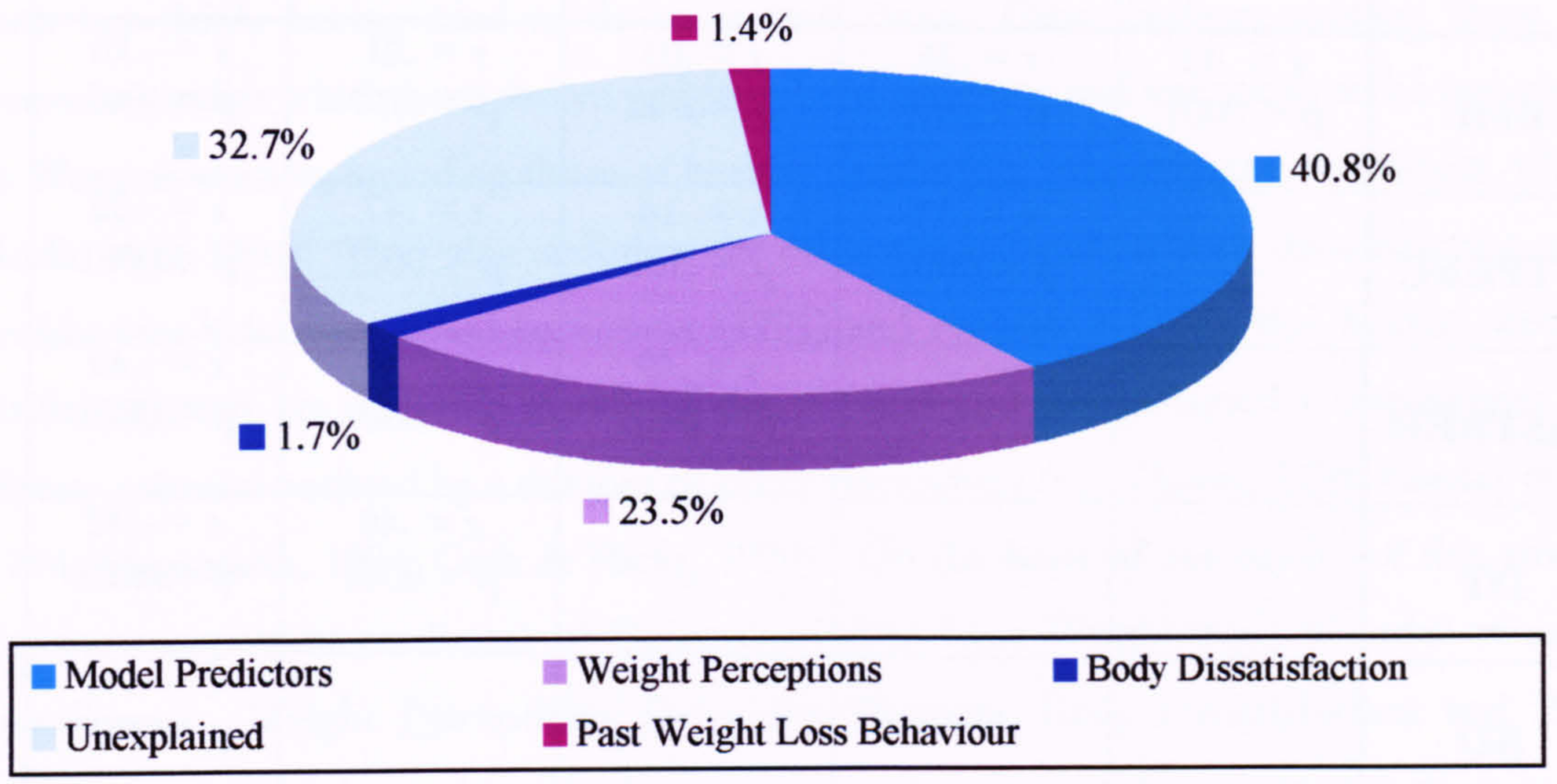
TABLE 2.3.2b Explanation of Variance in Determination to Lose Weight[a]

Model		Beta[b]	t	p	R^2 Change	Adj. R^2	F Change (Sig.)
1	(Constant)	10.87	7.04	<.0001	.424	.408	26.51 (<.0001)
	DT	.33	4.31	<.0001			
	SOCINF	.24	3.14	.002			
	SELFEFF	-.33	-4.23	<.0001			
2	(Constant)	-.55	-0.31	.761	.235	.647	73.84 (<.0001)
	DT	.34	5.65	<.0001			
	SOCINF	.10	1.60	.112			
	SELFEFF	-.21	-3.27	.001			
	WTPERC	.53	8.59	<.0001			
3	(Constant)	-.56	-0.32	.750	.017	.661	5.69 (.019)
	DT	.29	4.59	<.0001			
	SOCINF	.08	1.37	.181			
	SELFEFF	-.16	-2.57	.011			
	WTPERC	.48	7.35	<.0001			
	BD	.172	2.39	.019			
4	(Constant)	-1.25	-0.71	.477	.014	.673	4.83 (.030)
	DT	.23	3.49	.001			
	SOCINF	.09	1.57	.118			
	SELFEFF	-.10	-1.51	.134			
	WTPERC	.43	6.42	<.0001			
	BD	.18	2.58	.011			
	PASTBEH	.16	2.20	.030			

[a] Determination to Lose Weight is the dependent variable.
[b] Beta coefficients for all predictor variables are standardised, while those for constants are unstandardised.

The second hypothesis also received partial support from the data, with Past Weight Loss Behaviour explaining 1.4% of the remaining variance in Determination once both the model and non-model predictors had been taken into account. The second non-cognitive predictor, BMI, did not provide a significant contribution, though, and was excluded from the final equation. The final combination of predictors explained a total of 67.3% of the variance in Determination to Lose Weight in this sample of healthy weight women. The contributions of the different predictors are depicted in Figure 2.3.2d overleaf:-

FIGURE 2.3.2d The Proportions of Variance Explained in Determination to Lose Weight



One point that should be noted here, though, is that two out of the three Model Predictors forcibly entered into the first block of the analysis explained only non-significant proportions of the variance in Determination by the end: Social Influence lost its significance as soon as Weight Perceptions were added in Model 2 and Self-efficacy for Weight Control did so with the addition of Past Weight Loss Behaviour in Model 4.

2.3.3 POST HOC ANALYSES

As shown above, in contrast to expectations based on the published literature, the relationship between Self-efficacy for Weight Control and Determination to Lose Weight in this study was in a negative direction. It was also mediated by Past Weight Loss Behaviour, which itself correlated negatively with Self-efficacy and positively with Determination. More frequent past attempts to lose weight are therefore associated with greater determination to make further such attempts in the future despite correspondingly weaker levels of confidence with respect to the achievement of desired outcomes.

Consideration of the inter-relationships among other key variables of this study, presented in Table 2.3.3a, overleaf, offers a possible explanation for why this should be the case:-

TABLE 2.3.3i Inter-correlations Between Key Variables*

	WTPERC	PASTBEH	DT	BD	SELFEFF
BMI	r = .40 p <.0001	r = .26 p =.002	r = .03 p = .742	r = .21 p = .017	r = -.16 p = .063
WTPERC	---	r = .33 p <.0001	r = .14 p = .102	r = .47 p <.0001	r = -.32 p <.0001
PASTBEH		---	r = .49 p <.0001	r = .37 p <.0001	r = -.49 p <.0001
DT			---	r = .48 p <.0001	r = -.32 p <.0001
BD				---	r = -.46 p <.0001

* $\alpha = {}^{.05}/_{15} = .0033$

The significant positive relationships, which can be observed in Table 2.3.3i, between the number of past attempts to lose weight and both BMI and Weight Perceptions suggest that such attempts had generally failed to achieve or sustain desired outcomes. Since Past Weight Loss Behaviour is also positively associated with Body Dissatisfaction and Drive for Thinness, it would seem that weight-related distress increases with the number of failed attempts to lose weight to the point which it is of sufficient strength to over-ride the associated reduction in Self-efficacy and foster increased Determination to Lose Weight.

2.4 DISCUSSION

2.4.1 DISCUSSION OF MAIN FINDINGS

As expected, weight-related concerns and intentions to lose weight were common in the women who took part in this study, despite the fact that they were all of healthy weight. Many erroneously perceived themselves to be overweight, were dissatisfied with their

bodies and/or their weight and, despite not experiencing undue social influence to try to lose weight in the near future, expressed a degree of determination to do so. In addition, a significant majority had attempted to lose weight during the five years prior to the study, with two-thirds having tried to do so at least twice. These findings support those of previous studies which have shown weight-related concerns and intentions to be prevalent in Western women, including those of healthy weight (e.g. Hetherington & Burnett, 1984; Rodin et al, 1984). They also underline the relationship between body dissatisfaction and weight loss behaviour noted by Garner (1991) and support the view that healthy weight British women are currently at risk of the physical and psychological consequences of dietary restraint outlined by a number of other researchers (e.g. Ogden, 1995; Lissner et al, 1994; Tiggemann, 1994; Cash & Hicks, 1990). On the basis of the results of this study, the most important predictors of Determination to Lose Weight were, in order of their significance: Weight Perceptions, Drive for Thinness, Body Dissatisfaction and Past Weight Loss Behaviour. It might be useful, therefore, to conduct an intervention study targeting the first three of these variables in those with a high incidence of past weight loss behaviour to see if any reduction in Determination to Lose Weight might be achieved. However, since the causes and consequences of weight loss behaviour are not the prime foci of this thesis, no such study will be conducted here.

The primary aim of the current study was to explore the extent to which model, non-model and non-cognitive predictors would contribute to the explanation of variance in Determination to Lose Weight. It was predicted that the non-model predictors would add significantly to the explanation once the model predictors had been accounted for and that the non-cognitive predictors would add further explanatory power once both the model and non-model predictors had been taken into consideration. These hypotheses were both partially supported, since two out of the three non-model predictors and one of the two non-cognitive predictors contributed significantly to the explanation. Drive for Thinness, Social Influence and Self-efficacy for Weight Control together explained 40.8% of the variance in Determination scores, while Weight Perceptions and Body Dissatisfaction explained a further 23.5% and 1.7%, respectively, in the second stage of the analysis and Past Weight Loss Behaviour added a further 1.4% in the final stage.

Although the model predictors were forcibly entered into the equation, the other variables were added stepwise and both one non-model predictor, Weight Dissatisfaction, and one non-cognitive predictor, BMI, were excluded. In the former case, this is probably

attributable to the large overlap between this variable and both Weight Perceptions and Body Dissatisfaction (r = .50 and .62, respectively, p <.0001 in each case). Since both of these variables correlated more strongly with Determination than did Weight Dissatisfaction (see Table 2.3.2a, p.69), they will have been entered into the equation first, leaving only a non-significant amount of variance to be explained by Weight Dissatisfaction. With respect to BMI, this has already been shown to correlate with women's perceptions of the degree to which they are overweight (Mielewczyk, Broughton, & Legg, in preparation) and did so again here (see Table 2.3.3i, p.72), so it seems likely that much of the variance in Determination which might have been attributable to BMI had already been accounted for by Weight Perceptions in the second stage of the analysis.

The proportion of variance in Determination explained by the model predictors in this study is, at 40.8%, on a par with the 40% average explanation of variance in intentions identified in the reviews of Armitage and Conner (2001) and Godin and Kok (1996). Since the nature and assessment of the model predictors did not conform exactly to the algorithms of either the TPB or any other SCM, their usefulness as independent constructs has been strongly reinforced by this study. The value of the TPB, however, has been correspondingly reduced since, despite its complicated algorithms, it does not appear to have anything to offer in terms of explanatory power over and above that provided by the model predictors, as conceptualised and assessed in this study.

The 67.3% of variance in Determination to Lose Weight which was explained by the final equation of the analysis is clearly much greater than the average of 40% found across the reviews conducted by Armitage and Conner (2001) and Godin and Kok (1996). It is also either on a par with, or better than, all but one of the most successful TPB studies to date (see Table 1.2.2, p.50). To be able to explain proportions of variance of this magnitude is a significant achievement but it is, nevertheless, important to recognise the size of the task which remains, since the ability of the variables incorporated in any of these studies to explain the variance in actual behaviour would almost certainly be considerably less than their ability to explain that in intentions. For example, the average proportions of variance in behaviour reported in Godin and Kok (1996) and Armitage & Conner (2001) were just 34% and 27%, respectively, compared to the 41% and 39% averages which they found with respect to intentions – an average reduction of 24%. If similar reductions were to be assumed in the six most successful studies of this kind to date (i.e. in the current study, Bagozzi and Warshaw's [1990] investigation and the four most explanatory TPB studies

detailed in Table 1.2.2), where the average proportion of variance in intentions is 67.5%, that which would be expected to be accounted for with respect to behaviour would be just 51%, leaving almost half of the variance in behaviour still to be explained.

Despite the achievements of the studies conducted in this field so far, therefore, it is evident that our understanding of the influences on health behaviour performance is still seriously limited. Possibilities for how this situation might be addressed will be discussed below, but first there are some further points relating to the results of the current study which are worth noting. These concern the finding that two of the model predictors, Social Influence and Self-efficacy, became non-significant as a result of other variables being added into the equation in later stages of the analysis - a result which suggests that, in certain circumstances, both non-model and non-cognitive variables might make greater contributions to explanations of variance in outcomes than model predictors.

Social Influence became non-significant when Weight Perceptions were introduced into the analysis in the second stage. This result may indicate that the strength of a woman's determination to lose weight reflects her own appraisal of her size relative to a personal ideal to a greater extent than it reflects the expressed (or perceived) views of her family and friends. However, it might also be the case that the measure of Social Influence used in this study was inadequate to its task. The addition of questions relating to direct pressure, as suggested by De Vries et al (1995), was an attempt to acknowledge that social influence is not merely a question of injunctive norms and motivation to comply with these (which is all that is included under the TPB), but the scale may still have failed to address the most pertinent sources of social pressure. More work is needed in order to identify what those sources are and the extent to which they vary from individual to individual and according to the behaviour in question. However, this is tangential to the main aims of this thesis and will not, therefore, be pursued any further here.

As a predictor of Determination to Lose Weight, Self-efficacy for Weight Control became non-significant when Past Weight Control Behaviour was added to the equation in the final stage of the analysis, indicating a mediating effect of the latter. In addition, and contrary to expectations based both on the previous literature and on the premises of the SCMs (all of which claim positive associations between self-efficacy, or related constructs, and outcome variables), the relationships between Self-efficacy and both Determination and the other predictor variables were all in a negative direction. It is possible that the

measure used to assess Self-efficacy in this study was inadequate, particularly as, unlike the other model predictors, it focused on weight *control* rather than weight *loss*. However, since all the correlations reached levels of significance of at least 0.001, this seems unlikely.

A more feasible explanation comes from a consideration of both the mediating effect of Past Weight Control Behaviour on the relationship between Self-efficacy and Determination and the inter-correlations of some of the predictor variables. Post hoc analyses showed significant positive associations between the number of past attempts to lose weight and both Weight Perceptions and BMI, suggesting that participants' attempts at losing weight in the past had generally failed to achieve anything more than limited and/or short-term success in achieving desired outcomes. It can also be deduced, from the negative association of Past Behaviour and Self-efficacy for Weight Control, that women's confidence in their ability to control their weight reduces as the number of such failures increases. However, the positive associations of Past Behaviour with Body Dissatisfaction and Drive for Thinness and the mediating effect of Past Behaviour on the Self-efficacy-Determination relationship imply that ongoing distress in the face of repeated failure to lose weight is sufficiently strong to over-ride such reductions in confidence, thereby promoting stronger levels of determination to make a further attempt to lose weight in the future. Despite the attention it has received in the literature, it would appear, therefore, that self-efficacy may be a less useful variable to take into account when attempting to explain individual differences in the performance of health behaviours than people's ongoing distress in the face of repeated failure to achieve their desired outcomes.

The theoretical implications of these findings will be discussed in Section 2.4.3, below. First, however, limitations relating to the methodological approach adopted in this study need to be taken into consideration.

2.4.2 METHODOLOGICAL LIMITATIONS

The investigation reported here was conducted by means of a cross-sectional design, using a quantitative, questionnaire-based approach and focussing on behavioural intentions as the target outcome. Although the use of cross-sectional designs and the confinement of

dependent measures to those tapping intentions were criticised in the previous chapter, both were considered appropriate to this investigation since improvements to explanations of behaviour are unlikely to be demonstrated in the absence of improvements to those of intentions. Questionnaire-based work has the advantage that a large amount of data can be collected in a short space of time, without being unduly demanding of either participants or researchers and with relatively small financial outlay. Data are readily quantified and can be comprehensively analysed by means of modern software packages capable of carrying out complex, multivariate procedures. Finally, results are readily comparable across studies, making evaluation of the impact of additional or amended predictors straightforward to conduct.

The use of self-report questionnaires is, however, subject to a number of limitations. First, the potential for questionnaire items and response options to be interpreted in different ways reduces the extent to which responses can be assumed to represent accurate reflections of underlying cognitive constructs. In addition, the practice rests on the assumption that these constructs are stable in nature - an assumption which has been challenged by Potter and Wetherell (1987) and also by Stainton Rogers (1991), who argues that such scales: "...do not provide any scope for recording uncertainty, varied reactions, or shifts in opinion from one moment to another." (p. 67). There is also a risk of losing information that is important in individual cases when data are aggregated into means and general trends (Ingham, 1993).

Another inherent assumption of this approach is that completing a questionnaire has no influence either on the cognitions being assessed or on subsequent behaviour. However, as Ogden (2003) argues, it is possible that the act of responding to questionnaire items may cause new cognitions to be created (where the target behaviour is unfamiliar to the respondent), existing ones to be shifted (as a result of emotional reactions to the items) or subsequent behaviour to be altered (because of increases in salience and/or social desirability). Increases in salience, resulting from having addressed early questionnaire items, might also influence participants' responses to later items in the same measure. In the case of this study, for example, responding to the early Weight Perceptions and Determination to Lose Weight items may have increased the salience of weight-related issues and thereby affected responses to the Drive for Thinness and Body Dissatisfaction subscales. Had these two pairs of subscales been presented in the opposite order, then the

response made to the Weight Perceptions and Determination subscales might have been affected by having already completed the other pair. The former direction of influence was considered less undesirable than the latter, however, which is why the items relating to Determination, in particular, were presented at an early point in the questionnaire.

These limitations clearly reduce the extent to which the findings of studies employing self-report questionnaires can be generalised across individuals, behaviours, times and contexts. However, since the use of the approach is common to the majority of explorations of influences on health behaviour performance, the impact of its limitations on cross-study comparisons is minimal and its use here, in order to facilitate the evaluation of supplementing model predictors with non-model and non-cognitive predictors, was therefore justified.

2.4.3 Theoretical Implications

This study has reinforced the ability of the combined model predictors to explain a significant proportion of the variance in behavioural intentions but it has also called into question the inherent usefulness of the SCMS over and above that of their constituent constructs. While significant improvements in explanations of variance in intentions were provided by the addition of the behaviour-specific predictors, almost a third of the variance remained unexplained by the final equation and calculations made on the basis of the findings of meta-analytic reviews suggest that only around half of the variance in actual behaviour would be likely to be explained by the same combination of variables. Since, despite the deliberate lack of adherence to the algorithms of any particular model, the results of the study were on a par with others which have successfully added variables to the usual model predictors (as detailed above), it seems probable that a ceiling has been reached in the proportion of variance explainable by studies of this nature. If the significant gaps remaining in knowledge and understanding of influences on the performance of health behaviours are to be addressed, therefore, more radical departures from the SCM approach are clearly required.

One potentially important direction for further research and the subsequent development of theory was identified in this study and this concerns the nature of the links between

past and future behaviour. Past behaviour has been relatively neglected as a predictor in the literature, but Norman et al (2000) and Conner and Armitage (1998) have shown that it can make a significant contribution to explanations of variance in future behaviour and these findings were reinforced here. In this study, past behaviour was found not only to be a significant, independent predictor of Determination once all the other predictors had been taken into consideration, but also to mediate the relationship between Self-efficacy and Determination. In addition, the inter-correlations of key variables in this study suggest that cognitive and emotional responses to the outcomes of past behavioural efforts may have an important bearing on future attempts to adopt the same target behaviour. Specifically, ongoing distress related to body shape and weight appears to have over-ridden reductions in self-efficacy associated with previous failures in order to foster intentions to make another weight loss attempt in the near future. It does not seem likely, though, that patterns of response to past failed attempts to adopt a health behaviour would necessarily be the same across all behaviours and circumstances. For example, the reactions of the women in the current study might differ in type and/or strength to those of a sample of obese women who had achieved, but failed to sustain, significant losses of weight over the same period of time. Differences might also be seen according to the salience of the need for the attempted change to be established in the near future. The initiation and/or outcome of attempts to change behaviour by cigarette smokers with severe CHD, for example, might be more greatly influenced by the fear of imminent death than by any reactions to having failed to stop smoking in the past.

Exploration of the nature of reactions to past failed attempts to adopt health behaviours and of how these might impact upon future attempts, across a range of behaviours and circumstances, could therefore prove a useful move beyond social cognition models and foster the generation of new theory concerning influences on health behaviour performance. Before doing this, however, the literature concerning the influence of temporal factors on the process of health behaviour change needs to be reviewed in order to discover the extent to which it might inform such an exploration. The most common approach which has been taken in the investigation of temporal influences on health-related behaviour change involves the application of Stage Models, so this body of literature will now be discussed.

CHAPTER THREE

Stage Models of Behaviour Change

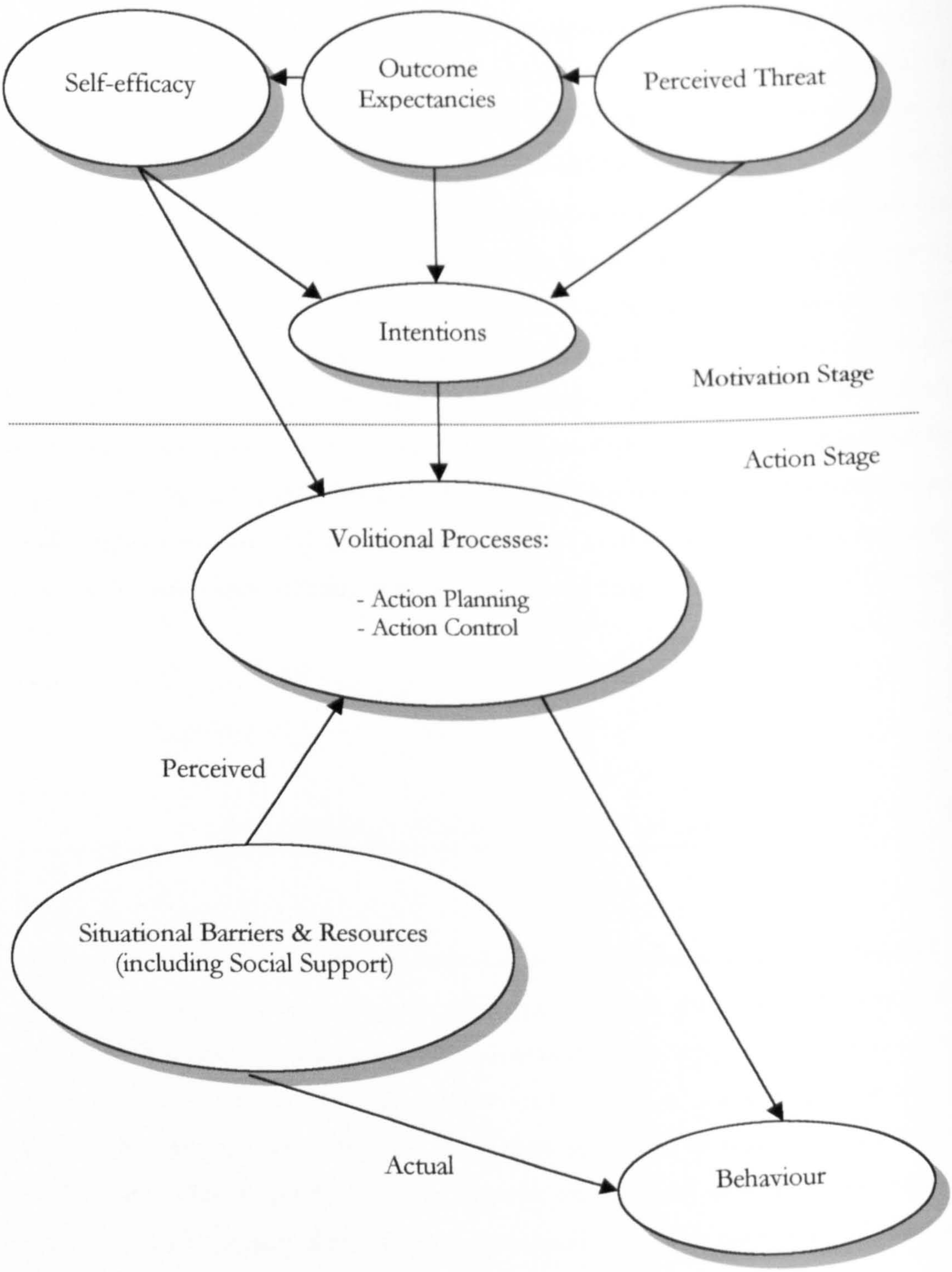
3.1 INTRODUCTION

Stage models are those which rest on the assumption that establishing a sustained change in behaviour involves passing through two or more discrete stages in which the nature and/or strength of social cognitive influences will differ (Norman and Conner, 1996b). The most recent of these is the Health Action Process Approach (HAPA; Schwarzer, 1992b). This model was developed directly out of the SCMs and represents an attempt to retain the best features of those models previously in existence while addressing some of their key limitations. The HAPA has not yet been fully tested, however, and the earlier Transtheoretical Model (Prochaska & DiClemente, 1983), which was developed out of theories of psychotherapeutic change, has been far more widely applied. The performance of both of these models will be evaluated below, together with a brief consideration of Implementation Intentions (Gollwitzer, 1993) as these bear strong similarities to Action Planning, which is a key component of the HAPA. Following this, a model with potential in this area which has not yet been directly applied to health behaviour change will be introduced - the Idealised Process Model of Cognitive-Affective Reactions to Repeated Failure (Jerusalem & Schwarzer, 1992).

3.2 THE HEALTH ACTION PROCESS APPROACH

The first key distinction between the Health Action Process Approach (HAPA) and the SCMs reviewed earlier is the identification of the two phases which Schwarzer (1992b) claims to make up the process of health behaviour change. These are depicted, along with their component variables, in Figure 3.2, overleaf. The first of the two phases, the Motivation Stage, is that in which the decision to attempt to change the behaviour is arrived at, with Schwarzer claiming the strength of the intention to take action to be influenced by perceived threat, outcome expectancies (including a subset of social outcome expectancies, considered equivalent to normative beliefs) and self-efficacy. Schwarzer suggests that perceived threat stimulates the formation of outcome expectancies and that these, in turn, stimulate self-efficacy.

FIGURE 3.2 Diagrammatic Representation of the Health Action Process Approach



In the second phase of behaviour change proposed within this model, the Action (or Volitional) Stage, the other major distinction between the HAPA and the SCMs can be seen, as this is where Schwarzer attempts to address the gap between intentions and behaviour. As in the TPB, beliefs about personal control (operationalised here as self-efficacy) are assumed to have an effect beyond that of influencing intentions. In this case, rather than a direct effect on behaviour, these beliefs have been awarded a bearing on both of the volitional processes (action planning and action control) which are central to the second stage of the model and which are themselves proposed to influence behaviour directly. The volitional processes are also considered to be influenced by perceived situational barriers and resources. Finally, Schwarzer also proposed external factors (i.e. actual situational barriers and resources) to have a direct bearing on behaviour.

Since Schwarzer claims his model to utilise the best features of various SCMs, including the HBM and the TPB, it is hardly surprising that most of the predictor variables are familiar although, on these grounds, the inclusion of perceived threat might not have been anticipated, given its inconsistent performance as a component variable of the HBM (see Section 1.2.1, above). However, the volitional processes of action planning and action control are completely different from any of the component variables of either the HBM or the TPB. Action planning involves the formation of concrete strategies for how successful behaviour change might be achieved, such as by the avoidance of high risk situations or by the development of means by which those that cannot be avoided may be managed. For example, a smoker trying to quit might ask guests not to smoke while in his or her home or might decide to go for a short walk after each meal instead of having a cigarette. Action control, on the other hand, involves meta-cognitive activities designed to promote coping when faced with critical situations, such as the making of favourable social comparisons (e.g. *Mark and Jane have both managed to stop smoking and I have more willpower than either of them*) or referring to one's self-concept (e.g. *I am generally a responsible and sensible person and it goes against that for me to engage in this extremely risky behaviour*). Schwarzer claims that the more that action planning and action control activities are engaged in and the more closely they are matched to particular risky situations, the easier it will be for the individual to persist in their attempt to change behaviour

One notable omission of the HAPA, despite its title, is the lack of a comprehensive consideration of process issues – a failing which is observable in the absence of a clear

proposal for what might promote movement between the two stages. The assumption seems to be that some minimum level of self-efficacy and/or minimum strength of intentions must be surpassed. However, this is not made explicit and no indication is given of what the minimum values might be, leaving the model resembling more a social cognition model with some extra variables slotted in between intentions and behaviour than a genuine stage model which clearly incorporates both temporal and process-based components.

This omission may go some way towards explaining why the HAPA has not made a great impact on the worldwide community of health psychologists. It receives no mention in Taylor (2003), Sarafino (2002) or Marks et al (2000) and only a brief paragraph in Ogden (2000). In addition, just five papers have been found which purport to test the model[20] and, of these, none provides a full test: instead of using the model as a whole, each study includes just some of its component variables. For example, the studies by both Garcia and Mann (2003) and Schwarzer and Fuchs (1996) have been confined to the prediction of intentions, and have thereby completely ignored the most original part of the model, the Action stage. Barling and Lehman (1999) assessed all components of the Motivation stage plus social support and barriers but they, too, failed to take account of the volitional processes of action planning and action control. Conversely, while Luszczynska and Schwarzer (2003) incorporated the volitional processes into their study, they left out social support and barriers. Finally, Murgraff and McDermott (2003) considered the influence of intentions plus cognitive activities of relevance to the Action stage but did not include the pre-intention motivational predictors.

Given this state of affairs, full evaluation of the HAPA as a coherent stage model is not possible and conclusions as to its potential can be tentative at best. This endeavour is further hampered by the fact that the internal consistency of each of the scales used by Barling and Lehman failed to reach the generally accepted level of 0.7 (Rust & Golombok, 1989), making the findings of this study unreliable. The remaining four studies have produced some evidence in favour of the HAPA but fail either to support Schwarzer's claim that it is a superior model to the other SCMs or to establish its value as a stage model. Garcia and Mann found the model to provide stronger predictions of intentions than either the HBM, the TRA or the TPB, but the absence of any test of the Action stage

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[20] using PsycInfo and entering *Heath Action Process Approach* into title and keyword searches.

precludes a proper assessment of the its ability to account for the intention-behaviour gap. In Schwarzer and Fuchs (1996), 29% of the variance in intentions and 20% of that in behaviour was explained by a combination of the Motivation stage variables and past behaviour and, although Murgraff and McDermott accounted for 29% of the variance in behaviour, neither of these studies provide greater explanations of variance than those achieved by the TPB. In addition, and perhaps because of the key limitation of the model itself (outlined above), none of the four studies have addressed the issue of the basic requirements for progression between the Motivation and Action stages to occur.

The evidence in favour of the model as a whole is therefore far from convincing. However, indirect support for the value of forming action plans can be found in a consideration of the literature concerning Implementation Intentions (IMIs), which were first outlined by Gollwitzer in 1993. IMIs generally take either of two forms. One involves a specific plan for when and where to carry out a given, desired behaviour, for example: *I will go for a swim at my local sports centre on the way to work on Wednesday.* The other, which takes the form *If I find myself in situation X I will engage in behaviour Y*, is that which most closely resembles Schwarzer's action plans and can therefore easily be used in relation to situations posing a high risk to an attempt to change a health behaviour. This can be demonstrated by a slight re-wording of the example of an action plan provided earlier, *viz: When I reach the end of a meal, I will go for a short walk instead of smoking a cigarette.* IMIs have been proposed to operate by facilitating the retrieval of intentions in memory (Orbell, Hodgkins & Sheeran, 1997) or by rendering the planned behaviour automatic when the given situation arises (Gollwitzer & Schaal, 1999) and they therefore clearly belong in the Action stage of any description of the process of behaviour change.

In terms of performance, some positive results have been achieved using IMIs. Sheeran and Orbell (2000), for example, found 92% of those who had formed IMIs kept a breast screening appointment compared to 69% of controls and, in Svenson, Oestergren, Merlo and Rastam (2002), students who had formed IMIs used condoms more consistently than those who had not. Verplanken and Faes (1999), report IMIs to have added significantly to intentions in predictions of healthier eating, while Murgraff, White and Phillips (1996) found IMIs to increase the likelihood of binge drinkers keeping within safe limits for single occasion drinking and to do so independently of both intentions and frequency of past binge drinking. Not all studies provide findings which as clear-cut as these, though.

For example, Higgins and Conner (2003) achieved only non-significant reductions in smoking initiation and behaviour in 11- and 12-year olds who had made IMIs, while Diefendorff and Lord (2003) suggest that the impact of IMIs on performance depends partly on the quality of the strategies developed. Overall, however, this area of research is promising and suggests that, despite the apparently weak potential of the HAPA as a whole, careful planning may be an effective means of improving the likelihood of intentions being translated into sustained behaviour change. This issue will be returned to in the final study of this thesis, reported in Chapter 7.

3.3 THE TRANSTHEORETICAL MODEL

When the Transtheoretical (or Stages of Change) Model (TTM) was developed by Prochaska and DiClemente (1983), their main aim was to establish a means of classifying individuals according to their stage of readiness to change in order that stage-appropriate interventions could be developed which would, hopefully, result in the facilitation of forward stage progressions. The model evolved out of a review of more than three hundred theories of psychotherapy and was originally developed for use in relation to smoking, alcoholism and drug addiction, although it has also now been applied to a range of other health-related behaviours. The model incorporates three key features: five discrete Stages of Change purported to be involved in the process of establishing a change in behaviour; ten Processes of Change, which are a series of activities proposed to be used differentially across the stages and to facilitate progression between them; and, finally, Decisional Balance, a weighing up of the pros and cons of changing the behaviour, which is also claimed to differ between the stages and to aid forward stage progression.

Table 3.3a provides both a basic description of each of the five stages of change (taken from Ogden, 2000, p.21) and also the most recent algorithm developed for determining the stage in which any individual belongs (adapted from DiClemente, Prochaska, Fairhurst, Velicer, Velasquez and Rossi, 1991):-

TABLE 3.3a The Five Stages of Change Proposed Within the TTM

Stage	Basic Description	Algorithm
Pre-contemplation	Not intending to make any changes to behaviour	Not thinking seriously about changing within six months
Contemplation	Considering a change	Thinking seriously about changing within six months but not intending to do so in the next month and/or not having made at least one attempt, lasting for at least 24 hours, during the past year
Preparation	Making small changes	Thinking seriously about changing within 30 days and having made at least one attempt, lasting for at least 24 hours, during the past year
Action	Actively engaging in a new behaviour	Behaviour has been changed, but for less than six months so far
Maintenance	Sustaining the change over time	A change has been sustained for at least six months

Although the model has achieved a degree of popularity, some criticisms have been lodged against the proposed stages. Bandura (1997), for example, has described them as artificial and as failing to reflect the true process of changing behaviour. More specifically, Sutton (1996) points out that, since the definition of the Preparation stage includes a prior attempt to change the behaviour, it follows that someone making a first attempt can never enter this stage. He also argues that the distinction between the Action and Maintenance stages is purely an arbitrary one, unmarked by any event of personal significance (such as a one-year anniversary) and that there is no reason to expect different processes of change to come into play simply because six months have elapsed since the change in behaviour was initiated. Ogden (2000) also finds the stage transition points problematic, suggesting it is difficult to know whether these are real or merely artefactual divisions of what is, in reality, a continuum.

In terms of progression, the model permits a return to an earlier stage at any point, but there is no allowance for moving backwards through consecutive stages (from Preparation to Contemplation to Pre-contemplation, for example) and forward progression must always take place in consecutive order, with no stage(s) being missed out. If an individual who had been in the Action stage were to experience a lapse and return to the Pre-

contemplation stage, therefore, they would be expected, under the terms of the model, to move into the Contemplation stage next and then again into Preparation before finally returning to Action. The model would not allow for them to jump forwards directly from Contemplation to Action, for example. In practice, however, there is little evidence that people really do follow these principles and pass through the five stages in the ordered fashion claimed by Prochaska and DiClemente (Sutton, 1996).

With respect to the decisional balance construct, Prochaska and DiClemente (1983) claim the pros of a changing a behaviour to be weak in pre-contemplators and to increase with progression across the five stages while the reverse pattern to be true in relation to cons. The evidence relating to these proposals will be discussed below. First, however, the processes of change will be outlined. As can be seen in Table 3.3b, below, five of these are behavioural, concerning actions considered helpful to the desired change, and five are experiential, relating to thoughts and feelings about the behaviour:-

TABLE 3.3b The Ten Processes of Change Proposed Within the TTM

Behavioural Processes	Experiential Processes
Self-liberation Choosing and committing to changing behaviour or believing in ability to change	***Consciousness Raising*** Gathering information about the behaviour and oneself
Counter-conditioning Substituting alternatives to the behaviour	***Self Re-evaluation*** Re-considering the self in relation to the behaviour
Stimulus Control Avoiding or countering stimuli that are associated with problem behaviours	***Emotional Arousal*** The experience and expression of feelings about problems associated with the behaviour and their solutions
Reinforcement Management Receiving rewards, from self or others, for making changes to behaviour	***Environmental Re-evaluation*** Assessing how one's behaviour affects the personal and physical environment
Helping Relationships Being open and trusting about difficulties with caring others	***Social Liberation*** Increasing alternatives, within society, for alternative behaviour(s)

A literature search for papers applying this model[21] elicited 29 studies across 28 empirical papers, including one meta-analytic review. Unfortunately, the majority of studies were

[21] using PsycInfo and entering *Transtheoretical Model* and *Stages of Change Model* into title and keyword searches

cross-sectional and therefore not capable of providing full tests of the proposed facilitating roles of either decisional balance or the processes of change with respect to stage progression. However, the majority of the ten cross-sectional studies which included the decisional balance construct did find stage-related differences in pros and cons in the directions proposed by Prochaska and DiClemente (e.g. Park, de Pue, Goldstein, Niaura, Harlow, Willey, Rakowski & Prokhorov, 2003; Keller, Herda, Ridder & Basler, 2001; Kelaher, Gillespie, Allotey, Manderson, Potts, Sheldrake & Young, 1999; Kraft, Sutton & Reynolds, 1999; Gorely & Gordon, 1995; Fava, Velicer & Prochaska, 1995). No differences were observed in the strength of perceived cons according to stage of change by Callaghan, Eves, Norman, Change and Lung (2002), though, and, in the study by Herzog, Abrams, Emmons, Linnan and Shadel (1999), which is the only longitudinal study found which also explored this issue, baseline pros and cons failed to predict stage progressions in smokers at either a one- or a two-year follow-up.

Almost half of the studies elicited by the literature search took no account of the processes of change and, of those that did, two-thirds were cross-sectional (n = 10). While results from these generally provided at least some support for the processes of change, wide differences were found across the studies. Callaghan et al (2002), for example, found that nine out of the ten processes of change differed significantly across stages of change in relation to exercise behaviour and that the failure of the tenth, social liberation, to reach significance may have been due to poor internal consistency of its measure. By contrast, however, only three out of the ten processes were found, by Borland, Segan and Velicer (2000), to differ between groups of smokers and recent quitters and Gorely and Gordon (1995) found only half of them to make unique and significant contributions to discrimination between those in different stages with respect to exercise.

Some of these cross-sectional studies were further limited by a consideration of only the first three stages of change; that is, from Pre-contemplation to Preparation. Here too, though, findings were not entirely consistent and, while both Herzog et al (1999) and Fava et al (1995) observed linear increases in the processes of change across these three stages, Andersen and Keller (2002) did not find those in the Contemplation stage to demonstrate a reliance on any of the processes. Despite these inconsistencies, Marshall and Biddle (2001) conclude their meta-analytic review by stating that the evidence is strong enough to

assume that stage membership is associated with different levels of processes of change. However, as with decisional balance, the existence of a causal role of these processes in forward stage progression can only be determined in studies carried out over time and the results of the five studies elicited by the literature search which adopted either prospective or longitudinal designs provide only very weak evidence for this role. For example, Carlson, Taenzer, Koopmans and Casebeer (2003) found only reinforcement management to have differed at baseline between those smokers who had quit three months after an intervention and those who had not. Similarly, Segan, Borland and Greenwood (2002) also found just one process to be associated with quitting smoking and, as this was self-liberation in this case, which is markedly similar to self-efficacy, the finding does not provide any information which is really new. Even less successfully, Nigg (2001) found no effects of any process of change with respect to exercise and, in the study by Herzog et al (1999), baseline processes of change in smokers failed to predict progressive stage movements at either the one- or the two-year follow-up. These recent findings therefore support the earlier conclusion made by Sutton that: "...there is no strong evidence that using particular processes in particular stages promotes movement to subsequent stages..." (Sutton, 1996, p.203).

Further doubt has been cast on the proposed facilitating role of the processes of change by the results of studies exploring the efficacy of providing individuals with interventions matched to the stage they have reached to date. Sutton (1996) has argued that the lack of evidence that the processes promote forward progression across the stages leaves little reason to believe that the provision of stage-matched interventions will foster successful behaviour change. This argument has also been supported by the literature, since examples have been provided of stage-matched interventions being both more and less effective than mis-matched ones (e.g. Dijkstra, de Vries, Roijackers & van Breukelen, 1998; Quinlan & McCaul, 2000, respectively). This inconsistency of the evidence is further illustrated in the reviews by Spencer, Pagell, Hallion and Adams (2002) and Sutton (2001).

The study by Herzog, Abrams, Emmons and Linnan (2000) appears, at first glance, to offer some new support for the TTM by suggesting that the role of the processes of change might be more reliably assessed where individuals are classified according to Biener and Abrams' (1991) contemplation ladder rather than the highly complex staging

algorithm of DiClemente et al (1991) which was presented in Table 3.3a, above. Even this study, however, found only two of the processes of change, consciousness raising and self re-evaluation, to promote increases in readiness to stop smoking and this was only the case in those already in the later stages of readiness to take action. The study therefore fails to provide support for the TTM's ability to offer an explanation of movement through the earlier stages, although it should be noted that only six out of the ten processes of change were included in the study and those already taking or maintaining action were excluded from it.

Overall, therefore, the Transtheoretical Model does not appear to have made a particularly useful contribution to the development of understanding of the nature and mode(s) of operation of the key influences on health-related behaviour change. Sarafino (2002) suggests that one reason for the lack of success both of this model and of the SCMs reviewed earlier is their focus, in the main, on rational processes, since this leads to a failure to take account of the conditions which can over-ride logical decision-making. Cognitive and emotional reactions to past failures to achieve desired behavioural outcomes, proposed at the end of the last chapter as potential influences on future behaviour, might be examples of such conditions. Jerusalem and Schwarzer (1992) put forward a detailed model of how cognitive-affective responses to stress may occur in the face of failure to achieve difficult tasks and have both illustrated how aspects of this response may change with repeated failure experiences and proposed some possible effects that these changes may have on future behavioural effort. This model will be outlined and reviewed in the next section and its potential for application to health behaviour change discussed.

3.4 THE IDEALISED PROCESS MODEL

Cognitive-affective responses to stressful situations, known as Cognitive Stress Appraisals (CSAs) were first identified by Lazarus and Folkman in their Transactional Model of Stress and Coping (e.g. Lazarus & Folkman, 1984), in which it is claimed that, while situations and events which are perceived as taxing or exceeding available resources are appraised, in the first instance, as being stressful, they are then further evaluated in terms of three types

of CSA: Challenge, Threat and Harm/Loss[22]. For the first of these, Challenge, the situational demands are such that, although a stressor is perceived to be present, it is appraised as providing an opportunity for some kind of personal gain and the individual is excited, keen to meet its demands and confident of its outcome. By contrast, Threat appraisals are formed when the individual is concerned that the resources available to them may be inadequate to deal with the situational demands and therefore perceives themselves to be at risk of physical and/or psychological damage. Functioning, morale and somatic health are all proposed to worsen in the presence of Threat appraisals. In the case of Loss, some kind of personal damage has already been sustained and the person feels threatened by the risk of further damage in the future. According to Lazarus and Folkman, these three different types of appraisal are not mutually exclusive but, rather, can be held simultaneously, albeit at different levels.

Jerusalem & Schwarzer (1992) have built on Lazarus and Folkman's ideas by proposing that the strength with which each CSA is held differs according to the number of failed attempts to perform a particular task. They also claim that the changes which take place in each CSA with increasing failures are non-linear and that each operates independently of the others. They divide their Idealised Process Model of Cognitive-Affective Reactions to Repeated Failure (IPM) into four stages according to both the relative strength of the CSAs and the associated levels of motivation and persistence which can be observed in relation to future attempts to perform the task in question. A diagrammatic representation of the IPM is provided in Figure 3.4, below, where it can be seen that, while Challenge appraisals are predominant in the first stage of the model and those of Loss the weakest, these relative positions have reversed by the fourth stage. In both of the interim stages, Threat appraisals are predominant, with those of Challenge being first stronger and then weaker than those of Loss (in Stages 2 and 3, respectively).

Stage 1 of the IPM is known as the Challenge Stage and is proposed to be characterised by a productive arousal, whereby the person explores the nature of the task and feels confident in his/her ability to cope with its demands. Stage 2, the First Threat Stage, occurs when the anxiety produced by initial failure experiences combines with productive arousal to form a state of facilitating anxiety, in which the person is likely to persist with the task. In the third stage of the model, the Second Threat Stage, the person is claimed

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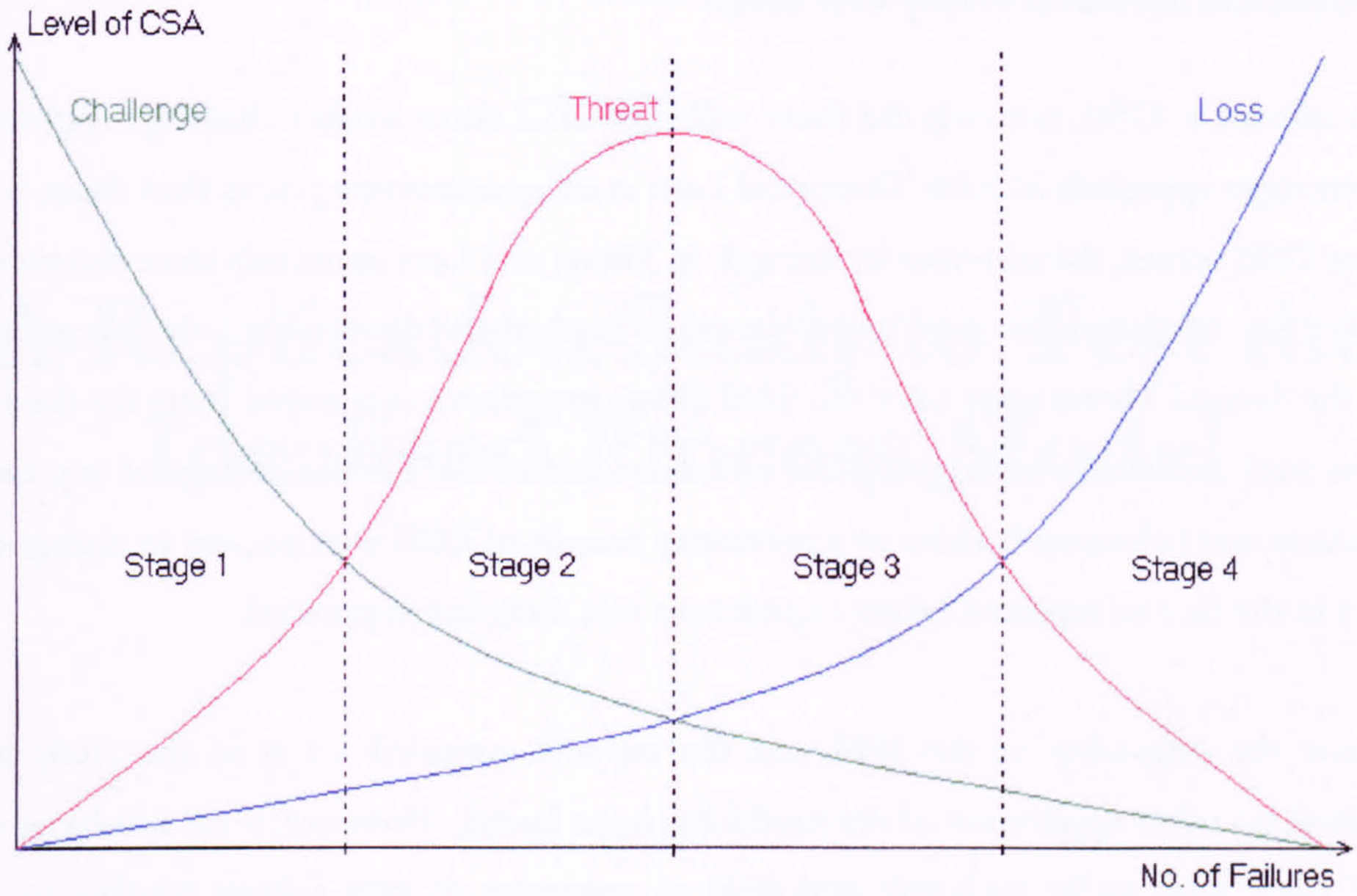
[22] Jerusalem and Schwarzer mainly refer to this CSA as *Loss*, so it will also be termed as that here.

to be in a state of debilitating anxiety, which is characterised by worries about capability and the potential for further failures if future attempts are made to carry out the task. In the final stage, Loss of Control, helplessness is proposed to occur as a result of the numerous failures so far experienced and, in the face of the conviction of almost certain of failure at any future attempt at the task, disengagement from it takes place.

FIGURE 3.4 Diagrammatic Representation of The Idealised Process Model



In addition to this basic framework of the IPM, Jerusalem and Schwarzer also propose a differential effect of failure experiences on CSAs according to baseline levels of Generalised Self-Efficacy (GSE) - a general belief in one's level of ability to master life's demands. Compared to those with higher scores, those low in GSE are claimed to appraise ongoing failure situations as being less challenging and more threatening and, eventually, as uncontrollable; that is, they are proposed to be more vulnerable to progression through the four stages outlined above and therefore also to associated losses of motivation and persistence in relation to future attempts at the behaviour in question.

In order to test both the basic IPM and any differences according to GSE, Jerusalem and Schwarzer carried out a Massed Trial study where 105 German-speaking adults were given fictitious failure feedback after each of nine sets of cognitive tasks, carried out one immediately after the other. Following each presentation of failure feedback, CSAs were assessed by means of self-report questionnaire. Each type of appraisal was present at each measurement point, with Challenge appraisals decreasing significantly with the number of failure experiences and those of Threat and Loss both increasing - results which provided support for the IPM. However, it should be noted that, contrary to the non-linear patterns of change in CSAs proposed under the IPM, those observed in Jerusalem and Schwarzer's study were linear.

With respect to GSE, not only did those with low GSE show weaker challenge appraisals and stronger appraisals of both Threat and Loss at all measurement points than those with higher GSE scores, the increases in strength in Threat and Loss appraisals were shown (by GSE x No. of Failure interactions) to be more marked for the former, who progressed into the Second Threat stage after the third failure experience and stayed there for the rest of the study, while the latter group did not move out of the Challenge stage at any time. Jerusalem and Schwarzer's claim of a protective benefit of GSE with respect to changes in CSAs in the face of repeated failure experiences was therefore supported.

Despite the originality of the IPM and the support provided for it in the study just outlined, no other application of the model has been found. However, if the results of the 1992 study were to be replicable and were to generalise to past failures relating to the performance of health behaviours, Jerusalem and Schwarzer's proposals could have important implications for those attempting to understand and promote the performance of health-promoting behaviours and the eradication of health-compromising ones. If, for example, the patterns of change in cognitive appraisals proposed under the IPM were to be found in those repeatedly failing to succeed in attempts to adopt health behaviours, then intervention programmes (such as those promoting smoking cessation, regular exercise or healthy eating) could incorporate measures designed to minimise or counteract these changes. If the changes were also found to be more marked in individuals with low GSE then interventions could specifically target such individuals, thus ensuring the most appropriate use of available resources. This being the case, a full exploration was undertaken of the potential of this model for application to the performance of health behaviour and is reported in the following three chapters of this thesis.

CHAPTER FOUR

A Replication Study to Test the Idealised Process Model

4.1 AIMS & HYPOTHESES OF THE SECOND STUDY

The first step in the process of assessing the potential value of the IPM in this area was to test its generality by means of a constructive replication of Jerusalem and Schwarzer's study[23]. The hypotheses tested reflect the findings of that study:-

1. There will be significant changes in each CSA as the number of failures experienced increases.

2. These changes will be more marked in those with low GSE than in those with high GSE.

3. Those in the low GSE group will reach at least the First Threat Stage of the IPM, while those with high GSE will remain in the Challenge Stage throughout.

4.2 DEVELOPMENT OF MATERIALS AND PILOT-TESTING

Since Jerusalem and Schwarzer's study was conducted by German-speaking participants, all materials used were in German. It was therefore necessary for equivalent materials to be developed in English. These comprised a questionnaire to assess the three types of CSA (the CSAQ), six sets of 15 anagrams and three sets of 15 intelligence test items. All these materials were pilot-tested, as detailed below.

4.2.1 PARTICIPANTS IN THE PILOT TEST

Since the phenomenon under investigation is unlikely to be specific to any particular population, participants were recruited for the pilot test using convenience sampling

[23] a few small changes were made to the original methodology - details are given in Section 4.2.

methods. 19 in total took part, 12 female and 7 male, aged from 20-62 years (mean = 37.4 years). One early participant in the pilot test did not speak English as a first language and, although she was sufficiently fluent to be conducting a doctorate in English, she found the anagrams extremely difficult. It was therefore decided that a requirement would be made for all remaining pilot and main study participants to speak English as their first language.

All but two of those who took part had undergone higher education: 80% (n = 15) had at least a Bachelor's degree, one other had an HND and one an HNC. The remaining two participants had completed their education at Advanced level. This level of education, while admittedly not representative of the general adult British population, was considered warranted given the difficult nature of the tasks to be carried out, particularly the intelligence test items, which were drawn from a test designed for those with the ability to study successfully at higher education level (see Section 4.2.5ii for full details of this test).

4.2.2 PROCEDURE

Participants were approached individually by telephone or email and, after a brief description of the study, asked if they were prepared to take part. Those who agreed were tested in the researcher's office or in their own homes, whichever they preferred. Before starting on the tasks, however, participants were given full written details of the nature of the part they were being asked to play in the study and asked to sign a consent form indicating their agreement to participate (see Appendix B, p.276, for copies). Although all were informed that they were free to change their mind about taking part in the study, none did. Once they had agreed to continue, participants were presented, via computer, with information about how to work through the anagram tasks and were then asked to key in their age and indicate their maximum level of educational achievement from a selection on offer. After this, they were presented with the five practice anagrams, each being followed by the correct answer, before moving on to the six sets of 15 anagrams, with the procedure for each set being as follows:-

- participants worked through the 15 anagrams in the set, being given 30 seconds to complete each before the next was automatically brought up on the computer screen[24]

- if an attempt was made to solve an anagram, it was followed by the word "correct" or "wrong", together with either a high- or low-pitched tone to denote a successful or failed attempt, respectively

- at the end of each set participants were given their score for that set

Participants were asked to complete the CSAQ at the end of the first set of anagrams. The measure was presented at this point as, once it had been completed, participants could be told that the items increased in difficulty within each set, but not across sets, that items were deliberately difficult, and the reasons for this. It was considered important to present the information at this point as, although it will not be possible to provide it to participants in the main study until after they have completed all nine sets of tasks, it was felt unethical to withhold the information this long if it could possibly be provided earlier. This was the earliest point at which the CSAQ could be completed since some idea of the nature of the task demands is required for responses to be meaningful.

Once all sets of anagrams had been carried out, participants moved on to the pen-and-paper intelligence test items. Practice items were completed first and then discussed with the researcher to ensure participants' understanding of the requirements of the different types of task. Once this was established, participants worked through the three sets of items, being allowed 7.5 minutes for each[24], and again being provided with their scores at the end of each set. On completing the study they were fully de-briefed and paid £10 for taking part.

4.2.3 Ethical Issues

All participants were informed in writing, in advance of the study, of the broad aims of both the main study and the pilot, of the anonymity of their responses, and of their right

[24] see p.102 for rationale of timings

to withdraw at any point. As stated above, they were also informed as soon as possible of the deliberately difficult nature of the task materials and were fully debriefed at the end of their part in the study (see Appendix B, p.277, for a copy of the de-briefing sheet).

Although the methodology used by Jerusalem and Schwarzer was modified in this study to avoid the need for impossible task items and fictitious feedback (see Section 4.2.5, below, for details), it was anticipated that some participants might experience a degree of distress in response to their failure to complete many of the task items correctly in the time given. Although, it was not anticipated that the distress would be greater than that experienced when attempting a difficult crossword, only individuals who were personally known to the researcher were recruited for the pilot study so that, given her knowledge of their characters, the researcher would be more readily able to ease any distress they did experience. In the event, although some expressed frustration at their inability to successfully complete more items, none was unduly distressed by taking part in the study.

4.2.4 COGNITIVE STRESS APPRAISAL QUESTIONNAIRE

Jerusalem and Schwarzer were contacted via email and asked to provide either the original German version of this measure or an English translation. They provided both (see Appendix B, pp.278-9) but pointed out that the English version had never been subjected to reliability testing. Cronbach's alpha for the three subscales of the original German questionnaire (one each for Challenge, Threat and Loss) were reported as being .78, .81 and .83, respectively (Jerusalem and Schwarzer, 1992). Since some of the wording of the translation was rather awkward, a new one was made: a German colleague of the researcher made a literal translation of the original German items, then she and the researcher discussed nuances of meaning before deciding on the final wording of each. As in the original version, the Threat subscale was made up of three items and the Challenge and Loss subscales of four each. Response options for each item covered a four point scale ranging from Strongly Agree to Strongly Disagree. The new translation is provided overleaf (subscales are indicated in brackets). The full scale, as presented to participants, the pilot data and reliability analyses are provided in Appendix B (p.280 and pp.282-5).

1. I'm curious to see how I'll cope with the next set of problems (C)
2. I suspect that the next set of problems will be too hard for me (T)
3. I can't cope with much more of this (L)
4. I'll be more able to solve the next set of problems if I make a real effort (C)
5. I feel discouraged and depressed now (L)
6. I doubt my ability (T)
7. I feel more fully challenged as the problems get more difficult (C)
8. I'm very nearly at the point of giving up (L)
9. I'm worried that I won't be able to do the next set of problems (T)
10. There's no point in trying any more (L)
11. I'm really motivated to do better now (C)

A power analysis, following Kraemer and Thiemann's (1987) method (p55 and Table 106; see Appendix B, p.281) showed that 19 participants would be required for a difference to be detected between a sample drawn from a population where the underlying correlation is .9 from one drawn from one where it is .7, with 80% power (one-tailed). 19 people therefore took part in a pilot-test of the new English translation, completing the scale after the first set of anagrams. The reliability analysis of their scores produced values of alpha of .81 for Challenge, .67 for Threat and .69 for Loss. It would have been possible to improve each scale slightly by the removal of one item from each, as detailed below:-

Item 2 (Threat)	item-total correlation = .26, alpha if deleted = .81
Item 4 (Challenge)	item-total correlation = .44, alpha if deleted = .83
Item 10 (Loss)	item-total correlation = .34, alpha if deleted = .71

Given the sample size and confidence limits, however, the reliability of the scale was considered sufficient for all the tested items to be retained for use in the main study.

4.2.5 COGNITIVE TASKS

Six sets of 15 computer-based anagrams and three sets of 15 pen-and-paper intelligence test items were required for the study, plus some additional practice items. In both cases,

following Jerusalem and Schwarzer's methodology, items would need to increase in difficulty within each set. However, since it had been decided, for ethical reasons, neither to provide participants with fictitious feedback nor to make the last item of each set impossible (as was the case in Jerusalem and Schwarzer's study), it was decided instead to provide simple practice examples which it was hoped would set up unrealistic expectations of ease of completion for the tasks to come. Items were developed to a standard which, in conjunction with an enforced time limit for their completion, was aimed at restricting average performance to no more than 4 or 5 correct answers out of each set of 15 – a level it was hoped would engender a sense of failure in participants after each set of tasks.

A small number of volunteers attempted one set each of either anagrams or intelligence test items, without time restrictions, in order that the approximate length of time required for their successful completion be gauged. It was intended to reduce the time made available to half that required, on average, for successful completion of the sets of tasks. In the event, none of the volunteers completed their set successfully and the times taken to successful completion of individual items within each set varied enormously, across both items and volunteers. In the end, it was decided to begin pilot-testing allowing 30 seconds for each anagram and, because of the more varied nature of the types of intelligence test item to allow participants to move freely between items within each set of these by giving 7.5 minutes per set rather than enforcing a limit for each individual item.

The same 19 participants involved in the reliability testing of the CSAQ also took part in pilot-tests of the cognitive task materials. These were aimed at ensuring that items had been grouped appropriately (i.e. so that they increased in difficulty within each set) and that the time limits agreed upon were such that participants could successfully complete no more than 4 or 5 items, on average, out of each set.

4.2.5i ANAGRAMS

Five practice anagrams were required plus 90 to be split into six sets of 15 each, of varying lengths, ordered within each set according to level of difficulty (which it was planned to assess by means of the number of correct solutions provided across participants in the pilot). Words selected as practice anagrams were the first common words, of up to seven

letters, on each of pages 15, 315, 615, 915, 1215 of the Concise Oxford Dictionary (1983). The ordering of letters of the words was randomised to provide the anagrams:-

Anagram	Solution
NMOGA	MANGO
WTRAE	WATER
IPMEER	EMPIRE
ACDVIE	ADVICE
RUMELB	RUMBLE

The words used in the six sets were all of five letters or over and drawn from the following pages of the same dictionary:-

Set 1	Set 2	Set 3	Set 4	Set 5	Set 6
10	20	30	40	50	60
95	105	115	125	135	145
180	190	200	210	220	230
265	275	285	295	305	315
350	360	370	380	390	400
435	445	455	465	475	485
520	530	540	550	560	570
605	615	625	635	645	655
690	700	710	720	730	740
775	785	795	805	815	825
860	870	880	890	900	910
945	955	965	975	985	995
1030	1040	1050	1060	1070	1080
1115	1125	1135	1145	1155	1165
1200	1210	1220	1230	1240	1250

The order of letters within each word was again randomised when forming the anagram, and the order of words within each set was also randomised to remove the alphabetical ordering resulting from the method of selection of words. Each anagram was checked for alternative solutions using The Anagram Engine at www.easypeasy.com. The final anagrams selected for pilot-testing and their solutions, are given in Appendix B, pp.286-8.

The results of the first three participants in the pilot test highlighted some difficulties with the anagrams just described. Firstly, while one correctly solved four out of five of the pilot items, the other two achieved just one and two correct solutions each. The items

were therefore considered too difficult to set up expectations of success at the anagrams to follow and new items were therefore developed using the following method: two words of three letters each and three words of four letters each were taken from the last pages of the 1st (A), 6th (F), 11th (K), 16th (P) and 21st (U) letters of the alphabet. Pilot-testing of the new items on the remaining 16 participants showed 69% to have correctly solved all of them, with the remainder getting just one wrong each. These practice anagrams were therefore retained for the main study and are presented below:-

Anagram	Solution(s)
URF	FUR
AEX	AXE
DSUE	USED, SUED, DUES
OKWN	KNOW
SUPH	PUSH

With respect to the main items, the first three participants in the pilot-test correctly completed, on average, just 3.77 anagrams per set, with the average for the second and third participants reaching only 1.75. Inspection of the results showed that words over five letters in length were generally found difficult and those of eight letters and over were almost never attempted. It was considered that such a level of difficulty would very quickly eliminate any expectations of success and encourage participants not to care about their level of performance since the demands of the task would be so clearly excessive. For these reasons, it was decided to develop new sets of anagrams made from words of between four and eight letters in length. Words of the required number of letters were taken from each letter of the alphabet in the following way:-

A	B	C	D	E	F	G	H	I	J	K	L	M
4	5	6	7	8	4	5	6	7	8	4	5	6
5	6	7	8	4	5	6	7	8	4	5	6	7
6	7	8	4	5	6	7	8	4	5	6	7	8
7	8	4	5	6	7	8	4	5	6	7	8	

N	O	P	Q	R	S	T	U	V	W	X	Y	Z
7	8	4	5	6	7	8	4	5	6	7	8	4
8	4	5	6	7	8	4	5	6	7	8	4	5
4	5	6	7	8	4	5	6	7	8	4	5	6

Words starting with each letter were taken at regular spacings of the section of the dictionary dealing with that letter. Words were then allocated to sets in such a manner as to ensure that each consisted of three words each of four, five, six, seven and eight letters, presented in that order, but with the order of words within each triplet being randomised. The order of letters within each word was again also randomised.

Pilot-testing these new anagrams with the remaining 16 participants gave an overall mean of 4.3 correct across all sets – a level of difficulty in line with that intended. Scores across the six sets were positively correlated with each other (r values ranged from .58, $p = .019$, for Set 1 with Set 6, to .86, $p < .0001$, for Set 2 with Set 5) and a repeated measures analysis of variance (ANOVA) conducted across them all yielded non-significant results suggesting that the sets present equivalent levels of difficulty[25]. Correlations showed that fewer attempts were made to solve later anagrams in each set (with r values ranging from -.66, $p = .008$ for Set 4 to -.87, $p < .0001$, for Set 5) and that the percentage of those attempted which was correct reduced correspondingly (r values ranged from -.52, $p = .026$, for Set 4 to -.84, $p < .0001$, for Set 5). It was therefore also concluded that the anagrams increased in difficulty within each set.

Mean scores on this task were similar to those for the intelligence test items (see Section 4.2.5ii below) and there was a significant correlation of the overall means on the two types of task ($r = .70$, $p = .003$). Taking all these findings into account, it was decided to retain the revised anagrams unchanged for use in the main study.

4.2.5ii INTELLIGENCE TEST ITEMS

45 intelligence test items were required for the study, to be divided into three sets of 15, increasing in difficulty within each set, plus some simpler ones for practice. The AH6 SEM intelligence test (Heim, Watts & Simmonds, 1983) was the source of all items, with the SEM (Science, Engineering and Mathematics) version having been chosen because of its difficult standard and because, unlike the AG (Arts and General) version, it

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[25] The revised items and their solutions are given in Appendix B, pp.289-91. Raw data and analyses can be found on, pp.292-314. All p values are two-tailed unless stated otherwise.

incorporates an equal distribution of verbal, numerical and diagrammatic items. Each of the 8 pages of the test includes one of each of the types of task item detailed below:-

verbal series	numerical series	diagrammatic series
verbal analogies	numerical analogies	diagrammatic analogies
verbal relationships	numerical problems	diagrammatic features in common

From the earlier test of timing carried out by volunteers, it appeared that items on each page of the test are more difficult than those on the preceding page. It was therefore decided to take one verbal, one numerical and one diagrammatic item from each of the 2nd, 3rd, 5th 7th and 8th pages to form each set of 15 items. The types of item (series, analogy, etc.) were varied across the major types of task (verbal, numerical and diagrammatic) to give five of each within each set, as shown below:-

Set 1

from 2nd page: verbal series, numerical analogy, diagrammatic features in common
from 3rd page: verbal analogy, numerical problem, diagrammatic series
from 5th page: verbal relationships, numerical series, diagrammatic analogies
from 7th page: verbal series, numerical analogy, diagrammatic features in common
from 8th page: verbal analogy, numerical problem, diagrammatic series

Set 2

from 2nd page: verbal analogy, numerical problem, diagrammatic series
from 3rd page: verbal relationships, numerical series, diagrammatic analogies
from 5th page: verbal series, numerical analogy, diagrammatic features in common
from 7th page: verbal analogy, numerical problem, diagrammatic series
from 8th page: verbal relationships, numerical series, diagrammatic analogies

Set 3

from 2nd page: verbal relationships, numerical series, diagrammatic analogies
from 3rd page: verbal series, numerical analogy, diagrammatic features in common
from 5th page: verbal analogy, numerical problem, diagrammatic series
from 7th page: verbal relationships, numerical series, diagrammatic analogies
from 8th page: verbal series, numerical analogy, diagrammatic features in common

It was initially decided to use the nine items on the first page of the test as the practice items. These provided one of each of the nine types of task detailed above. However, some of these items were found to be quite difficult by participants and it wasn't easy for them to see how the answers were arrived at. Practice items provided by Heim et al (1983) were therefore adopted instead: 18 in total are provided, two for each of the nine types of item. One of each pair is clearly simpler than the other, so the simpler of each was selected for use. Both sets of practice items, the three main item sets and their answers are given in Appendix B, pp.315-43, together with all relevant data and analyses.

With respect to the main items, the mean score across all sets and participants was 4.81, which was in line with both the level of difficulty required and performance on the anagrams. Scores across the sets were positively correlated: r values were .69 ($p = .001$) for Set 1 with Set 2, .53 ($p = .019$) for Set 2 with Set 3 and .47 ($p = .041$) for Set 1 with Set 3. However, a repeated measures ANOVA across all sets showed a significant difference (Wilks' Lambda = .49, $p = .002$), with means for the sets being 4.00, 5.42 and 5.00, respectively. Paired samples t tests showed that the differences between Set 1 and Set 2 and between Set 1 and Set 3 were significantly different ($t = -4.34$, $p < .000$ and $t = -2.21$, $p = .04$, respectively). When correct scores were considered as a percentage of those attempted, though, while the least correct scores were achieved for Set 1 (46.6%), this was followed by Set 2 (49.3%) and then Set 3 (53%). This last finding is consistent with studies showing performance on this type of test to improve with practice.

In addition, correlations show that fewer attempts were made to solve later items in each set ($r = -.84$, $p < .0001$ for Set 1, $r = -.53$, $p = .042$ for Set 2 and $r = -.79$, $p < .0001$ for Set 3). However, while there was a significant decrease in the percentage of attempts which were correct with later items in Sets 2 and 3 (r values = -.88 and -.63, $p < .0001$ and .012, respectively), this was not the case in Set 1 ($r = -.22$, $p = .425$). It would appear that, while after Set 1 participants continued to approach items in order, attempts were more likely to be made with respect to questions they might be able to solve.

Taking all these analyses together, the results seem unlikely to reliably indicate any objective differences in difficulty levels of the three sets of intelligence test items and it was decided to retain them unchanged for the main replication study.

4.3 THE REPLICATION STUDY

4.3.1 METHOD

4.3.1i DESIGN

The study followed a Massed Trial design incorporating two independent variables: Number of Failures (as inferred from the number of sets of cognitive tasks (within-subjects, with nine levels, failures 1 - 9) and GSE (between-subjects, with two levels, high and low). There were three within-subject dependent variables, Challenge, Threat and Loss appraisals. Characteristics of the two GSE groups were analysed using an independent t test and a Kolmogorov-Smirnov z test. Reliability of the CSAQ was assessed by correlations and descriptive statistics, while the hypotheses were tested by mixed design Analyses of Variance and Covariance[26].

4.3.1ii PARTICIPANTS

Jerusalem and Schwarzer used a six-item measure to assess GSE in their study, but have since developed a 10-item scale (the Generalized Self-Efficacy Scale, GSES; Schwarzer and Jerusalem, 1993), which has been subjected to some evaluation of psychometric status and translated into English. The latter measure is a self-report scale which usually takes no more than two or three minutes to complete. There are four response options from "not at all true" (scoring 1) to "exactly true" (scoring 4). Scores are summed to provide the final GSE score, with high scores denoting high levels of GSE. The psychometric status of the German version is summarised by Weinman, Johnston & Wright (1995) and the information provided includes details of the mean, standard deviation and internal consistency from five samples of German adults, totalling 1660 individuals whose scores produced alpha values ranging from .82 to .93 (taken from Schwarzer, 1993). Weinman et al also show evidence for test-retest reliability of the scale as well as both concurrent and predictive validity and they report the results of a factor analysis indicating that the GSES

[26] All raw data and analyses relating to this study are provided in Appendix C, pp.347-407.

is measuring a unitary concept. Full details of the psychometric properties of this scale can be found in Appendix C (pp.347-9) along with the English translation provided by Weinman et al and used in this study.

Although Jerusalem and Schwarzer carried out a median split to produce their high- and low-GSE groups, here, the sample was split into thirds and the upper and lower thirds only compared - this was in order to ensure a clear distinction between the two groups in terms of their GSE scores. A power analysis (using the DataSim software package) showed 14 participants to be required in each of the high- and low-GSE groups to achieve a power of 80% assuming an effect size of .25. Participants from the pilot study and other acquaintances of the researcher approached acquaintances of their own to see if they would be prepared to take part in the study – a process which resulted in the return of 50 completed GSES questionnaires and consent forms from individuals of at least 18 years, all believed to speak English as their first language.

GSES scores of this sample ranged from 21 to 38 (mean = 31.46, S.D. = 4.53). Since the possible range of scores on the scale is 10 to 40, these scores appeared negatively skewed, however a one-sample Kolmogorov-Smirnov (K-S) test showed them not to deviate significantly from a normal distribution ($z = .94$, $p = .339$). This sample appeared to have scored more highly on the GSES than the 1660 Germans reported by Schwarzer (1993), whose mean and standard deviation were 29.28 and 4.60, respectively, but since, as reported above, the latter were assessed using a six-item scale and not the 10-item version used in this study, no meaningful comparisons can be made between the two samples. In this study at least, however, it is possible that those with very low GSE were reluctant to volunteer because of their lack of confidence in their general coping abilities, thus biasing the samples.

The 14 respondents with the lowest scores were approached to form the low-GSE group and all initially agreed to take part but one later withdrew due to pressure of work and another was excluded from the study as it was discovered that English was not her first language. The two respondents with the next highest scores were approached to make up the required number for this group and both agreed to take part. The respondents with the top 14 scores were approached and all agreed to participate in the study. K-S tests showed that neither group's scores deviated significantly from normal. An independent t

test comparing the GSES scores of the two groups (equal variances not assumed: Levene's $F = 4.52$, $p = .043$) showed them to differ significantly ($t_{20.165} = -18.41$, $p < .0001$). The two groups were therefore considered to form suitable comparison groups for this study. Details of the scores of the two groups are presented in Table 4.3.1ii below, with raw data and analyses being provided in Appendix C (pp.350-3):-

TABLE 4.3.1ii GSE Scores of Those in the High- and Low-GSE Groups

	Mean	S.D.	Range	K-S z	p
High Group	36.50	1.02	35-38	.97	.302
Low Group	26.07	1.86	23-29	.72	.685

4.3.1iii MATERIALS AND MEASURES

The translation of the CSAQ, plus the six sets of anagrams and three sets of intelligence test questions developed and tested in the pilot phase were adopted for use in the main replication study.

4.3.1iv PROCEDURE

The procedure followed was identical to that of the pilot study, except that participants completed the CSAQ after being told their score on each set of tasks, making a total of nine times in all, and were asked to complete the ninth questionnaire as if another set of tasks were to follow. Participants were told in advance of the number of sets of each type of task and so were aware, when completing the CSAQ for the 6th time, that the next set of tasks would be different from those completed so far. Since this study required more of participants' time than did the pilot, the fee paid was increased to £15.

4.3.1v ETHICAL ISSUES

Ethical issues were largely the same as for the pilot study. However, participants in the pilot had been informed of the deliberately difficult nature of the tasks immediately after completing the CSAQ at the end of the first set of anagrams (since they were only required to complete the scale once) but those taking part in the main study could not be

given this information until they had completed all nine CSAQs and therefore all nine sets of tasks. The likelihood of the participants in the main study experiencing undue distress as a result of their poor performance was therefore increased compared to those taking part in the pilot. Participants' right to leave the study at any point was emphasised before they began and all were informed, at debriefing, of the extensive pilot-testing that had been carried out in order to ensure the tasks were suitably difficult. A debriefing sheet was provided to explain the full rationale for the study (a copy is given in Appendix C, p.356).

4.3.2 RESULTS

4.3.2i DEMOGRAPHIC COMPARISON OF HIGH- AND LOW-GSE GROUPS

The high-GSE group comprised 4 men and 10 women, while 5 men and 9 women made up the low-GSE group. An independent t test showed no significant difference in age between the two groups ($t_{26} = -.77$, $p = .450$), with means being 36.00 and 32.21 years for the high- and low-GSE groups, respectively, and standard deviations being 14.99 and 10.76 years. The maximum educational achievements of participants in each group are shown in Table 4.3.2ia below. It should be noted that, while the majority of participants (79% of each group) were educated to beyond Advanced Level, their occupations varied considerably, with the sample including an consultant physician, an office manager, a person selling tickets for Football Association cup matches and a sub-editor of a food magazine as well as one trainee clinical psychologist and three first year psychology undergraduates.

TABLE 4.3.2ia Education of Those in the High- and Low-GSE Groups

Number	GCSEs	'A' Levels	BA/ BSc	MA/ MSc	MPhil/ PhD	Professional Qualifications
High-GSE Group	1	2	9	1	1	0
Low-GSE Group	2	1	8	1	0	2

The two groups each scored similarly on the two types of task to the participants in the pilot study. Independent t tests showed the groups not to differ significantly in terms of their performance on either type of task ($t_{26} = .02$, $p = .983$ for the anagram sets and $t_{26} =$

-1.36, p = .185 for the AH6 sets) - mean correct scores for each group on each type being shown in Table 4.3.2ib, below:-

TABLE 4.3.2ib Mean Number of Correct Scores of High- and Low-GSE Groups on the Two Types of Task

Type of Task	High-GSE Group	Low-GSE Group
Anagrams	4.54	4.52
Intelligence Test Questions	4.19	4.86

It can therefore be concluded that there were no notable differences between the high-GSE and low-GSE groups in terms of age, gender, educational attainment or performance on either type of task.

4.3.2ii RELIABILITY OF THE CSAQ

A reliability analysis of the CSAQ, when completed after the first set of anagrams, was conducted using the scores of the pilot and main study participants combined (n = 47). Table 4.3.2iia below, shows the results of the analysis for each subscale (the data and full analyses are provided in Appendix C, pp.360-71):-

TABLE 4.3.2iia Reliability of the CSAQ After Single Completion

	Challenge	Threat	Loss
Range of Item Means	2.36-3.34	2.28-3.02	1.49-1.87
Range of Item Standard Deviations	.67-.89	.74-.88	.62-.80
Range of Subscale Inter-item Correlations	.18-.64	.32-.65	.43-.65
Range of Subscale Item-total Correlations	.38-.66	.36-.61	.56-.68
Cronbach's Alpha	.72	.70	.80

As can be seen, the mean score for Loss is a little low. However, since only one set of tasks had been attempted at the time of completion of the questionnaire, and since this

represents just one failure experience with respect to the tasks being asked about in the scale, it is entirely reasonable that Loss scores would be on the low side at this measurement point. Threat scores were higher at this stage than might have been expected, but the standard deviation of scores was good. Inter-item and item-total correlations were all acceptable and all Cronbach's α scores were greater than .7. In addition to the above, alpha scores were also calculated for each subsequent completion of the measure by the main study participants, as shown in Table 4.3.2iib below. Taken together, the analyses were considered to have established the reliability of this measure to a level sufficient for its use in the analyses below.

TABLE 4.3.2iib Alpha Scores for the CSAQ over Completions 2 - 9

Completion	Challenge	Threat	Loss
2	.41	.80	.87
3	.76	.89	.90
4	.80	.90	.95
5	.72	.92	.96
6	.61	.88	.93
7	.73	.91	.90
8	.70	.91	.90
9	.80	.81	.87

4.3.2iii MAIN FINDINGS

The Analyses of Variance reported in this section were conducted using the Bio Medical Data Package (BMDP) software package, since SPSS (Statistical Package for the Social Sciences) employs regressional techniques to carry out ANOVA and MANOVA (Multiple Analysis of Variance) it therefore requires more participants per variable than were used in this study. BMDP, which does not use such techniques, is able to produce reliable analyses for smaller samples. It does not have the facility, though, to conduct MANOVAs, so individual ANOVAs were carried out for each of the three types of CSA (with Number of Failures and GSE as the two independent variables) and a Bonferroni correction was employed to allow for the multiple comparisons, making a probability of .017 necessary for statistical significance.

Greenhouse-Geisser corrections (G-G; Geisser & Greenhouse, 1958) were used in analyses relating to the CSAs because of significant Mauchly's tests of sphericity (Mauchly, 1940; derived here using SPSS). Because the variance in GSE between the high- and low-GSE groups was heterogeneous (as shown by the significant Levene's test reported on p108), GSE score was entered as a covariate into a separate set of analyses to those reported in detail below. While, as would be expected, the previously significant main effects of GSE disappeared as a result, no changes were found with respect to either the main effects of the CSAs or any CSA x GSE interaction. For this reason, these analyses will not be reported in any detail here, but are available in Appendix C, along with all data and analyses relating to the main hypotheses of this study, which are presented in order of relevance to the text (pp.372-407).

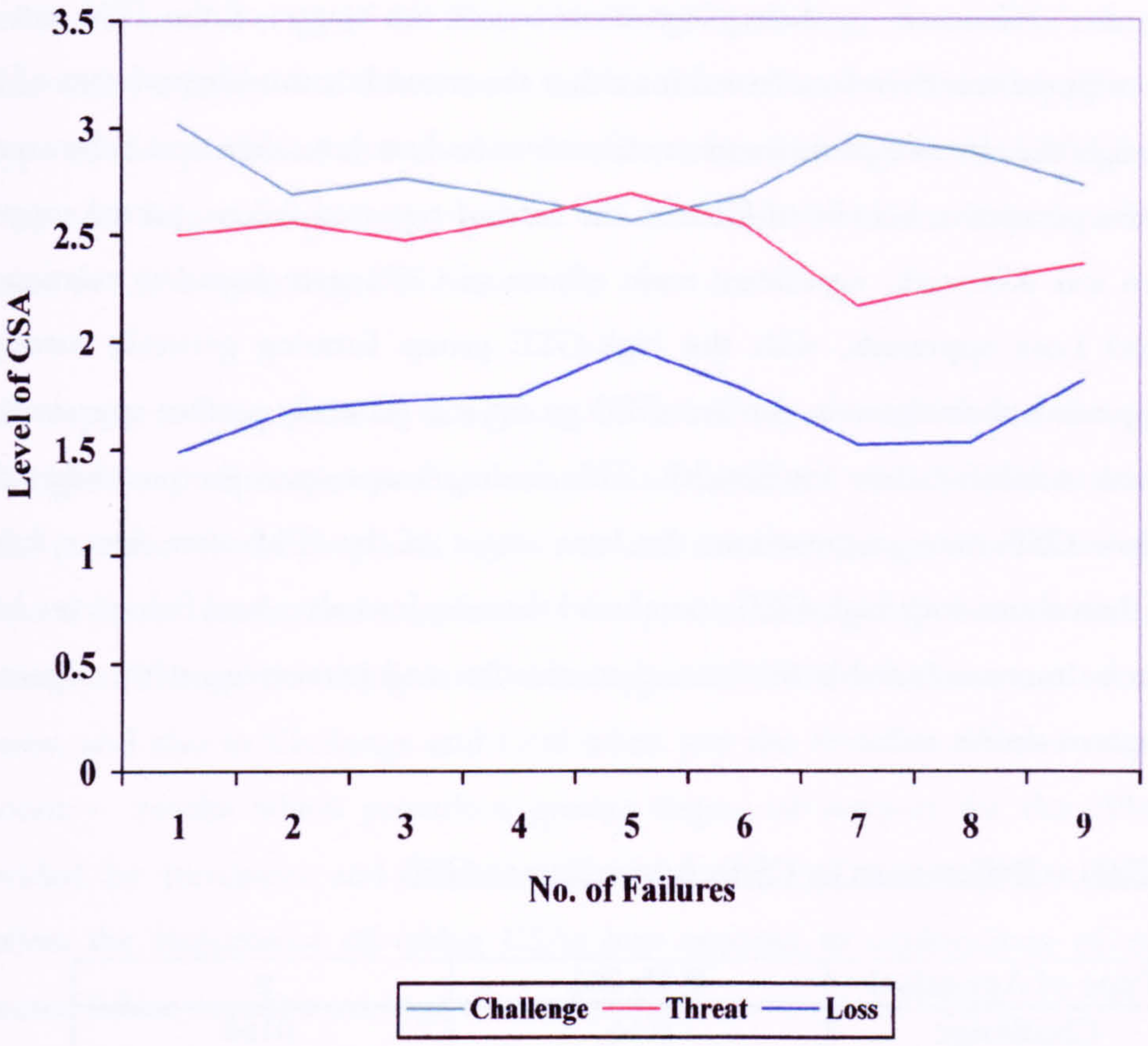
The first hypothesis predicted that there would be significant changes in CSAs as the number of failures (as represented by the number of sets of cognitive tasks attempted) increased. Results of the ANOVAs carried out with respect to this hypothesis are presented in Table 4.3.2iiia, where it can be seen that all three types of appraisal changed significantly across the nine measurement points, thus providing full support for the first hypothesis.

TABLE 4.3.2iiia Main Effects of the Cognitive Stress Appraisals

Type of Appraisal	F [8, 208]	p (G-G)
Challenge	6.57	.0001
Threat	4.54	.0037
Loss	7.04	.0003

The patterns of change in the CSAs are presented in Figure 4.3.2iii, overleaf, where it can seen that participants began in the first stage of the IPM, the Challenge stage, but that Challenge appraisals tended to decline from then until just after the fifth set of tasks, with Threat and Loss appraisals both increasing over the same period. At the measurement point just after the fifth set of tasks, the sample can be seen to have progressed into the second stage of the model, the First Threat stage. However, Challenge appraisals increased again briefly after this point and those of Threat and Loss dipped briefly before resuming their previous trends after task sets 8 & 9. Loss appraisals were the lowest of the three types of CSA throughout.

FIGURE 4.3.2iii Overall Patterns of Change in CSAs



The observed patterns of change for each CSA were found to have significant non-linear components – up to Sixth Order for each. However, since the patterns of change in CSAs changed with the change in type of task (both in this study and in the original), it might be argued that it does not make very much sense to look at trends across all nine failures. The patterns of change can be observed to have reversed, in this study, after the fifth measurement point and it seems likely that this reversal may have resulted from participants' awareness that the sixth set of anagrams would be the last time they would be required to attempt this type of task. It was therefore decided to also explore the trends in patterns of CSA change across the first five failures only in order to assess these when uncontaminated by expectations of an imminent change of task. Although the results for Threat provided no clear findings (since neither linear nor non-linear trends were significant), non-linear components were still observed for both Challenge and Loss, to the cubic level in each case. Both sets of trend analyses therefore lend support to the proposals of the IPM.

No significant interactions were found between Number of Failures and GSE for any CSA, so neither systematic differences in the patterns of change in CSAs across the two GSE groups nor differences in their progression across the stages of the IPM can be claimed. No support was therefore found for either the second or third hypotheses of the study. Although the absence of interaction effects contradicts Jerusalem and Schwarzer's suggestion of a protective benefit of GSE in the face of repeated failure, partial support for this claim was achieved: significant main effects of GSE were found in relation to Challenge and Loss appraisals, with the high-GSE group forming generally stronger Challenge appraisals than those in the low-GSE group and generally weaker appraisals of Loss (see Table 4.3.2iiib below for details). This finding keeps open the possibility that those with low GSE may progress into the later stages of the IPM after fewer failure experiences than those with high GSE scores and thus, as Jerusalem and Schwarzer have claimed, also be more vulnerable to reduced motivation and persistence with respect to future attempts at similar tasks.

TABLE 4.3.2iiib Differences in CSAs According to GSE

Type of Appraisal	F [1, 26]	p
Challenge	6.56	.0166
Threat	.67	.4204
Loss	8.54	.0071

4.3.3 DISCUSSION

4.3.3i DISCUSSION OF MAIN FINDINGS

The findings of this constructive replication of Jerusalem and Schwarzer's (1992) test of their Idealised Process Model have provided support both for the formation of each of the three types of CSA (Challenge, Threat and Loss) in response to failure and for the patterns of change in these proposed to occur with repeated failure experiences. As will be discussed below, however, the protective benefits of GSE with respect to this phenomenon are less clear. In common with Jerusalem and Schwarzer's work, all three types of CSA were observed after each failure experience in the replication study and each changed significantly as the number of failure experiences increased, with Challenge

appraisals decreasing and those of both Threat and Loss increasing. At the point of greatest appraised stress, towards the end of the anagram tasks, the sample as a whole reached the second stage of the IPM - the First Threat stage. A second finding which was in line with Jerusalem and Schwarzer's results also occurred when anticipation of a change in type of task produced a reversal in the directions of change in the CSAs, but only until the second failure to perform well on the new task had been experienced, when the pattern of CSAs again began to deteriorate.

With respect to the pattern of changes in CSAs with increasing failures, though, results of the original and replication studies were found to differ: while Jerusalem and Schwarzer found (contrary to the proposals of their model) that the changes in all three types of CSA followed linear trends, in the replication study, non-linear components were found in the patterns of change occurring in all three types of CSA, when assessed across all nine failures, and also in Challenge and Loss when just the first five failures were taken into account - results which provide a greater degree of support for the IPM than that provided by Jerusalem and Schwarzer's own study. Taken together, these findings confirm the importance of taking CSAs into account in explorations of responses to repeated failure experiences, regardless of participants' levels of GSE.

A second difference between the two studies concerns interactions between the CSAs and GSE. While, in the original study, significant interactions were found between GSE and both Threat and Loss appraisals across the nine measurement points, no such interactions were found in the replication, preventing differences according to GSE in either patterns of change or progression through the stages of the IPM from being claimed. In both studies, however, those with high GSE scores showed stronger overall Challenge appraisals and weaker overall appraisals of Loss than those in the low-GSE group, although no significant differences were found in the replication study with respect to overall appraisals of Threat. Rather than influencing how patterns of appraisal change with increasing failure experiences, therefore, any protection afforded by GSE was, in this case, limited to affecting the way in which failures were generally appraised in terms of Challenge and Loss. This study has therefore lent only partial support to Jerusalem and Schwarzer's claim that those low in GSE will be more vulnerable to progression across the stages of the IPM and, therefore, also to associated losses of motivation and persistence in relation to future attempts at behaviours at which they have previously failed.

4.3.3ii METHODOLOGICAL LIMITATIONS

The limitations associated with the IPM approach as a whole will be discussed at the end of Chapter 6, which marks the end of the work in which this approach was taken. However, some specific limitations associated with the sample involved in the replication study need to be taken into account at this point. Firstly, with respect to the formation of the high- and low-GSE groups which, despite the selection of only those with scores at the upper and lower ends of the range of all those who returned completed GSES questionnaires, and the exclusion of more than a third of these in total, did not result in ideal group characteristics for the low-GSE group. The possible range of scores on the GSES is from 10 to 40, with the mid-point therefore falling at 25. While the range of scores of those in the high-GSE group was acceptably close to the top end of the scale (35-38), that for the low-GSE group (23-29) made them more of a 'mid'-GSE group than a 'low' one. The most probable reason for the lack of respondents genuinely low in GSE is that such individuals are unlikely to volunteer for a study involving the completion of 135 cognitive task items, precisely because of their low GSE. However, since significant differences were found between the two groups in terms of their overall levels of both Challenge and Loss, the lack of interaction effects seems more likely to have arisen because those in the high-GSE group in this study were not as invulnerable to repeated failure experiences as the results of Jerusalem and Schwarzer's study suggested they might have been rather than because the low-GSE group here were not sufficiently low scoring on this measure.

A second limitation relating to the sample arose because individuals known to the researcher were used either as participants or recruiters for this study - a strategy which resulted in the recruitment of a homogenous group in terms of maximum educational attainment: while there was a reasonable variation in age, gender and occupation in the sample, a high proportion had at least a Bachelor's degree. In some respects, this was useful - the cognitive tasks had been designed in order that samples with similar characteristics to the pilot participants would be expected to achieve an average of four or five correct answers in each set and, since a similarly high proportion of those who took part in the pilot also had first degrees, the anticipated level of performance was achieved. However, it is acknowledged that the proportion of the general population of the United Kingdom with first degrees is much lower than that of this sample. Men were also under-

represented in this study, with just 29% of the high-GSE group and 36% of the low-GSE group being male. As the responses under investigation here are unlikely to be specific to any one subgroup of the general population, though, the lack of a representative sample is not considered likely to have influenced the results in any systematic, meaningful way.

4.3.3iii THEORETICAL IMPLICATIONS

The fact that only partial support was achieved for the protective benefits which Jerusalem and Schwarzer claim to be conferred by GSE in relation to changes in CSAs add weight to the contention, made at the end of the previous chapter, that the importance of self-efficacy may have been over-estimated in the literature. However, in replicating Jerusalem and Schwarzer's main findings from their 1992 study, the current investigation has also reinforced the potential value of considering reactions to failure experiences, in the form of cognitive stress appraisals, as important links between past and future behaviour. It would appear that (at least in relation to cognitive task performance) people do form each of the three types of CSA in response to failure and that changes do take place in these, with increasing failure experiences, which may have a negative effect on future motivation and persistence in relation to attempting the same type of task. The nature of the relationships proposed within the IPM and supported by this study represents a marked departure from the nature of those proposed within the SCMs, with the former having the potential to add non-linear patterns of influence as well as a temporal dimension to theories of health behaviour adoption.

A number of questions have been raised by the results of the replication study which, together with those of Jerusalem and Schwarzer's original investigation, could have a bearing on future theoretical development and which therefore warrant further exploration. For example, would perceptions of failure produce similar results if, while still (as here) being attempted at the behest of another, tasks were (unlike in this study) expected to lead to outcomes highly valued by the individual (such as when an individual is advised to stop smoking, lose weight or take up regular exercise in order to reduce the likelihood of a second heart attack)? Would their impact be strengthened if the task being attempted were not only to have a personally valued outcome but were also initiated at the sole volition of the individual concerned (such as when someone wants to stop smoking

for financial reasons or to lose weight or take up regular exercise in order to improve their appearance)? A third question concerns what happens when interim successes and failures are intermingled during ongoing attempts to change patterns of behaviour or when success is only partial and/or short-lived, such as is often the case in relation to health behaviours.

None of these questions can be addressed, however, unless the persistence of the effects of repeated failure experiences on CSAs over time can be established. Furthermore, only if patterns of change in CSAs are found to last beyond the period immediately after failure feedback has been received are they likely to have an effect on motivation and persistence in relation to tasks that require longer periods of time to be fully achieved (such as quitting smoking or establishing a pattern of regular exercise). The potential value of supplementing SCM explanations of health behaviour performance with a consideration of the influence of reactions to past failure experiences was therefore further explored in a Distributed Trial study in which the persistence of failure-induced changes in CSAs was assessed. This study is reported in the next chapter.

CHAPTER FIVE

Do Failure-Induced Changes in Cognitive Stress Appraisals Persist Over Time?

5.1 AIMS & HYPOTHESES OF THE THIRD STUDY

As discussed in the previous chapter, changes in CSAs resulting from failure experiences are considered more likely to have an impact on the future performance of health behaviours if they persist for a period of time following the receipt of failure feedback. With both this and the ongoing questions concerning the extent of protection afforded by GSE in mind, a further study was planned in order that the following aims might be addressed:-

- to see whether changes in CSAs resulting from failure experiences persist for a week after the receipt of failure feedback;

- to see if the strength of their persistence is related to GSE.

Inherent in the first of these aims is the assumption that changes in CSAs will again be found to occur in the face of failure. This assumption is reflected in the second of the three hypotheses tested in this study, which were as follows:-

1. CSA scores immediately after the receipt of failure feedback will be positively correlated with corresponding CSA scores one week later;

2. CSA scores will change significantly across failure experiences, with Challenge appraisals becoming weaker with increasing failures and those of Threat and Loss becoming stronger;

3. Higher GSE scores will be associated with smaller differences between initial and delayed CSA scores.

Raw data and descriptive statistics relevant to this study are provided in Appendix D, pp.423-9 and analyses relating to each of the three main hypotheses on pp.430-2, 433-49 and 450-1, respectively.

5.2 METHOD

5.2.1 DESIGN

A Distributed Trial design was adopted in this study, meaning that participants carried out tasks over an extended period of time, rather than one directly after the other, as was the case in the Massed Trial replication study reported in the previous chapter. Three sets of 15 anagrams were attempted, one on each of three consecutive weeks, with failure feedback being provided at the end of each set. On the first occasion, as in the previous study, the CSAQ was completed immediately after the receipt of failure feedback but on each of the two subsequent weeks, it was completed twice, once prior to and once after the next set of tasks was carried out. Five sets of CSA scores were therefore derived for each participant, with the timing of each in relation to the sets of tasks and related feedback as detailed below:-

Completion	*Timing*
1	Immediately after the first set of anagrams and receipt of failure feedback
2	One week later, immediately before the second set of tasks was attempted
3	Immediately after the second set of anagrams and receipt of failure feedback
4	One week later, immediately before the third set of tasks was attempt
5	Immediately after the third set of anagrams and receipt of failure feedback

The number of failure experiences to be included in the current study[27] was decided upon after consideration of the need to keep participant attrition to a minimum, the availability of a sample and the number of failures likely to produce significant changes in CSAs. Since types of response to failure experience are not likely to be specific to any particular group of individuals, and since attrition in longitudinal studies is generally quite high, it was decided to use a sample comprising primarily students for this study and to offer participants an incentive, in terms of either cash or course credits, payable only if all

[27] to be referred to as "the extended study" when a distinction needs to be made between it and the replication study reported in the previous chapter.

required sessions were attended[28]. It was considered that a requirement for attendance over no more than a three week period would minimise attrition, so the data from the first three measurement points of the replication study were analysed, using ANOVA, to see if the changes in CSAs reached significance after only three failure experiences. BMDP software was used, as in the previous study, and Greenhouse-Geisser and Bonferroni corrections were also again made (alpha = .017). Results are presented in Table 5.2.1, below, which show that, although changes in Threat appraisals over the three failure experiences were not significant, those of both Challenge and Loss were strongly so (full details of this analysis can be found in Appendix D, pp.411-419). It was decided that a study incorporating three failure experiences would be sufficient to meet the requirements of the study outlined above.

TABLE 5.2.1 Changes in CSAs over the First Three Failures of the Replication Study

Appraisal	F [2, 52]	p (G-G)
Challenge	11.49	.0001
Threat	.74	.6056
Loss	7.91	.0021

The first and third hypotheses of the extended study were both analysed using Pearson product-moment correlations, while the second was analysed using three separate ANOVAs, with Number of Failures as the independent variable in each (three levels, failures 1 – 3, within-subjects) and Challenge, Threat and Loss appraisal scores as the within-subject dependent variables, one each per ANOVA.

5.2.2 PARTICIPANTS

A power analysis, using the DataSim software package, showed 20 participants to be sufficient to provide a power of 80% assuming an effect size of approximately .35, which

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[28] First year undergraduates are given the option to choose between earning 12 credits for taking part in research or undertaking a research-related piece of coursework: most take the former option. The final deadline by which the total number of credits earned had to be reported fell at the end of the three week period of this study.

was broadly in line with that of the previous study. Of the 20 participants initially recruited, one was unable to attend for the second trial due to illness and was therefore withdrawn. Since more than 20 people had initially volunteered for the study, a reserve list had been created to deal with any such withdrawals and the first person on that list was therefore recruited to the study. Demographic details of the final 20 participants are presented in Table 5.2.2 below:-

TABLE 5.2.2 Participant Demographics

Characteristic	Details
Age	Median = 20 Range = 18 - 49
Gender	15 Females 5 Males
Occupation	12 First year undergraduates 3 Course Administrators 2 Second year undergraduates 1 Research Assistant 1 Technical Manager 1 Placements Officer
Highest Educational Achievement	A Levels - 14 Bachelor's degree - 2 Master's degree - 2 Professional qualifications - 1 Doctorate of Psychology – 1

5.2.3 MATERIALS AND MEASURES

The practice anagrams developed for use in the replication study were also used here, along with the first three sets of anagrams, which were employed in consecutive order across the three trials. CSAs were assessed by means of the same questionnaire as before.

5.2.4 PROCEDURE

Participants were approached by either of two methods: first year undergraduates were told of the study during lectures given by the researcher, while research assistants, staff members and second year undergraduates were made aware of it via email distribution lists (a copy of the information sheet is provided in Appendix D, p.420). The first 20 volunteers completed consent forms and GSES questionnaires and then agreed with the researcher a mutually convenient day and time at which they would be able to attend, on three consecutive weeks, to take part in the study. People who expressed an interest in the study after these 20 had been recruited were added to a reserve list for use should any of the initial volunteers later withdraw from the study. As outlined in Section 5.2.2 above, just one reserve was required to take part.

At their first attendance, participants were reminded of the nature of the study, reassured as to the anonymity of their responses and told that they were free to withdraw at any point. They were reminded that payment for taking part in the study was £5 or one course credit per week (making £15 or three credits in total), but these were only payable if they attended for each of three consecutive weeks - those who attended for only one or two weeks would not be paid. Five first year undergraduates opted to be awarded credits while all remaining participants chose to be paid in cash. For the remainder of this session the procedure was the same as that of the pilot and replication studies already reported, except that only the practice and first set of anagrams were completed. The CSAQ was completed just once, immediately after participants had been informed of the number of correct solutions they had achieved. After being thanked for taking part so far, participants were then reminded to attend at the same time of the same day the following week.

The procedure for the following two sessions was similar to that of the first, with two exceptions: first that, on each occasion, the CSAQ was filled in both before the next set of anagrams was attempted as well as after its completion and the receipt of failure feedback; second, that no practice items were offered on either occasion – participants went straight into the main sets of anagrams. At the end of the third session, after again being thanked

for taking part, participants were paid and then debriefed, both orally and in writing (a copy of the debriefing sheet can be found in Appendix D, p.422).

5.2.5 Ethical Issues

The experiences of the pilot and replication studies, outlined in the previous chapter, suggested that no particular ethical difficulties might expected from this study. Issues of confidentiality, freedom to withdraw and payments to be made were dealt with at the first session and debriefing took place at the end of the study, as outlined above.

5.3 Results

Participants can be seen to have successfully completed an average of 4.3 anagrams per set across all three sets (S.D. = 1.86). Since this average was similar to those of the samples in both the replication and pilot studies, it can be assumed that the participants in each of the three studies experienced feelings of failure of similar strength. GSE scores of the sample ranged from 25 to 37 with a mean score of 30.5 and a standard deviation of 3.32. An independent t test (equal variances assumed, Levene's $F = 2.86$, $p = .096$) showed that these scores did not differ from those of the 50 people who initially volunteered to take part in the previous study ($t_{68} = .86$, $p = .394$) and a one-sample K-S test showed them not to deviate significantly from a normal distribution ($z = 1.00$, $p = .266$).

It was predicted, in the first hypothesis of the study, that significant relationships would be found between CSA scores derived immediately after receipt of failure feedback and those derived one week later, before the next set of tasks was attempted. Since the three types of CSA were each assessed both before and after two periods of delay, six Pearson product-moment correlations were required in order to test this hypothesis. A Bonferroni correction was therefore made, with an alpha of .0083 being adopted as a result. Details of the means and standard deviations of each CSA at each of measurement point are

presented in Table 5.3a and the correlations between the immediate and delayed CSA scores are presented in Table 5.3b. In each case, capital letters in the first column refer to the type of appraisal and the numbers following these refer to the particular completion of the CSAQ from which the scores were drawn (as detailed in Section 5.2.1 above).:-

TABLE 5.3a Means and Standard Deviations of CSA Scores at Each Measurement Point

Measurement	Mean	S.D.
C1	2.95	.43
C2	3.01	.41
C3	2.70	.48
C4	2.86	.55
C5	2.74	.65
T1	2.25	.61
T2	2.30	.46
T3	2.38	.56
T4	2.27	.54
T5	2.28	.54
L1	1.75	.53
L2	1.49	.55
L3	1.63	.59
L4	1.59	.54
L5	1.70	.62

TABLE 5.3b Correlations of Immediate and Delayed CSA Scores

Correlation	r	p*
C1 with C2	.56	.005
T1 with T2	.64	.001
L1 with L2	.52	.009 (n.s.)
C3 with C4	.69	<.0001
T3 with T4	.73	<.0001
L3 with L4	.85	<.0001

* one-tailed

It can be seen that, with the exception of that of L1 with L2, which just failed to reach significance, all of these correlations were significant, indicating that the relationships between appraisals made immediately after receipt of failure feedback with those made

one week later were generally strong, suggesting persistence of CSA scores over the first week after the receipt of failure feedback. The presence of a significant correlation is not necessarily indicative of stability, though, since it may simply indicate that participants' responses have generally changed in similar ways across each of the paired measurement points. T-tests were therefore conducted to see if there were any significant differences in mean CSA scores across each of these pairs of measurement points. The results are provided in Table 5.3c, below. Since six comparisons were again required, alpha was unchanged, remaining at .0083.

TABLE 5.3c Paired Sample t-tests Comparing Immediate and Delayed CSA Scores

Paired Means	t	p*
C1 with C2	-1.71	.245
T1 with T2	-0.47	.322
L1 with L2	2.22	.020
C3 with C4	-1.78	.046
T3 with T4	1.28	.109
L3 with L4	0.53	.302

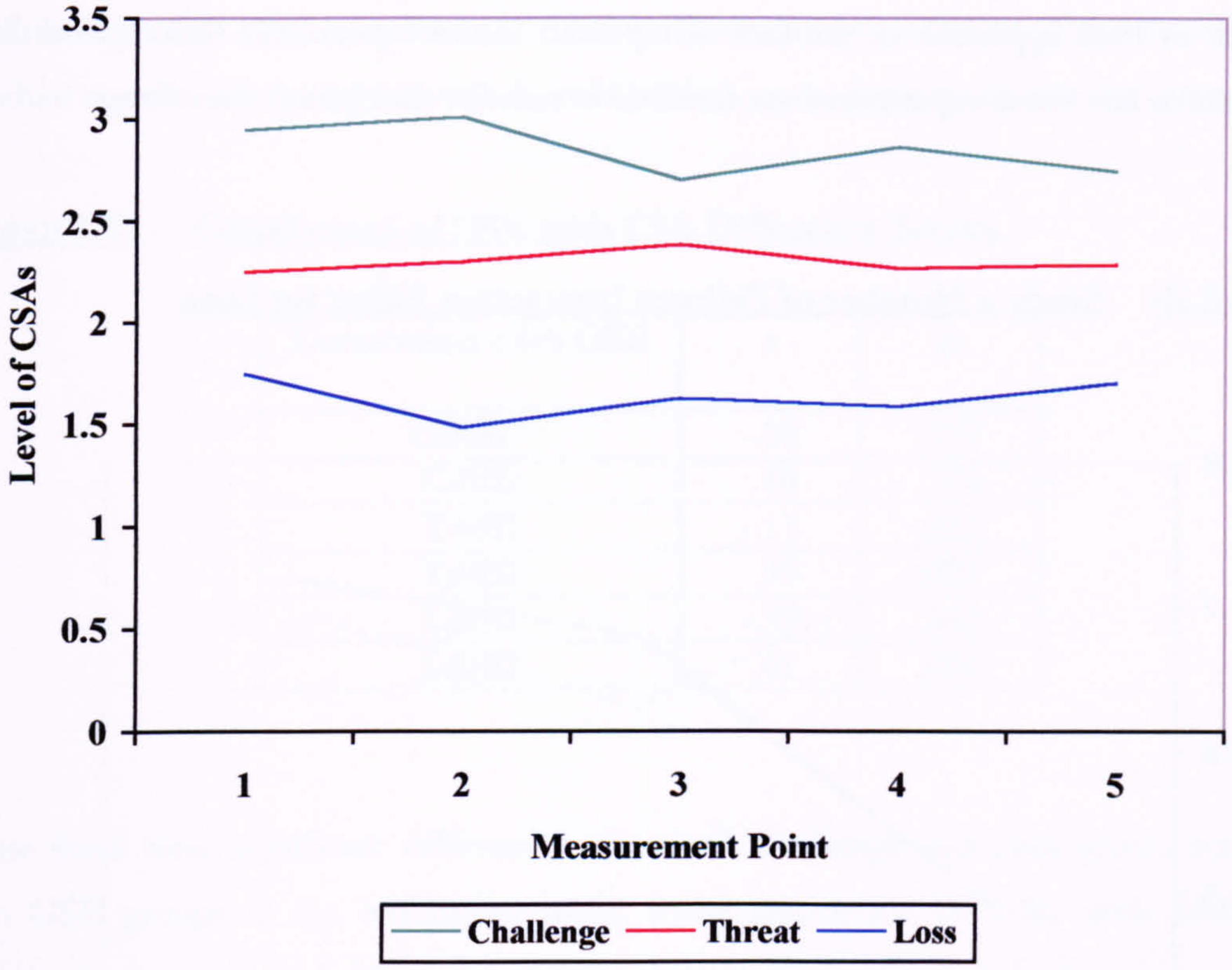
* one-tailed

As there were no significant differences in mean CSA scores across any of the paired time points, stability of scores across each pair of measurement points can be assumed. However, these results can only be considered indicative of a lasting *effect* of failure on CSAs if, in line with the second hypothesis, Challenge, Threat and Loss scores *changed* significantly as a result of the failure experiences. With respect to this hypothesis, mean CSA scores recorded at each of the five measurement points are shown in Figure 5.3a below, where it can be seen that the sample remained in the Challenge stage of the IPM throughout the study (a finding which echoes that of the replication study, where the progression into the First Threat stage did not take place until after the fifth failure) and that there was little overall change in scores for any of the three types of appraisal.

As in the replication study, and for the same reasons, these results were analysed for significant changes across failure experiences by ANOVA, using BMDP software and with both Greenhouse-Geisser and Bonferroni corrections, leading to alpha being set at .017

for each of the three analyses. In contrast to the results of the previous study, however, CSA scores in this study did not change significantly with increasing failure experiences.

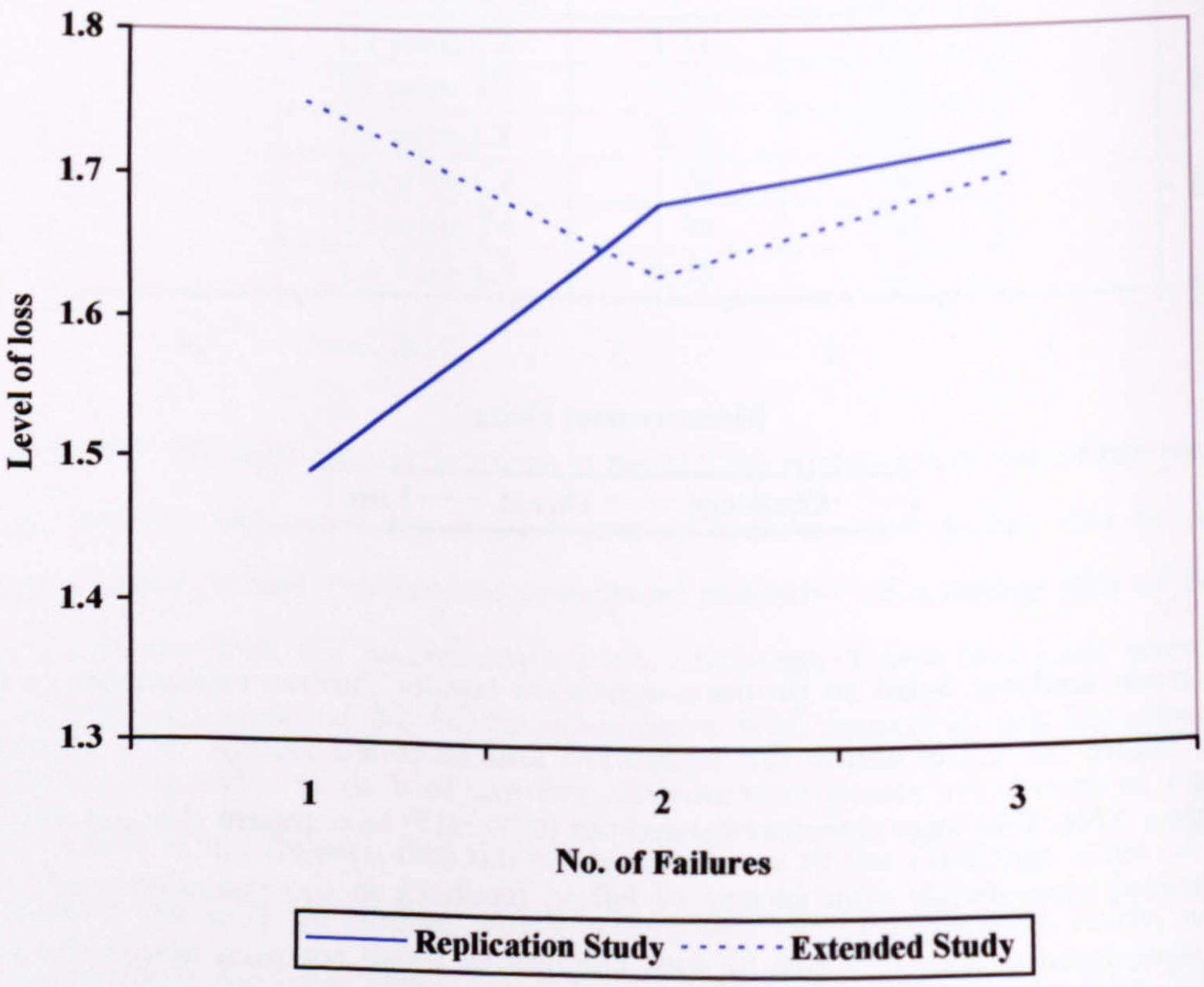
FIGURE 5.3a Changes to CSAs Across the Five Measurement Points



Since the main analyses failed to produce significant results, further exploration of the effects of failure on CSAs across the replication and extended studies were required. Three further ANOVAs were therefore carried out ($\alpha = .017$) to compare changes in CSA scores reported immediately after receipt of failure feedback in the extended study (i.e. across measurement points 1, 3 and 5) with changes in those reported across the first three measurement points of the replication, since any meaningful difference between the two would be reflected both in main effects of Study and also in interactions between Study and Number of Failures. The effects of Study were non-significant for all three types of CSA, as were the interaction effects for both Challenge and Threat. Largely similar responses to failure across the two studies were therefore observed in terms of the latter two types of appraisal, despite the differences in levels of significance between them.

With respect to Loss, however, a significant interaction *was* found (F [2, 92] = 6.04, p [G-G] = .0081). As can be seen in Figure 5.3b below, Loss appraisals made after the second and third failures were very similar across the two studies, but those made after the first failure were markedly different, with participants in the replication displaying a weaker sense of Loss at this point than those in the extended study. The fact that the changes in appraisals were significant in the former study but not in the current one suggests that the formation of Loss appraisals in the face of repeated failure experiences differs according to whether or not those experiences are received *en masse* or distributed over time.

FIGURE 5.3b Study x Number of Failures Interaction Effect for Loss



Overall, despite the non-significant changes in CSAs across the extended study, the largely similar nature of these and those observed in the replication study is considered sufficient to enable reliance to be placed on the significant correlations found between immediate

and delayed CSA scores in the current study, suggesting that changes in CSA scores resulting from failure feedback persist for a week after the receipt of that feedback.

The third hypothesis – that higher GSE scores would be associated with smaller differences between immediate and delayed CSA scores – was tested by a further six correlations, one each per CSA for each of the two sets of difference scores, with alpha again being set at .0083. As Table 5.3d below shows, however, none of these correlations reached significance (using one-tailed probabilities) so the hypothesis was not supported:-

TABLE 5.3d Correlations of GSE with CSA Difference Scores

Correlation with GSE	r	p
Cdiff1[29]	-.08	.337
Cdiff2	.10	.334
Tdiff1	-.17	.233
Tdiff2	.46	.021
Ldiff1	-.39	.043
Ldiff2	.41	.038

Since there were significant differences in overall Challenge and Loss scores across the two GSE groups in the replication study, some association of GSE with strength of appraisals was suggested. Therefore, GSE scores were correlated with those for each CSA at each measurement point in the current study (since this required 15 separate analyses, alpha was set at .0033. None of these correlations were significant, however, with r values ranging from .04 to .50 and corresponding probabilities falling between .869 and .027. Overall, therefore, the results from the extended study have failed to find any evidence that GSE protects against either the development or persistence of negative changes in CSAs in the face of repeated failure experiences.

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[29] 'Diff1' scores are appraisal scores reported immediately before completion of the second set of anagrams minus those reported immediately after completion of the first set. 'Diff2' scores are those reported before completion of the third set minus those reported after completion of the second set.

5.4 DISCUSSION

5.4.1 DISCUSSION OF MAIN FINDINGS

In this study, significant relationships were found between all CSAs assessed immediately after the receipt of failure feedback and corresponding appraisals assessed one week later, before any further attempts at similar tasks had been made. In addition, there were no differences between immediate and delayed scores for any CSA – findings which support the first hypothesis of the study. Although the changes in CSAs across the three failure experiences did not reach significance for any of the three types, neither did any differ significantly from those of the replication study reported in Chapter 4. Furthermore, there were no interactions between Study and the Number of Failures for either Challenge or Threat. No strong distinctions in the patterns of change in appraisals of either of these two types of CSA across the two studies can therefore be assumed and, despite the lack of significant main effects of Number of Failures, the significant correlations between immediate and delayed Challenge and Threat appraisals can be considered both meaningful and as indicative of a sustained influence of repeated failure experiences.

The findings concerning Loss appraisals are not quite so clear, however. Although there was no significant difference between Loss appraisals assessed immediately after receipt of failure feedback and those assessed a week later, a correlation between immediate and delayed appraisals was only observed in the second week. In addition, a significant interaction was found between Study and the Number of Failures for this type of appraisal. Comparison of the changes observed in Loss scores in the replication and extended studies showed those formed after the first failure experience to be weaker in the former case than in the latter. As the changes in Loss in the replication study were significant while those in the current one were not, these findings suggest that the patterns of change in Loss appraisals made in relation to repeated failure experiences differ according to the extent to which failure feedback is received under massed or distributed conditions.

Finally, the lack of conclusive results with respect to GSE arising from both this study and the replication significantly weaken Jerusalem and Schwarzer's argument for a protective role of GSE against the adverse cognitive consequences of repeated failure experiences.

5.4.2 Methodological Limitations

The main limitation of this study was the fact that it was confined to just three failure experiences. Although significant patterns of change in Challenge and Loss appraisals were observed across the first three failures of the replication study, clearer findings may have been achieved in the current study if it had encompassed more than this. Given all that had to be taken into account, however, it was not unreasonable to keep to this number of failures, and useful results were achieved despite this limitation.

5.4.3 Theoretical Implications

There was no support, in this study, for any relationship between GSE and the persistence of failure-induced changes in CSAs. Although it has become widely accepted, in the period since Jerusalem and Schwarzer's original work was conducted, that self-efficacy beliefs which relate specifically to the particular behaviour(s) under investigation should generally be utilised in preference to the generalised trait (Schwarzer, 2002), this lack of support for a protective benefit of GSE still reinforces the suggestion (raised in Chapters 2 and 4, above) that the power of self-efficacy as an influence on the performance of health behaviours has been over-estimated.

With respect to the impact of failure experiences, however, the findings of this study, together with those of the replication reported in the previous chapter, have more positive implications. Three key findings have emerged which are of particular theoretical importance with respect to the adoption of health behaviours: the formation of CSAs in response to failure, their persistence beyond the time at which failure is perceived and their negative patterns of change with increasing failures. Extrapolating these results, failed attempts to adopt a health behaviour would be expected to result in the formation

of CSAs which would persist beyond the point of realising that the attempt has failed and which would become increasingly detrimental to the future successful adoption of the behaviour as the number of past failed attempts increased. In addition, the differences in the strength of Loss appraisals which were observed across the two studies, according to the frequency of failure feedback, may also have implications for health behaviour adoption. Behaviours such as smoking cessation, for example, involve constant feedback on progress while others, such as weight loss attempts, are associated with feedback which is received only daily or weekly. It is therefore possible that Loss appraisals may be found to strengthen at different rates in relation to different health behaviours.

In conclusion, the IPM appears to have the potential to progress knowledge and understanding of health behaviour performance beyond that which has been provided by the SCMs in two important ways: it may show how reactions to past failed attempts to achieve a desired change in health-related behaviour can influence the likelihood and/or degree of success of future attempts and it may help, by means of a consideration of the frequency with which feedback on progress is received, to account for differences in the impact of past failure across different health behaviours. The work reported in Chapter 6 provides details of how this potential was further explored.

CHAPTER SIX

Can the Idealised Process Model be Generalised?

6.1 INTRODUCTION

The findings of the replication and extended studies have demonstrated the value of separating cognitive stress appraisals into the three different types (Challenge, Threat and Loss) when considering reactions to intellectual failure. However, it cannot be assumed that such separation will necessarily be helpful when exploring reactions to failure in other types of endeavour. The aim of the work reported in this chapter was therefore to determine whether the same tripartite division of stress appraisals could be usefully applied when considering attempts to change health-related behaviours.

The first stage of the investigation was to determine whether reliable scales of Challenge, Threat and Loss relating to health behaviours could be developed. It was decided to adapt the English translation of the original German version of the CSAQ (used in the replication and extended studies reported above) to apply to attempts to give up smoking, where feedback on progress would be constant, and also to attempts to take up regular exercise, where only intermittent feedback would be received.

6.2 THE FIRST PILOT TESTS

6.2.1 PARTICIPANTS

In line with the power analysis reported in Chapter 4, a minimum of 19 people attempting to give up smoking (*Quitters*) and a further 19 attempting to establish regular exercise (*Exercisers*) - would be required to complete the adapted versions of the scale in order that the reliability of each might be assessed. All participants were required to be at least 18 years of age and to have sufficient command of the English language to be able to fully understand and answer the questions on the scale. No demographic information was requested from participants and any names provided have been kept strictly confidential.

6.2.2 REVISIONS MADE TO THE ORIGINAL SCALE

In adapting the CSAQ, all Challenge and Threat items and one concerning Loss were subjected to change, although the Loss item was only amended for the Quitters' scale. There were two reasons for the changes. First, all references to "the problems" were replaced with references to taking up regular exercise or stopping smoking (for the Exercisers' and Quitters' questionnaires, respectively). Second, items were modified where this was considered to enhance the clarity of their meaning within the new context. The order of presentation of the items forming each subscale remained the same, that is: the four Challenge items were questions 1, 4, 7 and 11 on the scale; the three Threat items were questions 2, 6 and 9; and the four Loss items were questions 3, 5, 8 and 10. Details of the revisions are presented below, with the original wording presented in ordinary font, changes made for the Exercisers' scale given in bold and those for the Quitters' scale in italics. Information regarding each item includes (in brackets) the subscale to which it relates (indicated by initial) and a number to show its position within the subscale.:-

Question 1 (C1)

- I'm curious to see how I'll cope with the next set of problems
- **I'm curious to see how much I manage to exercise this week**
- *I'm curious to see how well I manage to keep off the cigarettes this week*

Question 2 (T1)

- I suspect that the next set of problems will be too hard for me
- **I suspect that it will be too hard for me to take enough exercise this week**
- *I suspect that it will be too hard for me to go without smoking this week*

Question 4 (C2)

- I'll be more able to solve the next set of problems if I make a real effort
- **I'll be more able to take enough exercise this week if I make a real effort**
- *I'll be more able to keep off the cigarettes this week if I make a real effort*

Question 6 (T2)

- I doubt my ability
- **I doubt my ability to develop the habit of exercising regularly**
- *I doubt my ability to stop smoking for good*

Question 7 (C3)

- I feel more fully challenged as the problems get more difficult
- **I feel more fully challenged as exercising gets more difficult**
- *I feel more fully challenged as the cravings get stronger*

Question 8 (L3)

- I'm very nearly at the point of giving up
- *I'm very nearly at the point of caving in*

Question 9 (T3)

- I'm worried that I won't be able to do the next set of problems
- **I'm worried that I won't be able to take enough exercise this week**
- *I'm worried that I won't be able to do without cigarettes this week*

Question 11 (C4)

- I'm really motivated to do better now
- **I'm really motivated to do better this week**
- *I'm really motivated to do better this week*

The adapted scales are provided in their entirety in Appendix E (pp.455-6), together with the full reliability analyses (pp.457-63).

6.2.3 Reliability of The Exercisers' Scale

26 participants completed the CSAQ as initially revised for Exercisers. All were newly enrolled on an exercise programme being run by a qualified fitness trainer at their place of

work (the London headquarters of a petroleum company) and all met the criteria for inclusion outlined above.

The reliability analysis yielded only low values of Cronbach's alpha for two out of the three subscales (Challenge and Threat) as well as some weak item-total correlations for the same subscales. Details of these, and the actions taken to remedy the problems, are provided below, along with details of the results of the reliability analysis of the Loss subscale.

6.2.3i Challenge

For the Challenge subscale, alpha was just .40 and the item-total correlations for the first two items (questions 1 and 4) were only -.02 and .00, respectively. The removal of either of these items would have led to increases in alpha, but only to between .51 and .55, neither of which would have been acceptable, given the ideal minimum value of .7.

Having looked again at the definition of Challenge as a cognitive stress appraisal (Jerusalem and Schwarzer, 1992), it became apparent that the subscale items, as currently written, were failing to tap two key aspects of the construct: the perception of a taxing situation as providing an opportunity for gain and the presence of confidence in its outcome. It was therefore decided to replace C1 and C2 with two new items designed to remedy this omission. It was also decided that the wording of C3 (question 7) was clumsy and that C4 (question 11) made no allowance for participants to have met their previous week's targets. These items were therefore revised. The new subscale items were as follows (the numbers in brackets are the question numbers of each item):-

C1 (q1) I'm really motivated to do well this week

C2 (q4) The benefits of regular exercise make all the effort worthwhile

C3 (q7) The harder it gets to exercise, the more fully challenged I feel

C4 (q11) I'm sure I'll be able to meet my exercise targets this week

6.2.3ii Threat

In the case of Threat, alpha was .52 and, while all item-total correlations were greater than the ideal minimum of .2, that for item 2 was, at .21, only just so. It was clear, therefore, that revisions were also required to the adapted version of this subscale. After having again returned to Jerusalem and Schwarzer's description of the construct, the following potential deficiencies in the scale were identified: "ability" in T2 was considered to be too specific; T3 did not sufficiently assess perceptions of the risk of personal damage; and, overall, there was not enough sense of the inadequacy of available resources. The items were therefore re-worded in order for T1 to present a sense of personal inadequacy rather than task difficulty, for T2 to have greater scope and for T3 to address potential personal damage. The new version of this subscale was as follows:-

T1 (q2)	I suspect I'm not up to meeting my exercise targets this week
T2 (q6)	I doubt I'll manage to develop the habit of exercising regularly
T3 (q9)	I'm worried how I'll feel if I don't meet my exercise targets

6.2.3iii Loss

Cronbach's alpha for this subscale (.78) exceeded the recommended minimum. All item-total correlations were at acceptable levels, ranging from .53 to .71 and no item's removal would have led to an increase in alpha. All items in this subscale were therefore retained unchanged. It is interesting to note that these items were those which, in the original version of the scale, did not include any reference to "the (next set of) problems" and which were therefore not subjected to any revisions in the adapted scales. The acceptable psychometric properties of the subscale therefore reinforce those from the pilot and replication studies.

6.2.4 PROPERTIES OF THE QUITTERS' SCALE

Since the recruitment of Quitters took place more slowly than that of Exercisers, only 10 completed Quitters' questionnaires had been returned by the time the above analyses with

respect to the Exercisers' questionnaire had been carried out. These had all been completed by members of a support group provided by the NHS and run by psychologists.

Given the difficulties with the Exercisers' scale, reported above, inter-item correlations were carried out on the data acquired from these 10 questionnaires in order to gain a preliminary feel for the performance of the Quitters' scale. Full details of the analyses can be found in Appendix E (p.463), but a summary is provided in Table 6.2.4, below, along with conclusions formed on their bases and changes made as a result.

TABLE 6.2.4 Summary of Analyses Relating to the Quitters' Scale

Correlations	Range of r Values	Mean*
Challenge items with each other	-.37 to .30	-.06
Challenge items with Threat items	-.83 to .43	-.08
Challenge items with Loss items	-.73 to .51	-.09
Threat items with each other	.29 to .67	.52
Threat items with Loss items	-.05 to .91	.62
Loss items with each other	.41 to .91	1.02

* since the sampling distribution of r does not approximate a normal distribution curve when $p \neq 0$, all r values were subjected to Fisher's transformation before being averaged.

The findings were explored in relation to the following two criteria: whether or not the items within each subscale correlated more strongly with each other than with the items of the other two subscales and whether the correlations within a subscale were of similar strength to each other.

It can be seen from Table 6.2.4 that, although the items of the Loss subscale correlated more strongly with each other than with those of either of the other subscales, there were some weaknesses in relation to the first question for both the Challenge and Threat subscales. The Challenge items correlated only marginally better with each other than they did with those of Threat and Loss and, in addition, the mean correlation of Challenge items with each other was in a negative direction. Threat items correlated much more strongly with each other than they did with those of Challenge, but they correlated even more strongly with the Loss items. In relation to the second question, some dissimilarities

were observed across the inter-correlations within the Threat subscale and those of Challenge were quite widely disparate. Although there was one negative correlation within the Loss subscale, the remainder were fairly similar.

The analyses relating to the Loss subscale therefore suggested it might demonstrate reliability after further data collection, so no change was warranted to its constituent items at this stage. However, since those relating to the Challenge and Threat subscales did not indicate that acceptable criteria were likely to be met it was decided to revise both. For the sake of consistency, it was decided that the changes would be made in line with those of the Exercisers' scale (outlined in Section 6.2.3 above) so the revised items were as follows:-

C1 (q1)	I'm really motivated to do well this week
C2 (q4)	The benefits of giving up smoking make all the effort worthwhile
C3 (q7)	The greater the temptation to smoke, the more fully challenged I feel
C4 (q11)	I'm sure I'll be able to keep off the cigarettes this week
T1 (q2)	I suspect I'm not up to doing without cigarettes this week
T2 (q6)	I doubt I'll manage to stop smoking for good
T3 (q9)	I'm worried how I'll feel if I don't manage to stay off the cigarettes

Following these revisions, both the Exercisers' and Quitters' scale were both subjected to a second pilot test. The two new scales are provided in Appendix E, pp.464-5.

6.3 THE SECOND PILOT TESTS

6.3.1 PARTICIPANTS

Individuals were recruited to the second pilot test via several methods: a block email was sent to all members of staff of a London university, first year undergraduate psychology

students at the same university were recruited during a lecture, personal contacts of the researcher approached people they knew to be attempting to change the relevant behaviours and Exercisers were also recruited by the leader of an exercise programme held at their place of work. As in the first pilot test, slower recruitment of Quitters meant less than 19 had been recruited by the time the analysis of the Exercisers' results took place. Since that analysis again produced results which precluded further work with the Exercisers' scale (see Section 6.2.2ii, below), recruitment of Quitters was stopped at this point. 35 completed questionnaires were returned by Exercisers and 14 by Quitters. The total numbers of participants recruited by each method are presented in Table 6.3.1 below:-

TABLE 6.3.1 Number of Participants Recruited by Each Method

	By email (staff)	In class (students)	Via Personal Contacts	Via the Leader of an Exercise Programme
Exercisers	3	17	1	14
Quitters	5	4	5	N/A

Students were offered a course credit for taking part in the study - a practice which could arguably have led to false responding. However, it was emphasised that it was of crucial importance that only those seriously attempting to change their behaviour should take part and only a small proportion of the class (19%, n = 17) volunteered (the four who completed the Quitters' scale also completed that for Exercisers), suggesting that volunteers were genuine. The leader of the exercise programme was the same as in the first study and she undertook to ensure that none of those recruited took part in both pilot tests.

6.3.2 RELIABILITY OF THE REVISED EXERCISERS' SCALE

While the analysis of the revised version of the exercisers' scale again produced evidence of good reliability for the Loss subscale, those for the Challenge and Threat subscales were again poor. These are summarised in Table 6.3.2, below, where it can be seen that alpha values for both subscales were well below the .7 minimum required, that the item-

total correlations were either below the required level of .2 or not far above it, and that removing the weakest items would not have resulted in satisfactory values of alpha:-

TABLE 6.3.2 Reliability of the Revised Challenge and Threat Subscales for Exercisers

	Challenge	Threat
Cronbach's Alpha	.51	.34
Item-total Correlations	.18 .22 .33 .50	.10 .22 .27
Alpha if the Weakest Item Removed	.52	.43

Given the very weak findings for the Threat subscale, it was decided to compare the alpha value it yielded with that achieved by the original version of the CSAQ (using the responses from both the pilot and main replication studies, n = 47). Following the method outlined in Howell (1992, p.251) for testing two independent correlations, the difference was found to be significant ($z = 2.20$, $p = .0139$)[30], indicating that despite the revisions made to the subscale, it not only failed to produce convincing evidence of reliability, it was, in fact, convincingly *un*reliable.

Although the alpha value for the Challenge subscale was not significantly lower than that of the same subscale in the original CSAQ, the measure did fall short of the minimum requirement for reliability in many respects. The implications of these findings will be discussed in Section 6.5, below.

6.3.3 PROPERTIES OF THE REVISED QUITTERS' SCALE

Inter-item correlations were conducted using the data acquired from the 14 completed Quitters' questionnaires in order to explore preliminary performance of this measure and a summary of the results is provided below. Full details are given in Appendix E, p.474.

[30] See Appendix E for this and all other analyses relating to the second exercisers' scale (pp.466-73).

TABLE 6.3.3 Summary of Analyses Relating to the Second Version of the Quitters' Scale

Correlations	Range of r Values	Mean*
Challenge items with each other	-.26 to .78	.31
Challenge items with Threat items	-.78 to .17	-.33
Challenge items with Loss items	-.74 to .22	-.42
Threat items with each other	.12 to .45	.33
Threat items with Loss items	.17 to .74	.54
Loss items with each other	.41 to .82	.71

* r values were again subjected to Fisher's transformation before being averaged.

Although the findings with respect to the Loss subscale were again good and some positive features were found with respect to the other two subscales, weaknesses remained in relation to the assessment of both Challenge and Threat: the within-subscale correlations for Challenge were again widely differing and Threat items again correlated more strongly with Loss items than with each other. The implications of these findings are discussed in Section 6.5, below.

6.4 EXPLORATORY ANALYSES

In further exploration of the data, it became apparent that removal of some scale items might lead to reliable measures of Cognitive Stress Appraisal, but only as a single entity and not as the three separate types of appraisal proposed under the IPM. However, the possibility exists that the addition of further items might produce a reliable, multi-dimensional scale, but one which would incorporate different dimensions from those applicable to cognitive tasks. It would therefore not be advisable to collapse the assessment of cognitive stress appraisals into a single entity at this stage. Furthermore, the use of a unidimensional scale would provide only an extremely narrow focus to explorations of what appears to be a highly complex topic.

6.5 DISCUSSION

6.5.1 GENERAL DISCUSSION AND CONCLUSIONS

This chapter has reported attempts to adapt the original CSAQ for application in investigations of individuals' responses to their progress when attempting to take up regular exercise or to stop smoking. It has not proved possible, however, to develop appropriate versions of the scale which demonstrate acceptable psychometric properties with respect to Challenge and Threat. There are two alternative conclusions which might be drawn from this outcome: first, that the process by which the measures were developed was flawed or, second, that the model which they were designed to reflect is not directly applicable, without at least some degree of modification, to the area of health behaviour change.

With respect to the first alternative, great care was taken (as has been outlined in this chapter) in the development of the amended versions of the CSAQ. In the first instance, the wording of the original scale was altered only in relation to the nature of the task being attempted. When this did not result in reliable measures of Challenge and Threat, the wording of poorly functioning items was adjusted to bring their assessment more in line with the original definitions of the constructs. The failure to produce reliable subscales is therefore not considered to have resulted from flawed scale development and it seems likely that the IPM does not provide an explanation of the influence of reactions to past failure on future attempts to change a health behaviour.

While it may be the case, as suggested above, that an alternative, multi-dimensional scale of CSAs might be applicable to investigations of health behaviour change, the potential components of such a model are not readily apparent and it is perhaps time to take stock of the current situation before making a decision about appropriate directions for future investigation. This issue will be discussed further in the next chapter. Before that, however, consideration is required of both the methodological limitations of the IPM approach and the theoretical implications of the outcome of this attempt to develop reliable versions of the CSAQ in relation to health behaviours.

6.5.2 METHODOLOGICAL LIMITATIONS OF THE IPM APPROACH

Since the second approach taken in this thesis involved the replication, extension and application of Jerusalem and Schwarzer's IPM it was essential to adopt the methods used by them in their original (1992) test of the model. The experimental nature of these methods had some benefits, in that all participants were required to undertake exactly the same tasks under the same conditions (other than some slight variations in environmental factors arising from the different times and locations of testing). However, there are also some limitations associated with this aspect of the work. For example, the artificiality of the experimental context and the absence of any particular implications of performing poorly, other than personal dissatisfaction, appeared to result in differences in the extent to which different participants engaged with the tasks and how they reacted to their performance. In addition, since there was no provision of fictitious failure feedback in this study (as this practice was considered unethical) there was no way of knowing whether participants did, in fact, interpret low scores on the tasks in terms of failure.

As well as these limitations, those associated with self-report questionnaires (which were discussed in Section 2.4.2, above) also apply to this study and could be argued to limit the confidence with which CSAQ scores can be considered to represent genuine reactions to failure experiences. However, the fact that CSAs were observed to change in similar ways across each of the original, replication and extended studies does suggest that this finding represents a meaningful, rather than an artefactual, pattern of response.

6.5.3 THEORETICAL IMPLICATIONS

In considering the possible reasons for the difficulties encountered when attempting to adapt the CSAQ for use in relation to health behaviours, a number of similarities were identified between some of the Challenge and Threat items and some core social cognition constructs. Examples of such items are presented below, with the subscale from which they are drawn and the constructs to which they appear similar being provided, italicised, in brackets:-

- I'm really motivated to do well this week (*Challenge/Intentions*)
- I'm sure I'll be able to… (*Challenge/Self-efficacy*)
- I suspect it will be too hard for me to… (*Threat/Self-efficacy*)
- The benefits of…make all the effort worthwhile (*Challenge/Attitudes*)

As would be expected (given the close adherence to the definitions of each CSA when adapting the CSAQ), similar links with social cognitions can also be seen in Jerusalem and Schwarzer's broad descriptions of these two CSAs. Challenge, for example, is described as involving consideration of the stressor as providing an opportunity for positive gain (*Attitudes*), keenness to meet its demands (*Intentions*) and confidence in relation to the outcome of taking action (*Self-efficacy*). Similarly, Threat includes an evaluation of resources as being potentially inadequate in relation to the situational demands (*Self-efficacy*).

Despite these similarities, however, the IPM is not simply a social cognition model in disguise - it also focuses heavily on emotion. One of the Threat items, for example, concerns an anticipation of distress ("I'm worried how I'll feel if…") and those of the Loss subscale combine to represent of a sense of helplessness and hopelessness. It is interesting, therefore, that it was only the Loss subscale, which is not behaviour-specific and therefore remained unchanged throughout this body of work, which was consistently reliable across all applications of the CSAQ. This finding reinforces the importance of focussing on emotional reactions to the results of past behavioural effort and suggests that these might, in some instances, have a greater impact on future attempts than cognitive responses.

The results of both Jerusalem and Schwarzer's original study and those conducted here suggest that Loss appraisals would not be expected to be high except in cases where a large number of past failures had been experienced. However, where failure to adopt health behaviours is concerned, it seems possible that salience could (in some cases, at least) be greater than that associated with failure to perform well on cognitive tasks, causing Loss appraisals to strengthen after fewer failure experiences. This being the case, one application of the IPM which could represent a constructive move beyond the SCMs would be to concentrate purely on the development and impact of Loss appraisals in those with a history of failure in relation to the adoption of particular health behaviours.

While of potential value for this particular kind of sample, however, such a move would not add greatly to knowledge and understanding of influences on attempts to adopt health behaviours in the broader population. A different kind of move away from the SCMs now seems necessary, therefore, and the next chapter provides details of how such a move was decided upon and conducted, together with its outcomes and implications.

CHAPTER SEVEN

Experiences of Trying to Adopt Health Behaviours:

A longitudinal, multiple case study investigation

7.1 INTRODUCTION TO THE FINAL STUDY

When planning future research, it is reasonable to draw on, and further develop theories, models and constructs shown to be of value in the established literature. However, decisions regarding which of these to take into account, out of the myraid of those available, will inevitably be influenced by a range of factors. The bases upon which such decisions have been made, both in the literature and in the work conducted towards this thesis, may be at least partly accountable for the continuing deficits in our knowledge and understanding of influences on the adoption and maintenance of health behaviours.

A good example of how such a situation has arisen in practice is provided by Rosenstock (1974) and relates to the developmental work which led to the formation of the HBM. This work was carried out in a U.S. public health setting in the 1950s, at which time there was a driving need to find an explanation for the widespread failure of healthy individuals to engage in preventative health activities or to undergo health screening even when these were being provided either free or at nominal cost. All those who were involved in the development of the model (Hochbaum, Kegeles, Leventhal and Rosenstock himself) were social psychologists of phenomenological orientation who were strongly influenced by the work of Kurt Lewin. As such, they considered individuals to be repelled from regions of negative valence in the life spaces in which they live and driven towards others of positive valence. They therefore also held the beliefs that people's behaviour is influenced by their perceived worlds and that historical background is of relevance only to the extent that it is represented in the dynamics of a current situation. Rosenstock proposed that, as a result, it was: "...almost foreordained that...the HBM...would include a heavy component of motivation and the perceptual world of the individual" (p.329). That is, the temporal, contextual and researcher-based characteristics just outlined were at least partially responsible for defining and constraining the final features of the model.

Similar factors can be seen to have operated in connection with the development of the TRA. In this case, there had been a widespread expectation, following the work of Gordon Allport (1935, 1968), that attitudes would provide all-encompassing explanations of behaviour. Such explanations had failed to materialise, however, and Fishbein and Ajzen, having examined the existing literature in the field, decided that a lack of clear

distinction between the definitions of beliefs, attitudes, intentions and behaviour was responsible (Fishbein, & Ajzen, 1975). The research context and the beliefs of the researchers seems to have encouraged them not to look beyond the boundaries of these particular constructs when shaping the conceptual framework which became known as the TRA.

Perhaps by virtue of the constraints they placed on the choice of components for the models, the decision-making processes involved in the development of both the TRA and the HBM failed to result in frameworks which even their developers considered to provided comprehensive explanations of behaviour. Despite Rosenstock's claim that the addition of cues to the other four core components of the HBM would serve to complete it, he goes on to describe an abortive attempt to also incorporate a measure of health salience to the model which belies this claim and he further admits that: "...the question of whether the avoidance orientation in the Health Belief Model is adequate to account for the so-called positive health actions taken by people remains unresolved." (1974, p.335). The processes involved in the development of the model were therefore clearly not such as to ensure its sufficiency in relation to its purpose.

Like Rosenstock, Fishbein and Ajzen (1975) also discuss their original model in ways which implies comprehensiveness, as the following statements illustrate: "The totality of a person's beliefs serves as the informational base that ultimately determines his attitudes, intentions and behaviors." (p.14), "...a person's behavioural intention is viewed as a function of two factors: his attitude toward the behavior and his subjective norm...this intention is viewed as the immediate determinant of the corresponding behaviour" (p.16) and "For the most part...people do not intend to perform behaviors that they realize are beyond their ability, and thus a person's intention, when appropriately measured, will usually predict his behavior." (p.382). In addition, Fishbein and Ajzen show a strong resistance to admitting that the decisions they had made about their component constructs or their links with behaviour may have been in any way deficient. They claim, for example, that in cases where intentions have failed to predict behaviour, this must have resulted from the intervention of some unforeseen event(s) which caused changes to intentions subsequent to their measurement but prior to the reporting of the relevant behaviour. Despite such statements and claims, though, Ajzen clearly did consider the TRA to be insufficient to the task of explaining and predicting behaviour not under the

complete volitional control of the individual, hence his later addition of PBC when developing the TPB (Ajzen, 1985).

This consideration of the developmental work relating to the HBM, the TRA and the TPB has illustrated how decisions made about the nature of the key constructs relating to behaviour and the ways in which they combine to exert their influence have been shaped by an interplay of the theories and findings reported in the established literature and a range of temporal, contextual and researcher-based factors. While decisions made on this basis have undeniably resulted in some useful additions to knowledge and understanding, they have also led to a reliance on a limited pool of constructs and a risk of over-confidence in the end result.

Although the aim of this thesis has been to transcend the constraints of the SCMs, the selection of constructs and models for application to health behaviour performance and change in the first study drew heavily on the literature which followed from the work just described and was therefore influenced by its limitations. In addition, the subsequent decision to explore the potential of Jerusalem and Schwarzer's (1992) proposals regarding the IPM and GSE, despite bringing in some constructs which were new to this area of research, was itself influenced by temporal, contextual and researcher-based factors. To illustrate, Jerusalem and Schwarzer's work was first read by the present researcher at a time when the importance of self-efficacy was being widely extolled across the health psychology literature and there seemed few limits to the scope of its influence. The claim of a protective influence of GSE in relation to responses to failure was therefore totally in line with prevailing views. In addition, the nature of the CSAs and their proposed formation and change in the face of ongoing failure experiences bore certain similarities to the present researcher's own experiences and responses in relation to attempts to quit smoking. Jerusalem and Schwarzer's proposals therefore had both a temporal and a personal credence which strongly influenced the decision to explore their potential in relation to health behaviours.

Overall, this examination of the current situation suggests that the theories and models outlined in the established literature, as well as decisions about which of these to apply in future research, are all subject to the influence of temporal, contextual and researcher-based factors and that the process of theory development may have been impoverished as

a result. There is now therefore a need to suspend this practice and to take a more radical departure from the existing work. An inductive approach is required in order that the limitations of scope which are currently in existence be removed and the breadth of human experience in this area be more fully explored. In this way, those influences of importance to individuals attempting to adopt health behaviours which have not so far been considered by researchers might be enabled to emerge while those already tapped in the existing literature might be reinforced and/or clarified. Once such results have been achieved, across a range of inductive investigations, the potential will then be in place for more informed decisions to be made about which constructs it is appropriate to apply in the further development of relevant models and measures. The final study of this thesis will therefore be conducted using qualitative methodology in order to allow those attempting to adopt health behaviours to tell their own stories in their own words so that an account might be generated of the nature of such experiences, the meanings associated with them and any links between the latter and the degree and persistence of change achieved. To ensure due consideration is given to process issues (including reactions to the outcomes of past behaviour), a longitudinal, multiple case study design will be used and only those who have been through at least one previous failed attempt to adopt the desired behaviour will be recruited to take part.

While qualitative explorations of issues relating to the performance of health-related behaviours are much rarer than those employing quantitative designs, some can be found in the established literature. However, since it was aimed, in this final study, to be as open to the emergence of new themes as possible, a decision was made (in line with Smith, 1991) not to access this literature until after the analysis of the data had been conducted. In keeping with this decision, rather than being introduced now, findings from previous qualitative work will be discussed, in Section 7.4, in the light of the results of the study.

7.2 METHOD

7.2.1 DESIGN

This investigation followed a longitudinal, multiple case study design whereby three individuals were interviewed on three occasions each: the first of these being within three weeks of their having initiated a change in one or more health-related behaviours, and the second and third around two and four weeks later, respectively.

7.2.2 RECRUITMENT & PARTICIPANTS

The recruitment of participants to this study was conducted both by word-of-mouth via family, friends, neighbours and local shopkeepers and also by a block email sent to colleagues of the researcher. As a result, two men and one woman were recruited to take part: one is a colleague of the researcher, another a colleague of her husband and, the third, the son of a local shop assistant. Although two had met the researcher before, neither could be described as more than slight acquaintances. One other person volunteered for the study, another colleague of the researcher, who came forward after the other three participants had been recruited. Since it had only been planned to interview three people, this person was asked to act as a reserve in case any of the other three volunteers withdrew from the study or returned to their original behaviour(s) before the second interview or in case it was decided that insufficient data had been acquired as a result of the first three case studies and that a fourth was therefore warranted. In the event, all three initial recruits completed the investigation and provided sufficient data for its needs, so the person held in reserve was not called upon.

After their initial expressions of interest, each volunteer was given an information sheet[31] outlining the aims of the study, the procedures to be followed and the fee, as well as providing an assurance of confidentiality and of participants' right to withdraw from the

[31] copies of the information sheet and consent forms are provided in Appendix F, pp.477-8.

study at any point without penalty. Each person indicated, in writing, that they consented to take part in the study and then, either alone or in discussion with the researcher, chose an alias by which they were to be referred from that point forward on all tapes and transcripts, in the written report of the study and in any presentations or publications which might follow.

The two men, "Stench" and "Meatloaf", are both in their forties, married with children and attempting to give up smoking. Stench is a mechanic who has recently taken over the directorship of a garage in a small town, while Meatloaf is a purchase manager for a manufacturing company based in a medium-sized city. Stench had smoked between thirty and sixty cigarettes a day since he was nine years of age, totalling 38 years as a smoker and Meatloaf had smoked an average of twenty cigarettes a day since he was 17, totalling 26 years as a smoker.

"Ellie" is single with one child, has recently turned thirty years of age and is trying to improve her diet and increase the amount of exercise she takes on a regular basis. She works as an administrative assistant. She has never engaged in what she considers to be serious exercise, but she used to "walk everywhere" (E1: 52). She also used to be able to retain a slim figure without paying any particular attention to what she ate. Her walking has decreased over a period of about seven years, however, and she has recently noticed some flabbiness around her waist. Her father died of a heart attack at the age of thirty.

Each of the three participants has made one serious attempt to change their target behaviour(s) in the past. Stench's previous attempt lasted for about a year and he doesn't really know why he started smoking again, but suspects he was just bored. When he realised he was back into the habit of smoking again, he didn't feel depressed or upset but instead was pleased that he'd managed such a good first attempt and was resigned at having returned to the behaviour.

Meatloaf first began trying to quit eleven months before the start of this investigation and had initially managed to get his intake down to about two cigarettes each evening, being somewhat helped in his efforts by using nicotine replacement patches and gum, albeit rather erratically. He also tried smoking cigars as a healthier alternative to cigarettes but found his use of them gradually increasing until he was smoking around ten each day. He

then returned to cigarettes but didn't go back to smoking as many as his usual twenty a day. He was nonetheless very depressed when he realised he hadn't achieved his goal.

Ellie had had what she termed a "health kick" a couple of years prior to this study during which she attended a gym fairly regularly for a period of between six and twelve months. However, this came to an abrupt end when she experienced a period of feeling unwell and, as a result, needed surgery. During the recovery period, she developed the habit of going out for takeaway food rather than cooking for herself. At the time of her operation she didn't feel particularly upset about the cessation of her exercise routine as her health problem was her predominant concern and because she thought she would be able to re-start her routine after only a short break. In the event, however, she was unable to do this and after a while gave up trying to do so.

Both Ellie and Meatloaf started their current attempts on New Year's Day 2004, while Stench was just four days behind them. All three participants are white and speak English as their first language. It was not anticipated that all volunteers would be of the same national and/or ethnic background, nor was it considered desirable that they be so. However, since the period immediately following New Year is a prime time for people to both make the decision to change their behaviour and initiate the change, only a very short period was practically available in which to recruit participants to the study. The first three to volunteer were therefore recruited despite their similarities of age and ethnicity. All come from the Midlands and speak using certain regional expressions, which will be explained where necessary to clarify the meaning of interview extracts.

7.2.3 THE METHOD OF ANALYSIS

The method of analysis adopted in this study was Interpretative Phenomenological Analysis (IPA; Smith, 1995, 1996). Although IPA has only recently been developed it has been used increasingly within health psychology over the past few years (Duncan, 2001) and has been shown to be a highly versatile method of analysis. Topics which have been explored are as diverse as: understanding unprotected sex in relationships between gay men (Flowers, Smith, Sheeran & Beail, 1997); patients' expectations of specialist palliative

care services (Jarret, Payne, Turner & Hillier, 1999); risk perception and decision-making processes in candidates for genetic testing (Smith, Michie, Stephenson & Quarrell, 2002); and the experience of living with vaginal agenesis (Holt & Slade, 2003). Furthermore, it has also been applied to case study research (e.g. Robson, 2002; Smith, 1991), including that incorporating multiple case studies (Smith, 1999), and is therefore well suited to exploring the process of changing health-related behaviour over a period of time.

Several other methods of data analysis were considered in relation to this study and subsequently rejected in favour of IPA. Micro- and macro-discourse analysis are two such examples. The former was considered unsuitable because it is concerned with what the individual is trying to achieve by means of the verbal and non-verbal strategies employed during conversation (including interviews) rather than focussing on the experiences they are attempting to describe. The latter was rejected because of its emphasis on establishing which discourses are currently prevalent and the reasons why they have become so (e.g. power, politics, etc.). Content analysis was also rejected for use in this study as it merely involves counting the number of examples of generated categories which are represented in the data and would therefore not provide a sufficiently detailed analysis for the meeting of the aims of this study. Another alternative, Grounded Theory, requires sufficient data for generated categories to become "saturated", which may have proved beyond the scope of a multiple case study investigation where different behaviours as well as different individuals were being considered. In addition, as an approach, Grounded Theory has become fragmented and has lost coherence as a result of divisions of opinion between its originators, Glaser and Strauss, with the latter having proposed a number of alterations to the method originally devised (Strauss and Corbin, 1990). Finally, the approach is based upon the premise that theory emerges from the data completely independently of any presuppositions held by the researcher – a premise which has been challenged by those advocating IPA (e.g. Smith, Jarman & Osborn, 1999; Smith, Flowers & Osborn, 1997; Charmaz, 1995) as well as by other researchers (e.g. Yardley, 1997) and which the present researcher considers untenable in practice. IPA therefore has a number of clear advantages in comparison to other qualitative methods of analysis in relation to the aim of this study.

IPA has its roots in the longstanding approach of phenomenology which is primarily aimed at gaining an understanding of how individuals perceive and experience their world

and it both incorporates the assumption that similar events or circumstances may be experienced by different individuals in widely differing ways (Willig, 2001) and rejects the idea of an objective reality, separate from the experiences and perceptions of individuals (Smith et al, 1997). It is considered vital, if genuine understanding is to be reached, that participants are enabled to report their own accounts of their experiences and the meanings they ascribe to them using their own words rather than being constrained by pre-determined and/or pre-defined constructs (Flowers, Hart & Marriott, 1999; Smith, 1995). However, it is not considered possible, even when adopting this approach, to access the participant's world either directly or completely (Smith et al, 1997) and it is a central premise of IPA that the discovery of meanings and insights can only be arrived at via a process of interpretation which depends on the researcher's own conceptions (Willig, 2001; Smith et al 1999).

Although descriptions of IPA do not provide guidance for exactly how these conceptions are implicated in the research process and there is no stated requirement for reflexivity (the exploration of "the ways in which a researcher's involvement with a particular study influences, acts upon and informs such research", Nightingale and Cromby, 1999, p.228), a discussion of the present researcher's standpoint in relation to this study was considered important and this is presented in Section 7.2.4, below.

The analysis of the data, which was conducted in line with the method proposed and outlined by Smith et al (1999), involved the identification and labelling of emergent "themes" where these are the fundamental units of analysis. While this usage of the word *theme* reflects that common to many types of qualitative methodology, the exact meaning of the word, as it has been used in data analysis, has not been clearly defined. The Oxford Compact English Dictionary of 1996 provides several general definitions (p. 1074) and these all relate to either a recurrence of subject-matter (such as in music, for example, where the word is used to refer to a melody which is frequently repeated) or a sense of unification (such as in interior design, where it is used to refer to a particular topic or idea which has been employed as a means of unifying the décor of a room or building). Both of these meanings have relevance to the use of the term in this report, where it can be seen to refer both to topics which were frequently repeated and those which were observed across interviews and/or participants. For the sake of clarity, those themes initially identified as being frequently repeated within a particular interview are specifically

referred to as "sub-themes", while groups of sub-themes clustered together on grounds of similarity are those termed "master themes". The following broad steps were involved in the analysis of the data:-

1. Preliminary notes were made in the left-hand margins of transcripts, recording anything considered interesting and/or potentially significant, initial interpretative thoughts, possible connections and summarising comments.

2. Preliminary sub-themes were generated for each interview and written, in the right-hand margins, at appropriate points of the transcripts.

3. Inter-connected sub-themes were then clustered together and superordinate concepts (master themes) encapsulating all component sub-themes were derived in relation to each cluster. The latter were then listed in a Table of Master Themes, together with their component sub-themes and brief illustrative extracts from transcripts.

4. Taking into account the choice offered by Smith et al (1999) between generating completely new master themes for each interview or applying those generated in the first to later interviews and adding to them as necessary, the following procedure was adopted:

- when developing sub-themes for the later interviews, those generated in relation to earlier ones were used where appropriate and new ones were generated as required

- the complete set of sub-themes relevant to each individual interview were clustered in the most appropriate way and master theme names were developed in relation to each cluster (in some instances, clusters were similar to those developed in one or more earlier interviews and master themes used in these were again applied while, in other cases, the clusters were less similar and new master themes were required)

5. A process of cross-checking then followed which included the re-examination of all sub-themes previously generated in order to assess the appropriateness of their labels

as well as to discover any substantial overlaps across sub-themes or any that were effectively redundant. As a result, a revised list of sub-themes was produced.

6. A table of generic master themes, applicable across all interviews, was then developed to encompass all the sub-themes in the revised list (although, in line with Smith et al's example analysis, not all sub-themes were in evidence in each interview).

7. The analysis of each interview was then revised in relation to the amended master and sub-themes.

8. A final process of cross-checking and refining followed, with some small amendments being made to the titles of some master and sub-themes before these were finalised[32].

9. The themes generated through the above process were then translated into a narrative account of participants' experiences based on what each person said in their interviews and the researcher's interpretative analysis of what was said. The key questions of this thesis were kept in mind throughout this process:-

- what factors are involved in a person's decision to attempt to change a health-related behaviour?

- what factors and processes are involved in the progression and outcomes of such attempts?

The techniques outlined above are designed to ensure what Osborn and Smith (1998) term "internal coherence" - by which they mean that the arguments presented in the analysis are both internally consistent and justified by the data. They also advocate, for the same reason, the presentation of sufficient verbal evidence in written reports of qualitative work to show readers the basis on which the analysis is founded and enable them to assess its quality for themselves. This strategy will be adopted throughout Section 7.3, below.

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32 The final master and sub-themes are presented in Appendix F, along with a chart of their occurrences in interviews and tables of master themes for each of the nine interviews (pp.484-506).

During the analytic process it became clear that the labels being applied to themes were tending to reflect the researcher's prior knowledge of social cognitive constructs commonly used in studies of health behaviour change. A decision to use verbs instead of nouns when generating theme labels was made in order that this tendency be reduced to a minimum.

7.2.4 The Present Researcher's Standpoint

I have a number of experiences in common with the participants in this study and these have undoubtedly contributed to my interest in the questions being addressed throughout this thesis. I began smoking at the age of 23 during a belated equivalent of teenage rebelliousness and continued to smoke a steady twenty cigarettes a day for the next 17 years. During that time, I made two serious attempts to stop smoking, each lasting for between four and five months. Both were prompted by being given the choice, by doctors, of stopping taking the oral contraceptive pill or giving up smoking. My memories of chemically unaltered gynaecological events were sufficiently nightmarish to prompt me to accept the latter option. Both attempts failed when I was unable to cope with difficult external events without resorting to cigarettes for relief. Each attempt to quit resulted in weight gain, as did a third attempt which I trust will be the final one (I had my last cigarette on 20th October 2001). On each occasion, I eventually lost the related weight, usually by refraining from previously excessive intakes of unhealthy foods, such as chocolate and ice cream, but also, in later years, by a medically necessary exclusion diet. Most of the excluded foods have now all been re-introduced into my diet but I am still only able to eat foods containing yeast occasionally and I still avoid both mushrooms and alcohol.

I have, in the past, engaged in sporadic bursts of serious exercise, playing squash and also registering twice for membership at gyms. All that stopped during a decade of digestive illness. Recently, however, I have taken up daily walking and generally cover between one and two miles each weekday and between three and seven miles a day at weekends. I also regularly ride pillion on a motorcycle (which is more physically demanding than it looks!). These various attempts, both successful and unsuccessful, at changing my own health-

related behaviours have undoubtedly given me empathy with people who are attempting to make similar changes. They have also given me certain ideas, alongside those gleaned from my knowledge of health psychology theory, as to the kinds of motivators which might foster both the instigation and maintenance of change.

My own motives for stopping smoking were a combination of feeling the behaviour was no longer appropriate for the person I had become, wishing to be rid an annoying cough and (probably the deciding factor) wanting to please the man I had recently met and fallen in love with, who is now my husband. I was also fortunate that this man, an ex-smoker, was unfailingly supportive of my attempts to quit without ever being judgmental. My motives for losing weight have always been ascribable to wanting to get closer to a slim aesthetic ideal, although I am not clinically overweight and neither expect, nor desire, to gain the extreme level of thinness currently in vogue. With respect to both diet and exercise, I tend to think nowadays in terms of moderation and balance and am a firm believer in my own need for a bit of leeway from time to time in terms of treats and occasional days off from walking. In contrast, where smoking is concerned, I have never been able to regain an attempt after a lapse and do not believe I could ever successfully emulate those who are able to have an occasional cigarette or to smoke only on social occasions without once again becoming regular smokers.

In my last attempt to quit smoking, I drew on my theoretical knowledge and both developed some action plans and engaged in action control. I wrote the following on a single side of A4 paper which I carried with me at all times and read frequently: my motives for wanting to quit, some phrases I decided it would be helpful to think when experiencing cravings and feeling tempted (such as: "you cough like your father did when he was 80" and "do you really want to taste like an ash-tray when he kisses you?") and, finally, some things to do to replace cigarettes (such as going for a short walk after a meal, taking deep breaths of fresh air, and keeping plenty of raw carrots in the fridge to nibble on). I decided against using nicotine replacement patches as, in my previous attempts, I had found coping with the nicotine addiction easier than dealing with the habitual and social aspects of the behaviour. Since these methods worked for me, I am undoubtedly biased in favour of this approach. However, I am also aware that people's motives, practices and needs are as individual are they are themselves and that there is bound to be an enormous variety of ways in which to succeed in changing any given behaviour.

In relation to methodology, this thesis has now encompassed experimental, questionnaire-based and qualitative approaches and methods and, in doing so, reflects my personal philosophy: that there are many different ways to conduct research, each of which has its own unique combination of strengths and weaknesses. Since no single study can ever provide a conclusive answer to any research question, I believe that the best approach to adopt in any instance is that which is most appropriate to the question, given the time and context within which the research is to be conducted, and to both acknowledge and take account of its limitations when drawing conclusions from the findings achieved. This study and those which have preceded it within this thesis have taken widely different paths in the search for answers to the same overarching questions but, as a result, combine together to provide a broader picture of both what is and what is not important to the process of changing health-related behaviours than any would have achieved alone.

7.2.5 PROCEDURE

Following the broad timetable outlined in Section 6.2.1, above, Stench was interviewed four days, two and a half weeks and six and a half weeks after he began his quit attempt, while the interviews with Meatloaf were held two, four and eight weeks after he began his and those with Ellie were approximately three, five and seven and a half weeks after she had initiated the changes in her behaviour. Interviews were arranged at times of mutual convenience and took place at participants' places of work, either during a lunch break or at the end of the working day. Each interview was tape recorded and subsequently transcribed, with participants being provided with copies of the transcripts of their interviews if they wanted them.

Interviews followed a semi-structured format, with broad areas of questioning being similar across all participants but with follow-up and person-specific questions also being raised as appropriate (copies of the interview guides can be found in Appendix F, pp.479-83). Baseline interviews included open-ended questions relating to the reasons behind participants' decisions to change their behaviour at this particular time and how they were feeling so far. Participants were also asked to talk about their past history in relation to the behaviour(s) concerned, including any previous attempts to change the same

behaviour(s), their feelings on realising that these had not succeeded, what it would mean to them to be successful at the current attempt and how confident they felt that they would be so. Other areas included any plans they had made for how to increase their chances of succeeding and whether they felt they had learnt anything in particular from their previous attempts. The last question was an invitation for participants to raise any other points they considered to be relevant.

At their second interviews, participants were asked how they were getting on with their attempt and how they felt about their progress. They were asked to give details of any particularly difficult experiences as well as anything they had found particularly easy, along with the reasons they considered to underlie the quality of these experiences. Other questions addressed any changes made to strategies used to further the attempt, the reactions of other people and participants' beliefs about why they had progressed to the extent that they had. As with the first interviews, participants were again invited to add anything else they considered relevant.

The final interviews were broadly similar to the second ones, however participants were also asked how confident they felt about being able to reach and/or sustain the desired patterns of behaviour over the next weeks, months and years and what, if anything, they thought might prevent them from doing this. They were also asked what advice they would give to someone thinking of trying to change their behaviour in the same way. The final question again asked for anything else relevant to participants' experience. At the end of the final interview, participants were thanked for taking part in the study and asked if they were prepared to be interviewed again at a later date, should the researcher wish to follow up the study with further investigation: all agreed.

Payments of £15 were made at the end of each initial interview and further payments of £10 were made at the end of each of the rest. The different payments reflected the extra length expected to be required for the initial interviews in the light of the types of question being asked - an expectation which participants were made aware of via the information sheet.

7.2.6 ETHICAL ISSUES

The need for participants to be fully informed of the aims of the study, of the requirements of taking part and of their right to withdraw at any point and/or ask for the return of all relevant tapes and transcripts was met by the provision of the information sheet. A second ethical consideration in this study was that participant confidentiality should be retained. It was for this reason that participants chose aliases to be used on the labels of all tapes, on the transcripts of the interviews and in all written reports and presentations relating to the study. A final issue concerned the potential for participants to need input in the way of formal support or counselling, which could not be provided by the researcher. The researcher was prepared to provide participants with details of appropriate sources of support in the event of such an occurrence, however none arose.

7.3 ANALYSIS

7.3.1 THE EXTENT & CONSISTENCY OF CHANGE ACHIEVED

All three of the original participants completed the study and expressed the intention to continue with their attempt to change their behaviour beyond the end of the study. However, their progress up to that point varied considerably. Meatloaf refrained from smoking throughout and had stopped using the nicotine replacement patches shortly after his second interview. By the end of the study he had thrown away all his lighters too and was consistently referring to himself as a non-smoker. Both Ellie and Stench, however, had lapsed in their attempts during the course of the study.

Stench's lapse happened in the period between his second and third interviews and was attributed to the pressure he experienced as a result of two major work crises having occurred simultaneously, one of which remained unresolved at the time of the third interview and continued to cause him a great deal of anxiety. It was difficult to ascertain the exact magnitude of the lapse, but it seemed that Stench had probably smoked on a

daily basis since the crises arose, but only a small number each day. He admitted that, despite his protestations of having returned to abstinence, his renewed attempt had only lasted for about two days so far and he was likely to continue to smoke intermittently until the second crisis was positively resolved. The potential impact of a negative outcome to this crisis was not discussed but a full relapse seemed the most likely consequence.

Ellie had had a short-term, minor lapse when she experienced a bereavement between the first and second interviews but she also had a more major one between the second and third interviews which lasted for two weeks. In the first of these weeks, Ellie's daughter was abroad and Ellie resorted to snacks, takeaways or to missing meals altogether rather than cooking for herself in the evenings. As soon as her daughter returned to England, she was admitted to hospital because of a problem with a knee and Ellie spent the next week mostly eating what she could find at the hospital shop, which again included snacks, particularly crisps and chocolate, but also sandwiches of dubious health value. The exercise programme was also disrupted during this time and continued to be so after the child was discharged from hospital, due to ongoing problems with her knee. Like Stench, Ellie also claimed to have re-established her new behaviours by the time of her third interview but she had had a further dietary lapse one recent evening and was only partly keeping to her new exercise regime because the continuing problem with her daughter's knee compromised those activities they had been engaging in together.

7.3.2 THE EMERGENT THEMES

Six overarching master themes were elicited from the data all of which were displayed in at least two of each participants' interviews. These themes were:-

- Being Motivated and Ready to Change
- Progressing and Regressing
- Experiencing Drawbacks of Changing
- Using Practical and/or Psychological Strategies
- Meeting and Making Hindrances and Hurdles
- Moving Towards a New Way of Life

A varying number of sub-themes were encapsulated within each of the master themes and these will be used to illustrate similarities and differences between the experiences of the three participants and also the ways in which participants' experiences of changing their chosen behaviour(s) altered over time[33]. These findings will then be used to inform the tentative development of a theoretical framework for understanding how the experiences and meanings associated with attempting to adopt health behaviours might be involved in the initiation and progression of such attempts. They will also be used to generate suggestions for techniques which might be added to interventions aimed at fostering long-term success in those preparing to initiate a change in their health-related behaviour.

One further theme, *Lacking Direction and/or Answers* (which incorporated sub-themes relating to feeling uncertain, not knowing, forgetting and hoping) will not be included in the analysis. Although all three participants provided evidence relating to this theme at each interview there were no real patterns observable either across participants or over time and no particular indication it had had any bearing on participants' experiences or progress. It seems likely, therefore, that these factors may be an integral part of the experience of attempting to change a health-related behaviour but do not directly influence the outcomes of such attempts.

Extracts from the transcripts, included throughout this section, will be identified by the initial of the alias of the participant being quoted, the number of the interview concerned and the line(s) of text provided. For example, an extract denoted "E2: 244-7" would have been drawn from lines 244 to 247 of Ellie's second interview. Where the interviewer (i.e. myself) was speaking, the extract will be denoted "I". Three dots (...) show that part of a sentence has been omitted. Italicised comments in brackets are provided where aspects of non-verbal communication, such as pauses or changes in volume, are considered to add to the point being made. Words spoken with emphasis are also presented in italics.

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[33] In order to prevent the report of the analysis from becoming overly fragmented, individual sub-themes will not be identified by separate sub-heading but will simply be used to inform the overall discussion of the master themes.

7.3.2i Being Motivated and Ready to Change

All three participants offered reasons for their decisions to make changes to their established patterns of behaviour. Two of these were common to all and were raised in almost all of the interviews. The first reflected an appraisal of the old behaviour(s) as posing a threat to health, fitness and/or lifespan:-

> "...I can feel my ability to do things like running for a bus practically kills me now...and I can feel my fitness levels really dropping." (E1: 54-6)

> "...every time I...see the advertisements it's there, it hits you in the face every day and it's, it's good. I'm not sure about the cigarettes where they show you the fatty substance off the end of the cigarettes, it's more the artery or whatever it is, you know, squeezing it out, that makes you sort of stand back and think." (M1: 223-8)

> "it is bad for you like really, I mean it is...*(drops his voice considerably)* it kills, dunnit?" (S1: 193-5)

Participants' focus on this reason for instigating the changes in their behaviour lends support to that presented earlier in favour of measures of attitude as predictors of health behaviours: all three participants were strongly motivated by a combination of the value they placed on their health, fitness and/or lifespan and by their belief that changing the target behaviour(s) would reduce or eliminate the threat they perceived these to represent.

Meatloaf's reaction to the recent television health promotion campaign aimed at smokers was perhaps particularly strong because he had experienced chest pains a year earlier, so the graphic depiction of fatty substances in the arteries was probably highly salient to him. Also notable is his description of feeling "hit in the face" by the advertisements: since, on television and in films, people who are very deeply asleep or in a drugged or drunken stupor are often shown as having their faces slapped by those trying to rouse them, his perception could therefore be interpreted in terms of a wake-up call to the need to rid his body of nicotine.

Ellie had experienced a similar wake-up call, although in her case this was not only related to her awareness of symptoms such as her fitness levels having dropped (illustrated in the

extract on the previous page) but also with having reached the age at which her father died:-

> "...my thirtieth birthday has been a bit of a turning point for me...it's the age where my Dad died of a heart attack and I've realised that over the last couple of years my lifestyle hasn't been as healthy as it could have been diet-wise and barely any serious exercise." (E1: 5-9)

Interestingly, Ellie later went on to explain that her father's heart attack had not had a lifestyle-related cause but that, despite that fact, reaching the age at which he had experienced it had still prompted her to take steps to reduce her own risks of developing ill-health:-

> "...it was a hereditary problem that caused his death, not erm, being overweight or eating particularly badly, so I think that is something that is weighing very heavily on my decision that I've got to do whatever I can to keep myself healthy." (E1: 214-8)

It seems likely that, faced with the possibility of developing the same hereditary problem that her father had, over which she had no control, Ellie felt driven to exert such control as she did have by reducing or eliminating the lifestyle-related risk factors for CHD.

For both Meatloaf and Stench, their desire to improve their own health and/or fitness was intricately bound up with wanting to maximise their lifespan for the sake of their children:-

> "I'm thinking mainly of the kids. I want to certainly stretch my lifespan out a bit more and this is one way to do it, so that's, I think that's what's motivated me is the kids..." (M1: 43-6)

> "I'm just thinking, 'well yeah, I want to be here for you boy, I mean you're only twelve at the minute, or just gone twelve' and I want to be here for him like, and all that. He's still got a bit to learn yet, hasn't he?" (S1: 21-4)

In addition, all three participants were wanting to act as better role models for their children than they felt they were currently doing:-

> "So I thought 'well, I'm giving the wrong messages to her if I'm just moaning and not doing anything', so…I told her I was going to join the gym…" (E1: 328-30)

> "…that's one of the fears…it's a worrying thing that she could go down the same route as me…" (M1: 265, 269-70)

> "She's fifteen…and I'm saying 'Look, Baby, don't, look…', but I'm setting a bit of an example for her as well like now. So, I'm hoping that's going to work with her too." (S1: 304-6)

For Stench, though, there was a further issue of wanting to do everything in his power to cement his already good relationship with his son, partly simply to respond to his son's wish for him to stop smoking but also to support him in his efforts to become a professional footballer[34], support which included joining him in training:-

> "It's my little lad, I just look at his little face and he don't want me to smoke and I think…I'm going to do it, you know, for you." (S1: 165-7).

> "…I'm encouraging him, so I have to take him down the rec and I have to do the running about, so I *need* to be fit." (S1: 174-5)

It is possible that this was a particularly strong motivator for Stench as he would himself have liked to have become a footballer but hadn't been able to do so:-

> "summink I wanted to do but I couldn't do it…" (S1: 178)

Other than when he expressed his desire to set an example for his daughter (which he only mentioned once, almost in passing), Stench made no reference to any other person as having had any bearing on his decision to quit.

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[34] the boy had recently been accepted into a football academy run by a local professional team

Neither Meatloaf nor Ellie showed very much evidence of social pressure to change. Meatloaf did refer to his wife's dislike of the smell of smoke he carried with him after having a cigarette but this does not seem to have been a key factor in his decision to quit:-

> "...has anyone in the family been asking you to give up? Have you been getting pressured from the family or is it coming more from inside you?" (I)

> "I think it's coming mainly from inside, I mean certainly if I went outside and had a smoke, um, then I come back in, my wife would say, she would certainly turn her nose up because she could smell it..." (M1: 63-5)

Meatloaf also mentioned that none of his family smoke and nor do most of his friends but he did not identify this situation as having been a factor in his decision to try to quit.

When Ellie was asked if she had been either pressured or supported by anyone in relation to the changes she was making, she replied:-

> "Not really, because I haven't really discussed it with anyone. Because there is only me and my daughter in the household and what we eat really is up to us at the end of the day and I don't need to really discuss it with anyone else...Most of my friends and family don't really do very much exercise at all..." (E2: 239-242; 251-2)

Despite the lack of immediate social pressure, however, Ellie did show signs of wishing to conform to the currently widespread ideal of appearing physically slim and toned:-

> "...I'm also noticing flabbiness round my middle, which I don't like at all, so just for vanity reasons I'd like to get rid of that as well." (E1: 56-8)

In addition to the motivators outlined above, Ellie also showed some specific indicators of readiness to change her behaviour, including both recognising a need to put effort into making the change and feeling mentally prepared to take it on:-

> "...I do realise I've got to put a bit more effort into keeping healthy, it's not going to be the effortless thing it was in my teens and, and twenties." (E1: 290-2)

> "I'm much more mentally prepared for it all this time round, the whole, the whole thing, I'm more geared up for it than I ever have been in the past." (E2: 211-3)

Ellie's feeling of being mentally prepared was reflected in her having made some advance preparations for making the change. Although she didn't fully implement her new behaviour patterns until the New Year, she had joined a gym the previous November, shortly after her thirtieth birthday, and had also started, during the autumn, to both decrease her use of takeaway food outlets and use up the "junk" (E1: 163) in her freezer.

Like Ellie, Meatloaf also made some preparations in advance of making the change in his behaviour. In his case, this involved stocking up on nicotine replacement patches once he had decided to try again to quit:-

> "So I then, this year, sort of as of the 1st of January this year I thought 'that's it', and I just went for it, stocked up on patches, gum, all the necessary bits and pieces." (M1: 10-11)

Unlike the other two participants, Stench had not made any advance preparations in relation to his quit attempt and there was no sense of him either having reached a specific turning point or having received a wake-up call. He had simply smoked all the cigarettes he had left at New Year and had neither bought nor smoked any more.

One final point of relevance here concerns the extent to which participants were confident in their ability to sustain the changes they had initiated in their behaviour. When asked about this, Stench was highly confident that he would be able to continue to refrain from smoking – a confidence which appeared to rest in a firmly expressed belief in the power of his mind and his will:-

> "If I don't want to do something I've got a good mind and I just don't do it." (S1: 162-3)

"So do you feel quite confident about it this time?" (I)

"Oh yeah, *I am*...if I put my mind to it I know I can do it." (S1: 165-6)

Meatloaf and Ellie, on the other hand, both tempered their expressions of confidence with some reservations. In Meatloaf's case, these related to worries about his ability to withstand the temptation to smoke in the face of the strong nicotine cravings he was experiencing in the early stages of his quit attempt:-

"Yeah, I'm quite confident, um, yeah, I am. I'm very, very confident at the moment, but ask me when I get a craving and I could probably have given you a different answer." (M1: 278-80)

Ellie's worry was that, as had been the case in her previous attempt, she would find herself faced with an external event which would make it impossible for her to continue with the newly established patterns of behaviour:-

"...do you feel confident that you can keep this going now?" (I)

"Yes, I think I can this time round, but, touch wood, make sure that nothing happens that prevents me from exercising for a while, because that's when you start falling into the trap of your old ways..." (E1: 205-7)

Over time, the frequency with which references were made to the initial motivators for change decreased in all three participants, but some references were made, in almost all interviews, to the threats posed by the old behaviour(s) and the desire to positively affect their children in some way. The decrease in frequency may reflect the nature of the questions asked in the different interviews but it may also show participants' focus to have shifted more onto the benefits they were starting to gain as a result of having changed their behaviour and, at other times, the consequences of having lapsed. These features of changing will be discussed further in Sections 7.3.2ii and 7.3.2v, below.

7.3.2ii Progressing & Regressing

All participants perceived themselves to make progress during the course of the study and all had, as early as their first interviews, noticed distinct benefits of the changes they had made to their behaviour. These were often expressed in terms of feeling good and of having or experiencing more of something than they did before having made the change:-

> "But it's great, but I am really eating, which is nice. I can taste the food, it's nice. I'm kissing the missus more, so it must be nice." (S1: 75-6)

> "...it's good, it's a good little feeling like." (S2: 7)

> "...where I work here we have a set of stairs, it's on two levels and that, and if I was to run up the stairs I could be out of breath. Now I could do the same, even though it's only thirteen days, and I'm not out of breath...I've got more capacity in my lungs and so on." (M1: 80-3, 8-6)

> "Feel good...I do feel good." (M3: 34-5)

> "...I am seeing, seeing the difference and feeling the difference, because I feel more energetic, which is helping me to carry on that bit more, sleeping better..." (E1: 186-9)

By the second set of interviews, each was clearly considering their attempt to be progressing well and was feeling pleased with what they had achieved so far:-

> "...feeling good about clothes I often wear and feeling better about myself and my body and everything. It's made a big difference." (E2: 223-4)

> "Well, I am pretty pleased, I'm not craving for no cigarettes or anything like that." (S2: 30-1)

> "...you hear people saying it gets better as you get along and I thought *(sounding very sceptical)* 'yeah, I'll believe this', but it does. I probably get two cravings a day

now, which is quite good...yeah, I'm quite pleased how it's going." (M2: 28-30, 33)

A side benefit of having made the change which appeared to be highly reinforcing for both Stench and Meatloaf was the reactions it produced in people close to them:-

"My little boy can't believe how long I've done it for, so he's chuffed to bits like, yes, which is nice." (S2: 83-4)

"...you can hear her *(his wife)* actually speaking to people about it now, saying oh, you know 'He's' er 'he doesn't smoke any more...he's done well, he's done well'...yeah, she is talking about it more...So that makes you feel good." (M3: 179-182, 182)

For Meatloaf, the fact that his wife was praising him to others was a major step forward as, up to this point, his family had neither paid any particular attention to the effort he was making nor offered him any support:-

"Do you think *(your children)* will see you differently if you give up? (I)

"No. I've had no, this is one of the problems as well, I don't really get a lot of support...I mean I mentioned giving up and that and everybody was 'yes, it's a wonderful idea' and so on and so on, but now I've given up and I've not had a cigarette, there's no praise from home...no-one's really noticed...no-one's really praised me at home and that, so yes, shame really..." (M1: 244-249, 253-4).

This situation had continued up to the time of Meatloaf's second interview but, by that time, with the cravings having reduced, he was feeling the lack of support rather less, although he was clearly still surprised by it:-

"...they've not said a word really...strange, but er no, they've not said anything." (M2: 94-6)

"How does that make you feel?" (I)

"I'm, I'm fine about it now, you know, I'm, I'm better now, now I can get...because the cravings are not so great, um, no, I think I can live with it..." (M2: 98-100)

For Ellie, the support of her daughter was seen as a positive factor in her attempt to change both her diet and her exercise. Over the course of the study, though, it emerged that Ellie's success in maintaining the new behaviours was heavily dependent on not only her daughter's support but also her active co-operation and even her presence. This reliance was interpreted as a hindrance to her progress and will therefore be discussed further in Section 7.3.2v, below.

A clear sign of progress for Ellie was that, by the second interview, her new behaviours were becoming more automatic and therefore also easier to carry out:-

"I'm doing it without really thinking now." (E2: 82)

In addition, both she and Meatloaf gave indications that they were finding the experience of changing their behaviour easier than they had expected and claimed they would have made the change before if they had realised that this would be the case:-

"...if I'd thought before it could be that easy to make the changes without having to make any major lifestyle changes, then I can't really see why I didn't do it a long time ago." (E2: 132-5)

"...if I knew it was going to be this *easy*, well, I won't say easy, if I knew that I could get to this side of it, you know, I would have done this ages ago, I really would've done...you listen to people and they say 'well it does get easier' and you think 'mm, I can't see that...*I can't see that at all*', but it does, it does." (M3: 87-92)

In Ellie's case, though, this feeling of ease was belied by two lapses she experienced during the course of the study. The first of these, which occurred on the day her grandfather died, was both relatively minor (although Ellie herself described it as major) and very short-lived:-

> "The day it happened I did have a major relapse, erm, but having, erm, a packet of crisps, a huge, huge bag of crisps...I thought 'well, just go with it' and I just let myself eat for the one day. But because I sort of knew what I was doing and I knew why I was doing it, it was so much easier then...the next day, to go back to eating properly again" (E2: 195-200; 202-3)

In this instance, Ellie's strategy of acknowledging that she was lapsing and allowing it to occur seemed to help her to contain the magnitude of the lapse. The situation with her second lapse was rather different and this will be discussed in more detail below. It is also notable here, though, by virtue of the fact that at her third interview, just after the lapse had occurred, Ellie had stopped showing any evidence that she was perceiving progress to have been made and she displayed only one current benefit of having made the change - an improvement in her relationship with her daughter which had resulted from them spending more time together during shared periods of exercise and when planning their meals for the week together:-

> "...on Sundays we go for a swim or a walk...It's times we can set aside to spend together as well as everything else." (E3: 239, 241-2)

> "I think it's pulling us together more in the household as well because she's having to give me input on what she wants to eat...we share in a lot of the decisions...I think she's really enjoying being part of the whole process of it." (E3: 254-5, 260-1, 264-5)

Despite this one continuing benefit, Ellie was also acutely aware of having lost at least some of what she had previously gained as a result of changing her behaviour:-

> "Because I haven't been...following the pattern over the last couple of weeks I can see the difference. This morning, in the mirror, doing my hair for work all my scalp was flaking and my skin's not very good. I mean, a part of that could be the weather, but the other part of it is not having eaten very healthily over the last couple of weeks has really taken its toll a bit." (E3: 26-31)

After Stench's lapse, a powerful sense of loss pervaded his interview:-

"...I was feeling really good...I was feeling as fit as a fiddle...I was feeling *really*, yeah, *(pause) living* again like, you know." (S3: 149-51)

"...I'm not so chopsy[35] am I again, now...?" (S3: 238)

"But it was feeling, you know, it was feeling really good like. But we'll have to wait and see, now..." (S3: 323-4)

In addition to this sense of loss, Stench's lapse had also provoked some disapproving comments from those close to him:-

" 'Ooh, Dad, you shouldn't do that'...'You're smoking too much, Dad.' " (S3: 229, 231)

"...the wife...said 'you shouldn't have started smoking again once you'd packed up.' " (S3: 234-5)

In both Stench and Ellie's cases, their awareness of the loss of benefits previously gained from the changes they had made in their behaviour plus, for Stench, the negative comments provoked by his lapse, appeared to be provided strong positive reinforcement which might perhaps have helped to prevent their lapses from becoming full-blown relapses. However, other aspects of their thoughts and strategies made a relapse seem a definite possibility in each case. These will be discussed further in Section 7.3.2v, below.

As the only participant who did not lapse at any point during the study, Meatloaf was reaping increasing rewards as he reached eight weeks without a cigarette - not just in the approval of his wife (shown in the extract on p.175) but also in the achievement of his aim of improved health and fitness:-

"...I bet I could run at least up to half a mile I would say now, without even stopping, and, okay, I do get out of breath still, but I feel like my lungs are bigger, you know, capacity-wise. I can, you know, take more air in and so on and so on.

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[35] a colloquial expression meaning 'talkative'

But yeah, I can run upstairs now without panting and puffing and all the rest of it..." (M3: 39-44)

Overall, it was plain that participants had experienced notable benefits of changing their behaviour in a very short space of time and that these were highly positively reinforcing. They were quickly lost, though, when lapses occurred and, in Stench's case, were further compounded by the disapproval that his lapsing behaviour provoked in his wife and son. Both of these occurrences can only have served to strengthen participants' already highly positive attitudes towards their target behaviours. However, since all three had noted the positive consequences of having made the change, the experience of these cannot have been sufficient to the maintenance of change in the face of severe external difficulties. It seems likely that, in addition to the particular features of such difficulties, it is qualitative differences in the benefits gained and/or the extent to which they are directly positively reinforcing for participants which may influence the likelihood of a lapse occurring.

7.3.2iii Experiencing Drawbacks of Changing

All three participants experienced at least one drawback of having initiated their change in behaviour, but there were again differences between them. Meatloaf and, to a lesser extent, Ellie were both challenged by experiencing cravings for the old behaviour but both also took encouragement when these diminished as the time since the behaviour had last been engaged in increased. For Ellie, this was particularly well illustrated on an occasion when she bought a chocolate bar in response to a craving, didn't get time to eat it, and finally gave half to her daughter when she re-discovered it in her bag two days later:-

"Before, if I'd eaten that half I'd have been desperate to run out to the shops because I'd only had half a chocolate bar and I needed the rest of it. But I was perfectly happy with that, perfectly satisfied with what I'd had from it, so it shows that I don't need the chocolate, it's probably more of a psychological thing craving food than it is actually, actually needing to eat it." (E2: 167-172)

Meatloaf was strongly challenged by his cravings for nicotine in the early stages of his attempt to quit smoking and very much wanted to find out how long they lasted in order to verify what he had been told previously about their short-lived nature:-

> "It's very hard *(pause)* I mean, I could probably say the cravings are not as strong now, but I say to myself when I get a craving, because people say they only last for a minute and stuff like that, and I've not managed to do this yet, but I keep saying to myself, right okay I'll time it, but, you know, it's probably two or three hours later that I remember what I was going to do and I think 'well, wait a minute, how long did it last then, was it only minutes?'" (M1: 280-7)

At no point did it seem to have occurred to Meatloaf that, given this repeated sequence of events, the cravings could not last for any length of time unless they were very mild since, otherwise, he would not have been so easily deflected from his aim of timing them.

In his second interview, Meatloaf went on to explain how close the cravings had brought him to going back to smoking in the early days of his attempt, but he also showed how far he had moved on from that stage by the time he had gone four weeks without a cigarette:-

> "I think when you first give up you're borderline *(pause)* I was borderline, when I had the craving I could sort of almost quickly turn back onto cigarettes and think 'well, this has been a waste of time'." (M2: 271-4)

> "I probably get two cravings a day now, which is quite good...yeah, I'm quite pleased how it's going." (M2: 30-1, 33)

Meatloaf's second interview occurred on the second consecutive day in which he had forgotten to put on a patch in the morning and, having used the last spare one he had had at work the previous day, was trying to do without wearing one at least until he returned home in the evening. One month later, at his third interview, he reported that he had succeeded in going without a patch for the whole of that day and had not used one since. By this stage, craving for nicotine had become a very minor part of his daily experience:-

> "...it's a very small craving...it's normally late at night is when I get it." (M3: 99-100)

So, although strong and worrying in the early days of abstinence, within less than two months the nicotine cravings had reached a point where their impact on Meatloaf was negligible. His ability to use the reductions in both the frequency and strength of his cravings as a marker of progress does seem to have proved useful to him and to have fostered his success. For him, the cravings were clearly the hardest part of the process and he had built them up quite strongly in his mind, finding other people's evaluation of them as being both short-lived and rapidly diminishing in frequency impossible to believe until borne out by his own experience. To have found himself able to cope with them without succumbing to a cigarette and to get to the point where he could see "the light at the end of the tunnel" (M3: 126-7), was enormously reinforcing for him.

This clear marker of progress may also have helped sustain him in his abstinence during the week, just prior to his third interview, when he was unwell and could easily have lapsed in response to boredom, loneliness, self-pity or even simply in an attempt to make himself feel better by relieving such cravings as were still being experienced.

Stench seems to have experienced the removal of cigarettes from his life in a rather different way from Meatloaf and only ever mentioned cravings once, when pointing out that he hadn't had any. Instead, he talked about a need to keep busy, in particular to keep his hands occupied:-

> "...if I get home like and I see some pots and they haven't been washed, I've got to wash them, you know, I've got to do something, like, you know." (S2: 176-8)

Stench also indicated experiencing a sense of strangeness, as if he felt somewhat dislocated from his usual experience of life, as is shown in his response to being asked, in his first interview, how he felt after his first four days without a cigarette:-

"Weird, I'm so hyper[36] at the minute, like...I mean...you're talking a long time, aren't you...a long, long time....But, um, it's strange, it is, it is strange." (S1: 265-7, 277)

Both the sense of strangeness and the need to keep busy persisted for the next couple of weeks and, unlike Meatloaf and Ellie's cravings, do not appear to have shown any sign of abating:-

"...it's certainly different, certainly different....It doesn't feel the same way." (S2: 49, 51)

"...can you elaborate a bit more?" (I)

"Yeah, the feeling you're chopsing[37] a bit more, like, and, you know, it's like your hands, you're moving your hands but you know as you'd normally put a cigarette in your mouth and you're moving your hands to express yourself, and you tend to do that a bit more, like..." (S2: 59-62)

Whether this lack of noticeable lessening had anything to do with Stench's later lapse is hard to say, as the crisis at work was of such a magnitude that it is difficult to see him being able to have held out even if he had not experienced any drawbacks of having made the change, particularly since he had also noted plenty of benefits of having made it. Other factors, to be discussed in later sections, seem likely to have had more of a bearing on his inability to hold out at that point.

7.3.2iv Using Practical and/or Psychological Strategies

With only minor variations, participants tended to be consistent, across interviews, in the strategies they used to further their efforts at behaviour change, although they differed from each other in the types of strategies employed. Stench, for example, used strategies

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36 Stench actually used the term 'hypo' but, later in the interview, made it clear that he meant he was being far more active than usual

37 talking

which were psychological and/or which had a predominantly psychological benefit. One of these is his firm belief in the power of his mind and his will, which was mentioned earlier and which is demonstrated again in the following extract:-

> "I've got good willpower, though, I have got, you know, it's there, if I want to do summink and I put my mind to it I know I can do it, like." (S1: 157-9)

The most commonly used strategy observed to have been used by Stench was his use of positive talk in apparent attempts to bolster his confidence or his mood. The conversation reported below followed a question regarding how Stench felt he was going to cope with the forthcoming month, which he had admitted to expecting to find hard:-

> "I don't know, *(raises his voice somewhat)* so I'm going to have to find out, *(lowers his voice again)* but I think I'm quite confident that I'm going to be okay. Strong willed so…*(voice tails away)*" (S2: 253-4)

> "Last time you said to me 'something will creep in to my mind.' " (I)

> "Yeah, yeah *(very quiet and sounding uncertain)* but we'll see if we can beat it *(sudden increase in volume)* we're gonna beat it, that's the way I look at it, we're gonna beat it." (S2: 256-8)

Despite his positive talk, therefore, Stench was unable to provide details of any strategy he might draw on in order to increase his ability to cope with the difficult month he anticipated without returning to smoking. This inability to pre-empt difficulties despite having identified them in advance will be discussed more fully in Section 7.3.2v, below.

In contrast to Stench's use of predominantly psychological strategies, Ellie tended to rely mainly on practical ones, such as trying to fit her new behaviours into her existing routine:-

> "And now, I'm not so centred around going to the gym to get my exercise, I'm trying to find ways of fitting it into my everyday routine, like walking a bit more, getting off the bus a couple of stops earlier and walking when I would normally

> hop on a bus, so, although I am going to the gym and going swimming a lot more now, it's not just centred around whether I can get there - if I can't find somebody to look after my daughter so I can go to the gym I can find another way of fitting it in around looking after her." (E1: 89-95)

Another of Ellie's practical strategies was to prepare home-cooked alternatives to convenience food in order to reduce both the need for takeaway meals and the temptation to binge on crisps and chocolate. This strategy involved her both thinking ahead before going shopping and also making double quantities of things like casseroles on days when she was happy to cook and freezing half for days when she didn't want to bother to start preparing a meal from scratch:-

> "...I try to do one big shop for the month, where I try to have all the food and the ingredients we're going to need for the month in, and then there's a weekly shop for things we run out of then. And er I sit down on a Friday evening and work out the meals for the week ahead." (E1: 121-5)

> "...if I make a bit extra then put stuff in the freezer then...if there's days when I can't be bothered to cook, there's a proper meal there just waiting to be reheated in the microwave for us." (E2: 18-21)

Unlike Stench and Ellie, Meatloaf used a broad mixture of both practical and psychological strategies, including comparing his progress favourably with that of other people he knew who had also made attempts to quit smoking, taking note of the beneficial results of having made the change and making advance plans and preparations. In addition, he also used two strategies which may have proved crucial to his progress and which the others either did not use at all or failed to use effectively. The first, a psychological strategy, involved anticipating potential difficulties and taking pre-emptive steps to deal with these. The first example of this shows Meatloaf to have learned from his failure to adequately prepare for his previous attempt to quit and relates to his need for nicotine replacement patches to help him cope with the cravings associated with withdrawal:-

> "...what happened is, twelve months ago when I tried to give up, February last year, I did get some patches and it was only a packet and what tended to happen is I used to run out. I wouldn't buy them at full price because, you know, you're talking £27, and then it was try and get down the doctor's, so you'd go back onto cigarettes. So it wasn't planned." (M3: 155-60)

As well as making sure he had an adequate supply of patches to see him through this time, Meatloaf had also thought about where he ought to keep these in order that they would always be available when he needed them:-

> "...it's just planning, making sure you've got enough stock in the house and also keeping some at work because you can guarantee that you come to work and forget to bring your patches. I keep some, some er patches at work as well." (M1: 188-91)

A different kind of pre-emptive strategy was raised in his first interview when he mentioned his deliberate decision to avoid going into public houses:-

> "...you talked before about smoking with a drink...are you avoiding going to the pub or anything like that?" (I)
>
> "Yes, I am avoiding going to the pub. I normally would go out every Thursday. I haven't done that this year, and again that's one of the reasons – I don't want to go and get easily dragged back into um smoking again, or go into a smoking environment." (M1: 129-32)

It is interesting that, despite this decision to avoid pubs, Meatloaf was still using the smokers' canteen at his place of work – that, although he felt able to cope with being in the smoky environment of the canteen, he did not feel confident that he could deal with being in an equally smoky place while under the influence of alcohol. He seems to have assessed the level of risk associated with each environment and judged one to pose too great a threat to his attempt, at least in the early stages. He did later return to the pub but, by that time, he was far more established in his move away from smoking and found he could easily cope with it:-

> "...I was out drinking last night as well and, so it doesn't, it doesn't affect me." (M3: 45-6)

The judgements Meatloaf made of what he could and could not cope with in the early stages of his attempt therefore appear to have been correct and to have made a valuable contribution to the success of his attempt.

In contrast to Meatloaf's success in this respect, Stench anticipated that the month following his second interview had the potential to prove difficult but he developed no strategies for how to deal with the difficulties he expected it to pose. Similarly, Ellie had developed no strategies aimed at either preventing external events from causing a lapse in her behaviour or at preventing a genuinely unavoidable interruption from becoming long term. Further discussion of issues relating to this lack of pre-emptive planning will be discussed in Section 7.3.2v, below.

The second strategy unique to Meatloaf was finding alternatives to the support and relief provided by the old behaviour. In his case, this was provided by the nicotine patches in the first instance, but as time went on, he was moving away from these and finding other things to fulfil this role:-

> "What do I do now? I shall probably turn to chewing gum. I've bought myself quite a few packs of chewing gum and when I get stressed and that I'll have a piece of chewing gum. I don't have to smoke, could take a walk, have a drink." (M2: 141-4)

In contrast, both Ellie and Stench were still clearly reliant on their old behaviours in times of stress:-

> "I was comfort eating..." (E2: 197)

> "When them two things come at once like that, it really did put a lot of pressure on me...that were just a *(pause)* phhwww *(pause)* a relief valve was that, a relief valve for me..." (S3: 62-5)

The interesting thing about this extract from Stench's third interview is his mimicking, by the "phhwww", of the action of smoking and the fact that, at that moment in the interview, his face depicted the huge relief he had gained by taking a pull on a cigarette at this time of intense emotional pressure.

Perhaps the use of patches gave Meatloaf sufficient relief from the nicotine cravings that he felt able to explore alternative sources of support, other than cigarettes, which he might draw on in times of stress. Since patches are in place all day, they cannot replace the kind of transient relief of pressure that smoking a cigarette or eating a bag of crisps can provide, so replacements for these, such as gum or a short walk, do need to be found but perhaps cannot be found without forethought and/or relief of strong cravings in the early stages of behavioural change.

One final point to note before moving away from this theme is that all three participants mentioned that they had benefited from taking part in this study. In the case of Stench and Ellie, the comments were spontaneous and these prompted a question to Meatloaf about the same issue. These points were not included in the analysis, but it is interesting to note that, in response to being asked if there was anything else relevant to their attempt that they wanted to raise, Stench said he found it "nice that somebody else is paying a bit of interest...just to monitor you" (S2: 262, 264) while Ellie stated that:-

> "...to be on record of doing it has provided me the incentive, particularly at the start, where it might have been a bit hard to carry on, it did give me the incentive to keep going where maybe I would have thought 'Oh, I can't be bothered'." (E3: 314-7)

When asked to give his opinion on the same subject, Meatloaf equated the interviews with his previous attendance at Quitline meetings. Clearly, all three participants valued the opportunity simply to talk about their experiences and felt they had benefited from having someone outside their families or social circles showing an interest in how they were progressing, even though no formal intervention was provided.

7.3.2v Meeting & Making Hindrances & Hurdles

A range of beliefs and behaviours were elicited during interviews that were considered to have the potential to reduce the likelihood of sustained behaviour change being achieved, with some having had a detrimental impact during the period of this study.

Common to all participants was the tendency to refer to an old behaviour as something insidious, that is, something which was likely to creep up on them, cause them to slip or fall, trap them, or otherwise catch them unawares. The extract from Ellie's first interview which is given on page 173 is one illustration of this - some more are provided below:-

> "If you're bored I think you will...it could creep in then like." (S1: 251-2)

> "...it gradually built back up again." (M1: 194)

> "...I started slipping into the easiest option...it became a habit then and it's something that was very difficult to drag ourselves back out of once we'd got into it." (E1: 34-8)

As discussed above, only Meatloaf provided any evidence of effective anticipation and pre-emption of potentially difficult situations and both Ellie and Stench were hindered by the lack of this.

Ellie referred to external hurdles throughout the study: at her first interview she talked about the illness and operation which had triggered the end of her previous attempt to establish a pattern of regular exercise; at her second interview she talked about comfort eating in relation to the recent death of her grandfather; and, in the fortnight before her third interview, she had found the absence and subsequent incapacitation of her daughter to present further hurdles to her progress. The consequences of a lack of effective contingency planning on Ellie's part were clearly demonstrated in relation to these hurdles, particularly the last: since all the extra portions of food which she had frozen for nights when she couldn't be bothered to cook were big enough for two people, Ellie did not want to defrost any just for herself and consequently reverted to snacking on unhealthy food or missing out meals altogether during her daughter's absence. Even after this

experience, though, she didn't develop any plans for how to cope with similar future situations but was simply relying on her daughter not going away again for some time:-

> "It's still not going to help the situation if...she's away, because that's where I have the problem of where I can't be bothered to cook for myself...but, I can't see her going away for any long period of time in the foreseeable future anyway so, hopefully, we should get back on track." (E3: 59-61, 68-9)

On being asked if she could think of anything she might do to make it easier for her to continue to eat more healthily even in the absence of her daughter, Ellie simply suggested filling up the cupboard with healthier snacks and sandwich fillings. She clearly hadn't thought of freezing some single-sized portions as well as doubles, spreading one defrosted meal over two nights, or of cooking fresh food just for herself. Her adherence to her new, healthier eating programme therefore continued to depend, in a very large part, on her daughter's presence, co-operation and enthusiasm.

Stench was hindered in a different way to Ellie by his lack of strategic planning. He did identify boredom as a potential risk factor for lapsing and cited this as the most likely reason he re-started smoking after his last quit attempt but, when asked if he had any ideas for how to guard against smoking when bored, merely replied:-

> "Not *yet* I've not, but something will creep in there, something will creep into my mind, I know it will." (S1: 254-5)

A kind of comic-strip image can be pictured here: a cigarette is trying to creep up on Stench but, at the same time, an amorphous form creeps into Stench's mind which has in its possession a weapon with which the cigarette can be destroyed before it takes hold of Stench. Unfortunately, though, Stench had no idea of the form of either his amorphous saviour or the weapon it carried.

Stench had made some plans, though, to spend time cycling in the future and also to train at a friend's gym but he could see no way of starting either until the arrival of warmer weather and lighter evenings and he made no suggestions for how he might fill his spare time in the interim. Although Stench expressed the belief that some people are put off

from stopping smoking at New Year for this reason, he appeared not to have thought about deferring his own attempt until later in the year:-

> "Funny, it's, it's this time of year as well isn't it, you can't really get out and do anything and that's the boring bit about it like, it's nice to go for a walk or something like that at night after your tea, but you can't now this time of the year. Shame people don't pack up smoking in, when should I say...April/May time, when there's things to do..." (S2: 99-104)

For Stench, this experience of waiting before being able to move forward more fully was echoed during his later lapse when he seemed in a kind of limbo while waiting for a decision to be made by "The Ministry":-

> "I'm just waiting for the Ministry, I mean as soon as the Ministry come *(claps his hands)* I'll be bouncing back up again, I know I'm going to be bouncing back up again." (S3: 125-7)

All Stench's energies and thoughts seemed centred around coping with this period of waiting and he was unable, even during the interview, to focus either very clearly or for very long on his quit attempt:-

> "...but it's been hard, it has been really hard *(pause)* I'm not thinking about the smoking side of it, I'm thinking about..." (S3: 141-3)

Ellie displayed a similar experience of feeling forced to wait for external events to move on before being able to fully resume her new behaviour patterns after her major lapse. In her case, the issue was her lack of knowledge of the extent to which her daughter should exercise an injured knee and her so far fruitless attempts to make contact with a physiotherapist in order to find out:-

> "...the actual, official exercise has perhaps drifted a bit because I don't quite know what she can cope with doing at the moment, with going swimming together and with her knee being out, erm, I'm still waiting to hear from the physiotherapist what she can and can't do really, so I'm a bit wary of taking her swimming and

> pushing her knee that bit too far...There's not quite as many opportunities as there would be if she was coming along with me to do with swimming and a lot of the walking as well..." (E3: 99-104, 112-4)

So, for both Ellie and Stench, their view of the old behaviour as having insidious tendencies was combined with a failure to anticipate and effectively plan for how to pre-empt lapsing in the face of difficulties or for how to prevent a lapse from becoming a full-blown relapse. It may be the case that each was experiencing a certain degree of denial in relation to the true nature of the process of adopting their new behaviours, particularly in terms both of the likelihood of external events and circumstances serving to increase the chances that they might lapse.

In addition, they both justified their lapses with reference to external circumstances rather than to their own failure to deal with those circumstances in ways other than by resorting to their established patterns of behaviour:-

> "...I've done so well, like and that, it just *(pause) that*, just took me over the edge, that really took me over the edge, just that lot. When them two things come at once like that, it really did put a lot of pressure on me." (S3: 60-3)

> "because I couldn't tempt her to eat we often had to dive out for a pizza and things like that..." (E3: 143-5)

In Ellie's case, it became clear in this third interview that, whereas the change in behaviour patterns had previously appeared to be an endeavour she was simply sharing with her daughter, it was rather the case that its success was, in fact, very strongly dependant on the daughter: her preference for home-cooked food, her willingness and, later, her fitness, to engage in exercise alongside her mother, even her readiness to eat excess food her mother didn't want:-

> "I'm never very good at estimating how much I'll eat, but *(give's daughter's name)* will always say, 'Oh well, throw the extra on my plate'...So I didn't even have my human dustbin there to finish off what I couldn't get through and that, so it was easier not to bother." (E3: 76-81)

In general terms, Ellie had a tendency, of which she seemed only partly aware, to take the easier option with respect to food. All the time her daughter was at home, preferred (and was able) to eat home-cooked food and was willing to finish off any excess so it didn't go to waste, then this was the easier option but as soon as any of these circumstances changed, then Ellie found her original dietary habits easier and returned to them.

Although, in their third interviews, both Ellie and Stench claimed to have returned to their newly established patterns of behaviour, it did not appear that this was entirely true for either. Ellie, for example, had only recently gone out for fish and chips as a result of a "dismal failure" in the kitchen and it being "too late" to prepare anything else (E3: 41, 43). This was a situation which strongly contrasted with views she had expressed in her first interview which had reflected a high level of flexibility in her approach:-

> "...it means we eat later of an evening, but it's better that we have proper fresh cooked food..." (E1: 116-8)

> "It doesn't always go to plan...but then I've got things like spaghetti bolognaise, which is very quick to throw together, which we can fill in with if we can't do the meal that I'd planned to do that night." (E1: 125-8)

For Stench, the continuing need to wait for a decision from "The Ministry" seemed likely to result in further occasions where he would resort to smoking for relief:-

> "You're sounding as if you're going to allow yourself the odd one while you're waiting." (I)

> "Aaaah, it does sound that way, yeah, it might do, it might happen that way..." (S3: 354-4)

In addition, although Stench urged me to go back to see him in a couple of months' time so that he could tell me a different story ("...I'll just say 'yeah, no problem'" S3: 372-3) he was also talking about his quit attempt as if it was in the past, i.e. as if he already viewed what was still, at that point, a lapse as a relapse:-

> "It was good while it lasted, it was really good, honestly, it really was...in fact it were *great* while it lasted, like." (S3: 368-9).

Although Meatloaf also viewed smoking as something insidious, saw it as a potential source of support ("I could easily turn to a packet of cigarettes" M1: 14-5), and seemed to like to think of himself as part of a smoking group ("I think all smokers..." M1: 211), he did not display any strong hindrances to the furtherance of his attempt. While he did not report having experienced any major stressors during the period of the study, he did describe the very bad cough he'd had for over a week as a "downer" (M3: 35) and it seems less likely that either Stench or Ellie would have been able to avoid lapsing while unwell and alone at home for a large part of a week. Rather, it is feasible that Meatloaf's ability to anticipate difficulties in a practical, pre-emptive sense together with his avoidance of potentially hindering thoughts and actions, such as depending on the presence and co-operation of another, combined to contribute to his success in quitting.

7.3.2vi Moving Towards a New Way of Life

Participants' desires in relation to their attempted behaviour change were more broadly based than their stated motives and their original patterns of behaviour were interpreted either as becoming incompatible with other changes they were hoping to make to their lives or as starting to provoke dissonance in relation to them. Stench, for example, wanted to be able to adopt a lifestyle which would include cycling trips into the local countryside as well as regular training sessions at the gym with his son and trips to the park with him to kick a ball about. Before giving up smoking, he was too breathless to do any of these things. Meatloaf's broader aims became evident over the course of the study and, like Stench's, also involved a degree of exercise which was incompatible with his continuing as a smoker. His desires with respect to exercise appeared to be bound up with desired changes in his self-image as well as a wish to be able to play more freely with his children and to lose the weight he had gained both during his earlier attempt to stop smoking and in the early stages of this attempt.

Ellie's desire to look more attractive and to feel better both in and about herself was tied up with her wish to make widespread changes to her life - she was planning both a change

of job and a re-location overseas.[38] Although this was not stated explicitly it appeared that a degree of cognitive dissonance would result from Ellie making the planned moves to where she lived and worked without having also improved her diet and established a programme of regular exercise.

It is not possible to make radical changes to lifestyle all at once and the ability to make relatively small moves away from the old behaviour were an important part of the process towards the achievement of a new way of life and provided a useful source of positive reinforcement for the participants. Some important differences were observed between them, in these respects, right from the first round of interviews. For example, while Meatloaf provided evidence of more than half of the sub-themes subsumed within this master theme at this point, Stench displayed none and Ellie showed only one in any strength - a focus on future events at which she would want to look physically attractive:-

> "I've also got a big party in February...the thought of looking good in my party outfit is more incentive than my weakness for Chinese at the moment. So just looking forward to little things like that, and I think once that party's out the way there'll be something else for me to focus on, and in the summer I've got weddings to go to..." (E1: 238-44)

Although Meatloaf had been making his change for nine days more than Stench, he was a week behind Ellie in this respect, so this difference in timing seems unlikely to be sufficient to account for the notable differences found between the three of them in relation to this theme. The following brief extract from his first interview provides a good illustration of how changing perceptions were forming part of Meatloaf's early moves away from smoking:-

> ".....when you're a smoker you don't smell...you can't smell it yourself, but now I've given up, um, anybody comes near me that smokes, you know, they could have had one an hour ago and I could smell it a mile off." (M1: 66-9)

As time went on, Meatloaf expressed not only his increasing ability to smell smoke but also an increasing dislike of, and eventually, a complete inability to cope with it:-

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[38] These plans were revealed just after the third interview and were therefore not recorded.

"...anybody that comes near me when they've been smoking...to me, they stink...they stink, you know, they, they really smell." (M2: 101-2, 109)

"...if I go into the smoking canteen at work...and people have been in smoking, then my clothes start to stink of tobacco and the other day I went in and there's about four or five people in there smoking and I just couldn't, couldn't stand it you know, I couldn't *breathe*..." (M3: 47-51)

By his third interview, Mealoaf was showing clear signs of having made good progress away from his old behaviour and towards a new way of life. Most notable was the fact, outlined earlier, that he had stopped using patches as a result of having forgotten to put one on and now found that he could cope quite easily without them. Additionally, the smell of smoke on either his own, or other people's, clothes or from within a smoky environment engendered revulsion rather than any desire to return to his former smoking behaviour:-

"No, I don't want a fag, no I don't want a fag, it's not taking it that way, it's, it's, you know 'I smell'...'I stink'...it's that way." (M3: 65-7)

Returning to his first interview, two early signs of moving on were that Meatloaf was both making one other change to his lifestyle in addition to quitting smoking and was talking about making a further one as well. The former was his deliberate avoidance of the pub, outlined above, and the latter was his aim to take up exercise:-

"I just want to go out for a jog...and not get out of breath." (M1: 114-5)

Although he expressed the desire to go out jogging, Meatloaf was not, at this stage, entirely sure about whether or not he would, in fact, be able to do this and this uncertainty was evident in later parts of the interview:-

"I'm not saying I'm going to be taking up jogging or anything like that, but my next stage would be that once I've got the cigarettes under control then I need to

then do something about the weight, and then I probably would take up exercise, you know, the swimming or jogging or whatever..." (M1: 234-8)

So, at this early stage of the process, Meatloaf was showing stronger signs of moving towards a new way of life than either Stench, who was not displaying any at all, or Ellie, who was just using glimpses of a different future to provide her with incentives to sustain the changes she was making to her behaviour.

By the time of their second interviews, Ellie was continuing to look forward to her party and both she and Stench had begun to experience changes in their tastes and/or perceptions and to show preliminary signs of moving away from their old behaviours:-

"So now I can have a little bit of chocolate and then leave it, I don't need to pig out and stuff my face with junk any more, in fact, the thought of sitting down and pigging the way I used to makes me feel quite queasy. I actually start to shudder at the thought of sitting down and eating three or four bars of chocolate in one go, where before there were times when I would have done that." (E2: 177-83)

"...when I get into the office and the boys have got a fag on in the ash tray and you smell it, it smells really, oooph, think 'God, that smells strong', but mind you that's what I used to be smoking like, so...I can honestly say I don't like the smell..." (S2: 33-6, 39)

Despite these signs of progression, Meatloaf was again ahead of both Stench and Ellie, and, in addition to the features mentioned so far, had already fulfilled his desire to start exercising, had started to eat more healthily to counteract his weight gain and was evolving a new self-identity as a non-smoker. The exercising pervaded the whole interview and was clearly a source of pleasure and pride as well as an indicator of the positive effects on his fitness levels which had resulted from his not having smoked for four weeks:-

"I've actually started exercising as well, so it's going good, yes." (M2: 8)

"...it's never been known for me to go out and exercise but...I look forward to it in the mornings." (M2: 298-300)

> "I'm starting to jog now and I feel, I feel I've got more energy now...I can remember when I used to chase the kids around when I was smoking, I used to sort of stop and I was wheezing and I felt tight at the top of my chest, but now I've got none of that, I feel I've got extra lung capacity, you know, and that's why I started to do jogging and I feel like I've got more energy." (M2: 56-61)

The above extract suggests Meatloaf also to be thinking of his smoking as a behaviour that is now firmly in the past for him and this interpretation was reinforced by his reference to himself as a non-smoker:-

> "Me and my colleague...We're both non-smokers..." (M2: 115-6)

> "It's interesting that you just referred to yourself as a non-smoker - are you starting to see yourself that way?" (I)

> "Yes, I know, I know...it just seems, seems so long ago when I smoked and it's not, just weeks, but I don't think about being, smoking." (M2: 121, 123-5)

By the time of the third interviews, having both lapsed, Ellie and Stench were, unsurprisingly, also both showing signs of having lost some of their momentum away from their old behaviours and towards new ways of life, although Ellie did mention that the changes she had made up to that point had made her think more about her diet and its physical effects:-

> "...it really has made me think about what I put into my body and what effect that does have quite rapidly as well." (E3: 307-9)

Despite this, there was little other real evidence of Ellie having moved on, away from her old lifestyle, though, and Stench was perhaps slightly ahead of her in this respect as he was not just still waiting for spring weather and lighter evenings but had set in motion an additional lifestyle change which would be difficult to sustain if he were to relapse fully:-

> "Like I say, I'm going to go up the gym with *(gives son's name)*...Next week I want to start that...I've had a word with *(gives name)* up the gym like, so...I'm going to

> go up there and he's going to put us through our paces and show us what to do. That will be on Wednesdays and Thursdays" (S3: 158,163,165-7)

Despite Ellie's improved awareness of the effects of what she eats and Stench's plans to start working out, Meatloaf was, by this time, a long way further along the path towards a new way of life. As well as all the previously displayed sub-themes, he was also now, with only the occasional hesitation, seeing the process of change as having been successfully completed and was consistently referring to himself as a non-smoker:-

> "Yeah, I'm, I'm a non-smoker. I've chucked all my lighters away as well now, so…yeah, I'm a non-smoker…I am, hopefully, not going to touch another cigarette. That's it, I'm a non-smoker." (M3: 172-3,267-8)

7.4 Discussion

7.4.1 Discussion of Main Findings

This multiple case study, following three individuals through the early stages of their attempts to adopt health behaviours has brought to light some important new insights relating to influences on attempts to adopt health behaviours and has also reinforced the value of using both an inductive approach and a longitudinal design as well as of employing IPA as a method of analysis when exploring this subject.

The three participants each made good progress for the first four to six weeks of their attempts but two then experienced major lapses. One of these occurred in the face of a double crisis in relation to the participant's livelihood and the other as a consequence of, firstly, the absence and then, later, the incapacitation of a person upon whom the change had become dependent. The third participant succeeded in sustaining his change in behaviour for the full eight week period covered by this investigation.

Six generic master themes emerged from the data and the examination of each participant's experiences in relation to these has provided some clues as to the possible reasons for their varying levels of success with respect to the change(s) being attempted. Interestingly, without any conscious effort having been made to highlight process issues when identifying and labelling these themes, they do broadly represent issues of relevance at different time points in the process. The first theme relates to participants' initial motivators and their readiness to change while the last concerns their subsequent movements towards a new way of life without the old behaviour(s). The remaining four concern the experiences and processes involved in attempting to sustain a change during the early weeks after its initiation. These include: experiences resulting from making progress or regressing back to old patterns of behaviour; those which might be seen as drawbacks of having made the change but which can also be used as indicators of progress; those associated with the use of specific strategies in attempts to foster sustained change; and those concerning hindrances and hurdles to success.

Since participants were approached after having initiated the change in their behaviour, the influences and processes involved in bringing them to the point of having done so could only be discussed retrospectively. However, some useful issues nonetheless emerged in relation to becoming motivated and ready to make the change. The major motivators related to the threats posed by participants' old behaviours to their health, fitness and/or lifespan and to their desire to act as positive role models to their children. Discussions surrounding the former showed that positive health was strongly valued by all three participants and that each believed that the changes they were attempting to make to their behaviour would result in the desired improvements to their health, fitness and lifespan. Since these are the two key features of the Attitudes construct of the TPB, this finding reinforces the support for the importance of attitudes to behaviour change which has been highlighted both in the literature and by the results of the study reported in Chapter 2, above.

When lapses occurred, participants became acutely aware of losing the benefits which they had gained while engaging in their new patterns of behaviour and Stench also incurred the disapproval of the person he was most aiming to please - his son. These negatively perceived consequences of lapsing seem likely to reinforce the positive attitudes which participants already held in relation to the behaviours they were trying to adopt.

Although, following a lapse, other factors may be more important to the restoration of the new behaviour, in cases where lapses develop into full relapses it is possible that such strengthened attitudes could increase both the likelihood of another attempt to change being made in future and also the chances of its success.

Both Meatloaf and Ellie had developed highly personal meanings associated with the health effects of their original behaviour patterns. In Meatloaf's case, the chest pains he had experienced had combined with the highly salient health promotion messages of the recent television campaign to make him realise just how devastating the effects of smoking could become for him personally. Similarly, reaching the age at which her father had died of a heart attack had brought the health-compromising aspects of Ellie's lifestyle into sharp focus as she realised the implications for her own health, fitness and mortality. This association of a decision to make a change in behaviour with the reaching of a turning point in life was also noted by Willms (1991) who observed that reaching a landmark age, changing an aspect of social status (such as by getting married or becoming a parent) and experiencing a major bereavement or the break-up of a relationship could all act as contributing factors in decisions to quit. Stench's case was a little different to that of either Ellie or Meatloaf for he gave no indication of having experienced any particular turning point in his life and improved health and fitness seemed to be viewed as aids to gaining a stronger relationship with his son and helping him in his endeavour to become a professional footballer - they did not appear to be ends in themselves.

In terms of social motivators, the findings of this study have added to the work discussed in the earlier chapters of this thesis which highlighted the inadequacies of the types of measure typically used in SCM studies. Here, although there were some indicators, particularly from Stench, of the power of normative beliefs and motivation to comply with these, the data showed social motivation to be rather more involved than just these standard components of SNs. Ellie's admission of being driven by her desire to conform to the current lean ideal for women, for example, lends indirect support to the argument for the inclusion of group norms in SCM studies. In addition, all three participants expressed the desire to act as positive role models. This is an aspect of social influence which has been completely ignored in social cognition studies where role modelling has been treated only as something which those whose behaviour is under investigation respond to, not something that they may provide. This may be a consequence of a greater

emphasis on the behaviour of teenagers and young adults, since relatively small proportions of these are likely to be parents compared to those in middle or older age. However, even teenagers may wish to be looked up to by those who might model their behaviour (such as siblings or younger children attending their school) and such a desire might be influential in decisions to adopt health-compromising as well as health-promoting behaviours. A teenager's decision to smoke, for example, might be influenced by a wish to be seen as a model of "cool" behaviour while another young person's decision to join a gym might be partially founded on a wish to be looked up to for having a toned body with well-defined musculature.

The limitations of the SCMs are further highlighted by a consideration of the control beliefs expressed by the participants in this study. Stench, who lapsed severely, was both the most vocal and the most unequivocal of the three participants in his early expressions of confidence in the sufficiency of his willpower to sustaining the change he had initiated in his behaviour. However, both Ellie (who also lapsed) and Mealoaf (who did not) expressed some doubts during their first interviews regarding their ability to maintain the changes they had begun - Ellie in relation to the occurrence of obstructive external events and Meatloaf in connection with his cravings. This finding suggests that cautious optimism may be more useful to the maintenance of change than an unrealistically strong sense of confidence which fails to take into account the existence of potential difficulties. Indeed, it is possible that expressions of extreme confidence might reflect a noted feature of emotion-focussed coping (e.g. Lazarus and Folkman, 1984) - that of denial. As has been seen, both from the work conducted here and from the established literature, achieving successful long-term change in health-related behaviours is a demanding task which frequently results in failure. Since anyone attempting such a change who is unwilling or unable to acknowledge its inherent difficulties will find themselves unprepared for challenging situations when they arise and for how to deal with any resulting lapses, a state of denial can only be counterproductive to success.

One reason why those who do succeed in changing their behaviour have often already been through one or more failed attempts may therefore be that such failures force initially over-confident individuals out of a state of denial or complacency and towards a more realistic assessment of the demand characteristics of the task they are attempting. However, a balance needs to be struck since, if the task is perceived to be too difficult

then the further attempts at change may well not be made at all: as Gillies and Willig (1997) have demonstrated, a discourse of addiction can be both deterministic and disempowering and, as Parry, Fowkes and Thomson (2001) propose, the view that stopping smoking is an extremely difficult, if not impossible, task is commonly held and is in need of being challenged by the narratives of those who found quitting easier than they had expected.

If correct, then the role of past failed attempts in serving as a positive challenge to denial or complacency may go some way towards explaining why it was not possible (in the study reported in Chapter 6) to apply the IPM to those trying to quit smoking or take up regular exercise. Certainly, there was little evidence, in the current study, that CSAs had been formed in response to the outcomes of previous, failed attempts and none that they had persisted for any length of time. When their current attempts were progressing well, participants gave a strong impression of viewing the efforts they were making as worthwhile – a view which is in line with one of the Challenge items. However, this view did not seem to diminish when lapses occurred, as would be predicted under the terms of the model. There were some indications that participants experienced perceptions akin to the Threat component of the IPM but these seemed very susceptible to fluctuations for reasons unrelated to actual performance, such as when Meatloaf's confidence was shaken by the experience of a strong craving or when Ellie worried about uncontrollable external events causing an unavoidable interruption to her new behaviour pattern.

With respect to Loss, it was mentioned above that both Ellie and Stench were acutely aware of having lost some of the benefits they had previously gained when they lapsed back to their old behaviours for a while. However, this sense of loss is very different to that incorporated within the IPM, which is more about feeling worn down by ongoing failures and unable to cope with any more, as well as the loss of the ability to see any point in trying again and a feeling of discouragement and depression. While Meatloaf did report having felt depressed after his previous, failed attempt to quit, he did not appear to have experienced this as an active emotion for very long. Neither Ellie nor Stench expressed any of the sentiments associated with Loss (as defined by Jerusalem and Schwarzer, 1992) in relation to their lapses, although it is possible that this may have been out of a desire to put a positive gloss on the situation and emphasise their renewed attempts to re-establish the changed behaviour. Even allowing for this possibility, though, when all the above

findings are taken together, they do appear to offer some explanation for why it was not possible to develop reliable CSAQs for application to attempts to adopt health behaviours.

Another important point relating to Meatloaf's control beliefs is that he was aware of variations in these depending on how recently he had experienced nicotine cravings. This finding supports the rejection, by Potter and Wetherell (1987), of the cognitivist assumption that expressions of attitudes and beliefs reflect stable underlying cognitive structures as well as adding a further explanation for the limited ability of SCMs to explain and predict behavioural outcomes. It also demonstrates that evaluations of personal control are more complex than a simple and stable assessment of ability to persist with a task in the face of pertinent obstacles, casting further doubt over the degree of importance which has been attached to self-efficacy in the literature.

Perceptions of having made progress early in the attempt were common across all three participants and Ellie and Meatloaf interpreted their cravings (for chocolate and nicotine, respectively) as additional signs of progress. These two participants also both expressed the view that the process of change had been easier than they had expected (although Ellie's assertions of this stopped after her major lapse). Parry et al (2001) found that, in cases where sudden, dramatic and unequivocal events (associated with smoking-related arterial disease) prompted smoking cessation, the necessity of succeeding made quitting the easiest option for participants to take and rendered the process easier than they expected. Neither Ellie nor Meatloaf were in this situation but Meatloaf had experienced some frightening symptoms (in the form of chest pains) and was being reminded of his fears by the television campaign which graphically illustrated the links between smoking cigarettes and developing arteries clogged with fatty deposits. It may be the case, therefore, that motivation which is sufficiently powerful may lead to notable reductions in the difficulties associated with behaviour change even when not as sudden, dramatic or unequivocal as the events experienced by the participants in Parry et al's study.

Sarlio-Lähteenkorva (1998) reports that maintenance of weight loss is difficult in cases where significant others are either unsupportive or uncomfortable with the change. In line with this, Ellie's progress initially appeared to be being fostered by the active support of her daughter. At the final interview, though, Ellie's dependence on both the presence and

the fitness of her daughter had become a hindrance and was a key factor in the major lapse she was experiencing at that point. For Stench, his son's wishes were a major motivator and the encouragement he received from him while abstaining from cigarettes was highly rewarding. It was not, however, sufficient to sustain his attempt in the face of the double crisis which erupted in relation to his work, nor was the resulting disapproval expressed by his son enough to promote an early recovery from his lapse. In contrast to the other two participants, Meatloaf did not receive any notable support from his family and, while this was clearly distressing for him, he did manage to continue with his quit attempt without it. These various findings do add to the established literature which has demonstrated the benefits of social support (e.g. Lepore, Evans & Schneider, 1991; Sarason, Sarason & Pierce, 1990) but they also suggest it is not an essential characteristic of successful behaviour change. In line with Pagel, Erdly and Becker (1987) they also imply that the wrong kind of support (in this case, in the form of an over-reliance on the active participation of another in the new behaviour patterns) can be counter-productive.

In terms of the use of strategies to foster change, the most notable difference between the participants was the contrast between Meatloaf's mixed selection of both psychological and practical strategies and the predominant reliance of Ellie and Stench on just one of these types each. An additional difference was that Stench used just a small number of strategies while Ellie and Meatloaf both drew on several. It seems logical that attempts to carry out such a difficult task as changing health-related behaviour would be less likely to fail in cases where both a greater number and a more varied selection of strategies are drawn on to bolster and sustain the process and this has been demonstrated to be the case (Sarlio-Lähteenkorva, 2000; Bott, Cobb, Kuckelman, Scheibmeir & O'Connell, 1997).

Arguably the most vital differences between the participants in this study, however, were those relating to the extent to which each engaged in proactive, pre-emptive planning and action in connection with potential and actual difficulties and also the extent to which they relied on their old behaviours for support and/or relief. As highlighted above, neither Ellie nor Stench managed the former and both engaged in the latter, while Meatloaf carried out some very effective pre-emptive planning and also both identified and used sources of support and relief other than his target behaviour. The very different outcomes achieved by Meatloaf and the other two participants seem likely to be attributable in a large part to these two differences.

Other researchers' findings have supported this proposed importance of planning in attempts to adopt health behaviours. Bott et al (1997), for example, identified Planning to Quit as a key theme in their study of ten smokers who had quit up to eight weeks before being interviewed and identified a wide range of aspects of this, such as gathering information about strategies which successful quitters had found helpful, identifying those which they might also benefit from and planning how they would use them. An example of one such strategy is finding alternative sources of support to cigarettes (such as chewing gum) in places where they used to keep their cigarettes. This strategy bears similarities to the way in which Meatloaf identified his need for nicotine replacement patches and his practice of ensuring he had supplies both at work and at home. Further similarities between Meatloaf and the participants in Bott et al's study included the making of decisions about whether to continue to frequent environments where others would be smoking, such as work canteens, restaurants and public houses, and the replacement of smoking with some other activity such as exercise. These strategies also tie in with two of the behavioural processes of change put forward as components of the TTM by Prochaska and DiClemente (1983), counter-conditioning and stimulus control[39]. Therefore, despite the questions regarding the existence of discrete stages of change (which were discussed in Chapter 3, above), these processes do appear to have a role in facilitating health-related behaviour change.

Bott et al's participants had found it useful to plan for the start of their quit attempt well in advance, including setting a date that was several weeks ahead and engaging in mental preparation for that date. None of the participants in this study talked about preparing for the initiation of their change in behaviour in quite this way, although Ellie did talk about feeling more mentally prepared for this attempt than her previous one and both she and Meatloaf had made some practical preparations in advance of the beginning of their attempt. Participants in both studies showed evidence of using positive thought to help sustain their attempts. Bott et al also report that their participants threw away their ashtrays and cleaned those in their cars as part of the planning for their quit attempt, but Meatloaf didn't do this until he had been without cigarettes for several weeks.

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[39] The description of all ten proposed processes of change is provided on p.88

The findings of the current study with respect to planning for, and using strategies to foster, long-term behaviour change both reflect and supplement those of existing models and theories. The kinds of advance preparations made and the breadth of strategies drawn on include, but go much farther than, both Gollwitzer's (1984) implementation intentions and Schwarzer's (1992) action plans. However, participants' use of positive thought appears less structured and focussed than the type of action control proposed by Schwarzer. In their Relapse Prevention Theory, Marlatt and George (1984) argue for the need to anticipate and take action against potentially difficult situations and to identify ways in which lapses might be prevented from becoming relapses. Again, these proposals have been both supported and supplemented in this study. The ability to carry out each of these things appears to have been a crucial difference between Meatloaf, who didn't lapse, and both Ellie and Stench, who did. Ellie's failure to engaging in constructive proactive planning seems to have been rooted in a view that such external difficulties as might arise would be impossible to surmount and it was hardly surprising that this turned into a self-fulfilling prophecy. Conversely, Stench's lack of planning may have been connected to a denial of the potential power of external events to deflect him from his desired course of behaviour. Again, as was argued above, a considered appraisal of likely difficulties and the identification of useful strategies both to cope with these and to recover from any lapses which do occur appears to be of vital importance to successful, sustained behaviour change. Past failed attempts may be useful to this process, not only in terms of challenging denial, as discussed earlier, but also by helping in the identification of both the types of situation likely to pose a threat to the success of a renewed attempt and strategies which will be useful in the management of these. Meatloaf's decision to ensure he had a large supply of patches before beginning his attempt is an example of this type of learning.

The extent to which each participant moved towards a new way of life was necessarily influenced by the extent to which they managed to sustain their new behaviour patterns. However, a certain reciprocity is also evident here since early moves, even small ones, away from the old behaviour were also indicated as having helped to sustain the change in behaviour. Small moves included things like changes in tastes or perceptions, such as Ellie's disgust at the thought of bingeing on chocolate and the dislike of the smell of smoke which both Meatloaf and Stench developed, with the latter showing a further link of the findings of this study with the TTM's proposed processes of change – in this case,

environmental re-evaluation. Meatloaf's early instigation of daily jogging was a greater move towards a new way of life and, since it would not have been sustainable had he returned to smoking, provided him with an additional and powerful motivator for continuing with his quit attempt.

The differences in the meanings and ambitions the three participants' held in relation to their old and new behaviours may also have been important in relation to qualitative differences in the benefits they gained as a result of having changed their behaviours and of the impact of these in terms of the extent to which the changes were sustained. For Meatloaf, exercise was immensely and directly rewarding. He enjoyed it, looked forward to it, was hoping it would help him lose the weight he had gained during the past year and interpreted his ability to engage in it as an indicator of how necessary and worthwhile all the effort he had put into his quit attempt had been. In contrast, by waiting for the arrival of spring before starting either to exercise or to train with his son (despite the fact that working out in a gym is dependent on neither daylight nor warm weather), Stench had prevented himself from gaining his most longed-for rewards. Admittedly, he did receive some praise from his son for having gone without cigarettes for the first few weeks, but he had not capitalised on the improvements he had noticed in his physical health by engaging in the one behaviour which would have most strengthened the bond between himself and his son as well as producing even stronger indicators of his improving fitness. Ellie was pleased with some of the physical effects she noticed to have resulted from her increased exercise and was happy with the way she looked at the party she went to in February but, like Stench, she also appeared not to have many immediate reinforcers to look forward to. This difference between the three participants seems likely to have had a bearing on their relative levels of success in sustaining the changes they had initiated in their behaviour: all had experienced early benefits but the only participant to have gained powerful and directly positive reinforcement by making strong moves towards a desired new way of life was the only one still persisting with the change at the end of eight weeks. This finding adds further evidence to support some effect of the TTM's behavioural processes of change - in this case, that of reinforcement management.

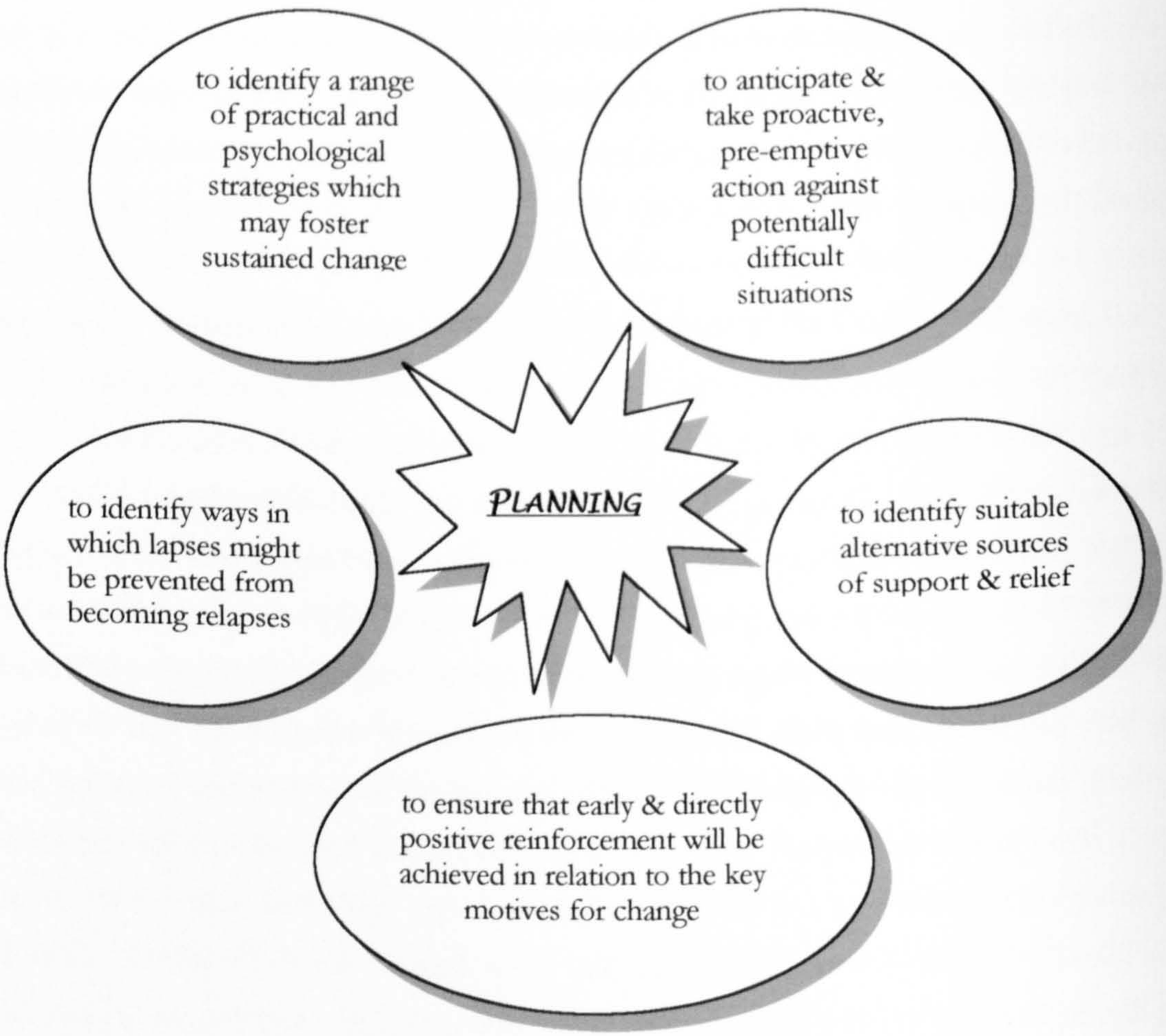
One final important point to note concerns transformations of self-identity which have been observed in those making major changes to their lifestyle, particularly to longstanding patterns of behaviour (Parry et al, 2001; Sarlio-Lähteenkorva, 2000; English,

1993). Meatloaf's repeated reference to himself as a non-smoker is an example of this type of identity shift and supports Prochaska and DiClemente's (1983) claims that self re-evaluation in relation to the behaviour being changed is beneficial to the change. Not everyone attempting such behaviour change experiences a smooth transition to a revised self-identity, however, and English reports that, after significant weight loss, participants frequently stated that they didn't feel like themselves any more and felt caught in a "no-person land" (p.238). Stench's persistent sense of strangeness, while not expressed in terms of self-identity, nonetheless seems likely to have been rooted in a similar feeling of dislocation from his usual experience of life and may have contributed to his lapse when the crises arose at work. English also observes that, when expected positive consequences of having made a major lifestyle change (such as the approval of loved ones) fail to materialise, nostalgic evaluations of the former self as being safe and comforting may be made and may increase the likelihood of relapse. This observation strengthens the above proposal of the necessity of early and directly positive reinforcement in relation to the key motives for change.

In the study by Willms (1991), while the participants were motivated to try to quit smoking because of developments in their personal circumstances (as outlined above), they also found that quitting reinforced this sense of moving away from an old way of life and towards a new one. One participant summarised this situation as follows: "Smoking is an old part of us... that we've cast aside. We've gone on to bigger and better things." (p.1367). Willms therefore describes the act of smoking not only as expressive of former selves which participants no longer recognised but also as symbolising a stage of life which they now felt was behind them. The only participant in the current study who displayed anything similar to this was Meatloaf, who mentioned on more than one occasion, and with a sense almost of surprise at himself, that it had never been known for him to be exercising and not smoking and who also described feeling as if it had been a considerable time since he had last smoked, rather than just a few weeks. The fact that even Meatloaf did not display such a strong sense of distinction between his past and current lives as that expressed by the participants in Willms' study probably results from the fact that the latter were all interviewed, on the last occasion, a full year after they had begun their quit attempts.

The findings so far discussed have highlighted five features which appear to be of central importance to the maintenance of attempts to adopt health behaviours. Each of these can be conceptualised both as likely to benefit from advanced planning and also as itself representing an aspect of active, strategic planning. All five have therefore been combined into the "Package of Planning for Sustained Health Behaviour Change", which is presented in Figure 7.4.1:-

FIGURE 7.4.1 Package of Planning for Sustained Health Behaviour Change



As Figure 7.4.1 illustrates, the scope of the strategic planning activities identified, in this study, as being important to the successful adoption of health behaviours is much greater than has so far been proposed in the literature (e.g. Gollwitzer, 1993; Schwarzer, 1992;

Marlatt & George, 1984; Prochaska & DiClemente, 1983). There are a number of implications of this finding in relation to future research and the development of theory and these will be discussed further after a consideration of the methodological limitations associated with this study.

7.4.2 METHODOLOGICAL LIMITATIONS

As mentioned earlier, the study was limited both by the fact that participants were recruited only after they had initiated the changes in their behaviour and also by their similarities in terms of ethnic origin. Further similarities in participants' age, their status as parents and as wage-earners and the fact that each had only failed at one previous attempt to change their target behaviour(s) also limited the study. Another weakness relates to the fact that the investigation covered a period of only eight weeks in participants' attempts to change their behaviour, since this precluded the consideration of process issues covering the entire period from the initiation of a change in behaviour to a point when the change might reasonably be assumed to have been established.

Interpretative Phenomenological Analysis was chosen for application in this study in order to ensure a close engagement with the active process of attempting to adopt one or more health behaviours. The approach has a number of advantages, such as facilitating the emergence of associated meanings which have relevance across the breadth of participants' lives and allowing the role of the researcher's own conceptions and interpretations to be openly acknowledged. However, it also has a number of disadvantages, some of which are similar to those discussed in relation to questionnaire-based methods in Section 2.4.2, above. Potter and Wetherell (1987), for example, claim that subtle, but important distinctions are equally subject to being missed in some qualitative methods as in quantitative ones - possibly since master themes generated to apply across a number of interviews and/or interviewees represent a specific form of aggregated data. It is also arguably the case that interviews may have a similar impact as that of questionnaire completion on cognitions and emotions. Interviewees may be equally likely, for example, to attempt to answer questions on topics with which they are unfamiliar and to form new cognitions as a result. There is also no reason to assume that

they are any less prone than questionnaire respondents to experiencing cognitive shifts as a result of their emotional reactions to questions about familiar behaviours. Similarly, since it is well known that individuals tend to respond to extra attention (Orne, 1962; Miller, 1984), behaviour is also likely to be influenced by having taken part in one or more related interviews. Indeed, Meatloaf raised this possibility himself by comparing his participation in the study with his prior attendance at a smoking cessation support group.

A further limitation of interviews is that the quality of the data they generate is at least partly reliant on the skills of the interviewer - my own inexperience in this respect led to some regrettable interruptions being made during interviews and to some missed opportunities for probing further into certain areas. In addition, interview data are highly contextual, with the choice of which story to tell, out of a range of possible alternatives, being influenced by any of a wide variety of internal and external factors (Antaki, 1994). This limitation, together with the influence of researcher interpretation, means that the account which has been presented in this chapter is only one among many that might have been produced had different individuals been involved, either as participants or researchers or both. It is for this reason that the practice, common among some qualitative researchers, of taking the account back to participants to see if they consider it directly reflective of their own, was not carried out here: if a participant had disagreed with any aspect of the account, questions would have arisen over whose view should be given the greater weight, theirs or mine. Since each participant was only aware of their own data while I, as the researcher, had access to that provided by all three participants as well as to my own knowledge, experience and conceptions, I decided to present my own account as it stands but to acknowledge that each participant, as well other researchers, might have interpreted the data in a different way. The conclusions which I have presented can therefore only be generalised with caution until support is provided by further work in this area, including that carried out by other researchers.

7.4.3 THEORETICAL IMPLICATIONS

The approach taken in this study is the most radical departure from the SCMs reported in this thesis and it has produced some findings with important theoretical implications.

Although its timing meant that motivating influences could only be explored retrospectively, the value of attitudes as key motivators has again been reinforced, as has the need to expand the consideration of social influences - in this case, to incorporate the desire to act as a positive role model to significant others. The important of control beliefs again appears to have been over-estimated, with findings suggesting cautious optimism to be potentially more helpful in relation to sustaining behaviour change.

The results of the study have also offered some explanation of why, in the last chapter, the IPM did not prove to be directly applicable to attempts to adopt health behaviour as, in contrast to the proposals of that model, the role of past failures in this study appears rather to have been a positive one. However, since each of the case study participants had made only one previous attempt to change their target behaviour(s), this investigation did not have the scope to provide any insights regarding the meanings associated with repeated failure to adopt health behaviours. This being the case, the findings of the study have not negated the suggestion, made at the end of the last chapter, that there may be some potential in exploring Loss appraisals in those who have experienced several failures, particularly if the target behaviour is highly salient. Fewer and/or less salient experiences of failure, however, appear to have the potential to facilitate learning regarding which practical and psychological strategies may foster the maintenance of attempts to adopt health behaviours and which may not. They may also serve to challenge states of denial or complacency concerning the difficulties inherent in attempting to change entrenched behaviours. Both of these effects could have further benefits by influencing the performance and efficacy of strategic planning.

The potential importance of active, strategic planning to the successful maintenance of health behaviour change was a key finding of this study and it has some important implications for the future development of theory. For example, the observed benefits of planning to ensure that early, positive reinforcement is gained in relation to the key motives for change has highlighted the need to consider both behaviourist and cognitive principles when generating theories of the maintenance of health behaviour change. In addition, the key features of the proposed Package of Planning, if supported by further research, suggest both a breadth of scope and a degree of importance of strategic planning activities which extend beyond each and all of those put forward in relation to Implementation Intentions (Gollwitzer, 1993), the HAPA (Schwarzer, 1992), Relapse

Prevention Theory (Marlatt & George, 1984) and the Transtheoretical Model (Prochaska & DiClemente, 1983). The nature and modes of operation of effective planning are therefore important areas for further investigation and theorising, with the potential to add valuable new insights to current knowledge and understanding of the influences and processes involved in health behaviour adoption. These will be discussed in detail in the next chapter, together with other implications of the thesis as a whole.

CHAPTER EIGHT

Summary & Concluding Discussion

8.1 General Summary

With the importance of behaviour to health and longevity having increased substantially over the course of the twentieth century, much of the energy of health psychologists has been directed towards identifying key influences on health behaviour performance and understanding how these operate. The most common approach taken in investigations has involved the use of social cognitions, either singly or combined into models, as predictors of behavioural outcomes. However, the review of literature presented in Chapter 1 highlighted a number of theoretical, methodological and performance-based limitations in this body of work. The main aim of this thesis was therefore to move beyond the SCMs in order to supplement the knowledge and understanding they have provided. Three broad approaches were adopted in the attempt to achieve this aim.

In the first approach, outlined in Chapter 2, behaviour-specific variables were added to key model predictors in an attempt to improve upon the proportions of variance in behavioural intentions typically explained in SCM studies. Three model predictors (Attitudes, as assessed by the Drive for Thinness scale, Social Influence and Self-efficacy) were selected for inclusion on the basis of their past performance and/or potential importance and they were assessed using simple, additive measures rather than the more complex, multiplicatory ones advocated in some of the SCMs. Two behaviour-specific variables, one cognitive (Weight Perceptions) and one non-cognitive (Past Weight Loss Behaviour), added significant contributions to the explanation of variance in scores on the measure of behavioural intentions (the Determination to Lose Weight scale). When combined together, these five predictors provided a level of explanation on a par with the most successful of the previous studies of this nature (e.g. Conner et al, 2001; Bagozzi & Warshaw, 1990).

Since a ceiling appeared to have been reached in this kind of study, however, an alternative approach was required in order that the aim of the thesis might be further progressed. Two unexpected findings (the negative relationship between Self-efficacy and Determination and the mediation of this relationship by Past Behaviour), together with other inter-relationships between key variables, suggested a need to explore cognitive and emotional responses to past failure experiences and the extent to which these might

influence future behaviour. A further review of literature (presented in Chapter 3) resulted in the identification of the Idealised Process Model (Jerusalem and Schwarzer, 1992) as having potential in this respect. The second approach taken in the move beyond the SCMs therefore involved the replication and extension of Jerusalem and Schwarzer's test of this model as well as an attempt to apply it to the adoption of health behaviours. This work (which was reported in Chapters 4, 5 and 6) provided support for the IPM by confirming that the cognitive stress appraisals of Challenge, Threat and Loss are formed and held simultaneously in response to failure to perform well on cognitive tasks and that they change in negative, non-linear patterns as the number of failures increases. It was also found that failure-induced changes in CSAs can persist for at least one week after the receipt of failure feedback. However, the proposed protective benefit of GSE in relation to progression across the four stages of the IPM was not observed and, in the final piece of work relating to this model, it did not prove possible to adapt the CSAQ to apply to attempts either to take up regular exercise or to quit smoking.

Although some possibilities for future research were identified in relation to Loss appraisals in a specific sub-group (to be discussed in Section 8.3.2, below), there was no evidence that continuing to work with the IPM in its entirety would further the development of theories able to supplement the SCMs in ways relevant to the population as a whole. Instead, an examination was made of the developmental work relating to the HBM, TRA and TPB with a view to identifying how decisions about the definition and selection of their component constructs were reached and any bearing this process might have had on the limited success of their performance in practice. Some weaknesses of the process were discovered during this examination and it was considered likely that some key predictors of health behaviour performance may have been missed as a result. In the light of this discovery, an inductive approach was adopted in order that the constraints associated with applying pre-determined constructs and models would be avoided and a broad exploration enabled of the experience of attempting to adopt one or more health behaviours, including the meanings associated with these and possible links between the latter and the degree and persistence of change achieved. This third approach to moving beyond SCMs (reported in Chapter 7), therefore involved the application of interpretative phenomenological analysis to a multiple case study investigation in which three people were followed through the early stages of the process of attempting to adopt one or more health behaviours.

Seven master themes were drawn from the interview data and six of these, each relating to different aspects of the process in which participants were engaging, were subjected to in-depth analysis. As a result, three key findings emerged from the data: a strong motivating influence of the desire to act as a positive role model; a potential beneficial effect of having experienced a small number of past failed attempts to adopt the target behaviour(s); and the role of active, strategic planning in the maintenance of health behaviour change. The implications of these findings for future research and the development of theory will be discussed in detail in Section 8.3, below. First, however, some methodological considerations of relevance to this thesis are in need of discussion.

8.2 METHODOLOGICAL CONSIDERATIONS

There is a tendency for those researching psychological phenomena to express strong views advocating particular methodological approaches over others. For example, Miller (S., 1984, pp.1-2) argues that it is the use of experimental ("scientific") methodology which distinguishes psychological theorising from that of other "observers of human nature" and he presents the key features of such theorising in the following, uncompromising terms:

> *"...a psychological theory has to fit the facts of behaviour as derived from systematic observations taken in carefully controlled conditions. If a theory does not fit the facts it is discarded or revised, no matter how long its history, how appealing its logic, or how convenient its implications...this emphasis on objectivity and rigorous control narrows the range of behaviour that can feasibly be studied, but in return it produces more solid and reliable conclusions.".*

Others, however, have argued that since human behaviour takes place within the context of a process of culturally influenced meaning-making and since meanings are not discoverable by systematic observation or under conditions of experimental control (and therefore do not fall within the remit of scientific methodologies) it is unlikely that researchers will be able to identify the full range of underlying influences on behaviour using this type of approach (Crossley, 2000; Stainton Rogers, 1991). In a further argument

against a reliance on scientific methodologies in psychological investigations, Yardley (1997, p.1) claims that the concept of objectivity so valued by experimental psychologists is illusory and that attempting to attain it is therefore futile:

> *"...ultimately, we can* only *perceive the world around us by means of human senses...and in relation to human desires and activities, and we* must *explain it to ourselves and others using human cultural concepts and language...[R]ather than striving for the illusory goal of objectivity, it is more productive to examine the way in which our reality – including the particular version of reality portrayed by scientists – is shaped by the purposes and conventions, aspirations and assumptions, which form an intrinsic part of human life.".*

This dichotomising of views, among psychologists, of what constitute useful and acceptable approaches to the study of human thinking and behaviour can be attributed, at least in part, to historical influences. While early psychologists, such as Wilhelm Wundt, valued qualitative and quantitative methodologies equally (Hayes, 1997), the tendency of young and developing disciplines to adopt the approaches of more established ones, in order to acquire respectability and status, rapidly led to a reliance on the scientific methodology which had recently become predominant at the time of psychology's emergence as an independent discipline (Murray & Chamberlain, 1999). Similarly, early health psychologists followed the example of established sub-disciplines, such as cognitive and social psychology, and again espoused the same methodological approach (Marks, 1996) and it is only relatively recently that the debate regarding the benefits of adopting different approaches has been re-kindled (Hayes, 1997).

It is clear, both from the literature and from the work conducted here, that quantitative and qualitative methodologies each have both some strengths and also some limitations when applied in psychological research. However, their various limitations are not as disparate as the arguments presented by some psychologists might suggest. It has been proposed here, for example, that the use of interviews as a means of data collection, while an ideal method by which to explore the nature and influence of meanings associated with certain aspects of human behaviour, is just as likely as the use of self-report questionnaires to create new cognitions, shape existing ones and/or influence subsequent behaviour. Similarly, the identification of temporal, contextual and researcher-based influences on

decisions regarding the component constructs of SCMs, as well as on the choice of the IPM for application in the second approach taken here, lends weight to Yardley's argument that quantitative methodologies are no more able than qualitative ones to achieve objectivity.

It would appear, therefore, that rather than any single methodological approach holding ascendancy over the others, it is instead the case that all approaches are flawed and that the findings achieved by means of each must therefore be interpreted and reported with due consideration and acknowledgement of its associated limitations. Furthermore, if psychological research and theorising is to be able to encompass the widest possible range of human experiences, including those relating to complex behavioural tasks such as the adoption of health behaviours, then it must be accepted that many different types of research question can appropriately be asked by psychologists and that a wide range of approaches and methods are required in order for them to be effectively addressed. As Miller (G., 1962, p.23) contends: "There are many ways to be scientific, there are many different psychological problems to be studied, and there are innumerable ways to fit our scraps of evidence together into an image of Man.".

8.3 THEORETICAL IMPLICATIONS & FUTURE DIRECTIONS

The three broad approaches adopted in this thesis have, both singly and together, produced findings with implications for the development of theories capable of supplementing the knowledge and understanding which have so far been provided by the SCMs in relation to the nature and operation of influences on attempts to adopt health behaviours. The most notable of these, which will now be discussed in turn, concern the value of the social cognition models and the model predictors, the impact of past failed attempts on future efforts to adopt health behaviours and, finally, the importance of engaging in active, strategic planning in order to further the maintenance of initiated changes in health behaviours.

8.3.1 THE VALUE OF THE SCMs & MODEL PREDICTORS

The work reported in this thesis has reinforced and supplemented the findings of the literature review concerning the strengths and weaknesses of the SCMs and the model predictors but it has also produced some contradictory findings. Support has been found, for example, for the proposed positive influence of attitudes on health behaviour performance and also in relation to claims that both conceptions and measures of social influence need broadening in scope (with a desire to act as a positive role model being identified as a key motivating factor). However, the relationship between self-efficacy and behavioural intentions in the first study was both unexpectedly negative and significantly mediated by past behaviour. Additionally, in the work relating to the IPM, no evidence was found for a protective effect of generalised self-efficacy with respect to patterns of change in CSAs and no relationship was observed between GSE and the degree to which changes in CSAs persist over time, although those high in GSE did display generally stronger Challenge appraisals and generally weaker ones of Loss than those with lower GSE scores. The case study finding that control beliefs are subject to the influence of immediate contextual factors lends weight to the claim made by Potter and Wetherell (1987) that the structures underlying assessed cognitions cannot be assumed to be stable. Together, these findings strongly suggest that the importance of self-efficacy - and therefore probably also of the other control belief constructs - has been over-estimated in explanations of health behaviour performance.

As far as the models as a whole are concerned, despite a deliberate lack of adherence to the algorithms of any particular model in the first study reported here, the proportion of variance explained by the model predictors was equivalent to that of the average TPB study. This result adds to questions raised by earlier researchers (e.g. Herold, 1983; Oliver & Berger, 1979) regarding the extent to which the SCMs have any value over and above that of their component parts. Another important question relates to what SCM studies are really intended to achieve: while it is unlikely that any researcher genuinely believes the models to be capable of providing complete explanations of behaviour (even when supplemented with additional predictors), the implicit aim of studies of this type appears to be to get as close as possible to explanations of 100 percent of the variance in outcomes. However, considering the results of the first study of this thesis alongside both

those of the most successful published studies of this type (e.g. Conner et al, 2001; Bagozzi & Warshaw, 1990) and those of the two meta-analytic reviews of the TPB (Armitage & Conner, 1998; Godin & Kok, 1996), it appears that around half of the variance in behaviour is beyond the scope of this approach to explain. Ongoing refinement of either the models or the model predictors (with the possible exception of social influence) therefore seems to have little of any real practical value to offer. Furthermore, since far more attempts to adopt health behaviours are started than succeed, there is now a need to increase the proportion of research and theorising which is directed towards explaining how attempts that have been initiated may best be maintained. Findings arising from both the second and third approaches adopted in this thesis are of relevance to this issue. Those concerned with the impact of past failure experiences will be discussed first, followed by those relating to the role of active, strategic planning.

8.3.2 The Impact of Past Failure Experiences

Although it did not prove possible to develop reliable measures with which to assess either Challenge or Threat appraisals in relation to health behaviour adoption, the Loss subscale (which does not incorporate behaviour-specific items and was therefore not modified in the final IPM study) was consistently reliable across all applications of the CSAQ. Since, under the terms of the IPM, notable increases in the strength of Loss appraisals are not proposed to occur until after a number of failures have been experienced, further explorations could usefully concentrate on their strength and impact in those known to have failed in several previous attempts to adopt a health behaviour. Should such explorations suggest a negative influence of Loss appraisals on motivation and/or persistence in relation to future attempts in such a sample, then the possibility that they strengthen at different rates according to the frequency with which failure feedback is received (as suggested by the results of the extended study) would be another issue worthy of further investigation.

While interesting, however, such investigations would only be pertinent to a specific sub-group and would not therefore have scope to supplement the information provided by the SCMs in ways relevant to the population as a whole. However, some possible links

between past failures and future attempts to adopt health behaviours have been identified here which could have more widespread applications. For example, contrary to the uniformly negative influences proposed by Jerusalem and Schwarzer (1992), the case study results point instead towards two possible positive effects of past failure experiences on the maintenance of future attempts. First, one or more experiences of failure were suggested to have the potential to force individuals out of a denial or under-estimation of the difficulties inherent in the process of changing a health behaviour and towards a more realistic assessment of its demands. By doing so, they may also promote the second identified benefit of past failure experiences - more accurate appraisals of both the need for, and the potential of, using particular practical and/or psychological strategies in order to foster sustained behaviour change.

Together with the replication study finding in which participants were observed to move into the second stage of the IPM only after five failures had been experienced, these results suggest that changes in CSAs are unlikely to have any notable impact on future motivation and persistence before several failures have occurred, even in cases where target behaviours are salient. A smaller number, on the other hand, seem likely to increase the chances of future attempts being sustained. Further qualitative investigation is now required to explore the meanings associated with different numbers of past failures to sustain changes in health behaviours and the positive and/or negative implications of these in relation to future attempts.

8.3.3 The Role of Active, Strategic Planning

Five key features were identified in the case study as being important to the sustained adoption of health behaviours and as representing the culmination of a process of active, strategic planning activity. The Package of Planning developed in that study (see Figure 7.4.1, p.216) suggests both a degree of importance and a breadth of scope of such activities beyond those so far proposed in the literature (e.g. by Gollwitzer, 1993; Schwarzer, 1992; Marlatt & George, 1984 and Prochaska & DiClemente, 1983) and much therefore remains to be learned in connection with each of the key features identified here.

With respect to anticipating and acting to guard against potentially challenging situations, for example, while some commonality is likely to be seen across individuals (such as the risks associated with entering a smoky environment while trying to quit smoking or being required to work extra long hours while attempting to establish a pattern of regular exercise), it seems probable that there will also be many such situations which are highly person-specific. Asking individuals who have successfully adopted a health behaviour to give details (either in an interview or by means of a survey) of those which they had found most difficult and how they dealt with them could provide some useful insights with which to inform the development of small-scale intervention studies. Such studies could also incorporate explorations of how people might best be helped to identify situations likely to threaten the success of their attempts, the types of actions which could effectively be taken to guard against these and the most helpful methods of preparing people to deal with any lapses that do occur. Some alternative forms of intervention which could be compared include the provision of written, self-help materials and/or activities engaged in during attendance at support groups or in one-to-one sessions. Similar explorations to these could also be conducted in relation to the third key feature of the planning package, the identification of suitable alternative sources of support and relief to the old behaviour.

The fourth of the key features is the identification of practical and psychological strategies which may foster sustained change and, as discussed in the previous section, past failures may promote learning in relation to which of such strategies may, and which may not, prove helpful in this respect. Since another case study observation, supported in the literature, was that being able to draw on a wide variety of both practical and psychological strategies is of greater benefit than having to rely on a smaller number and/or just one type, ways of helping people become aware of the full range of strategies available to them are also in need of exploration. Again, the relative benefits of written materials and other, more direct methods of intervention could be investigated.

The final feature identified as being of central importance to the maintenance of an attempt to adopt a health behaviour is the achievement of early and directly positive reinforcement in relation to the key motives for change. Since behaviourist principles have received very little attention within health psychology research and theorising, initial investigations in relation to this feature will need to consider the extent of influence of such reinforcement and how best to plan for its achievement, both within individuals and

across groups. One useful approach to take could be to encourage those planning an attempt to identify their key motives for change and what positive reinforcement of these would constitute. Each could then be helped to identify ways in which the receipt of such reinforcement might be initiated within a short space of time after the start of their attempt. Comparing the outcomes for such individuals with an appropriate control group would be one way of evaluating the outcomes of this type of intervention.

Parry et al (2001) found that it is possible, under certain circumstances, for the process of adopting a health behaviour to be easier than anticipated and this finding was reinforced here, particularly in relation to Meatloaf's experience of attempting to quit smoking. Since the proposed Package of Planning emerged, to a large extent, out of differences observed between Meatloaf's actions and experiences and those of the other, less successful, case study participants, effective engagement with this package may help to reduce the difficulties inherent in attempting to adopt a health behaviour process to more manageable levels and thereby increase the likelihood of success.

8.4 Concluding Comments

The work reported in this thesis is a three-part exploration of influences on attempts to adopt health behaviours in which it was aimed to address gaps in knowledge and understanding which have resulted from a longstanding over-reliance on social cognition models. The results of this work have both demonstrated the highly complex nature of the processes involved in attempting to adopt a health behaviour and highlighted the importance of taking into account the fact that such attempts take place within the broader context of people's lives and are therefore subject to influences arising from their past experiences, their current circumstances and their aspirations for the future. Given these findings, it is not surprising that the widespread application of a single methodological approach has resulted in only a limited understanding of these processes and influences.

In order both to effectively address the research questions which arose during the course of this evolving body of work and to foster the development of theories with which to

supplement the limited information the SCMs are capable of providing, three different methodological approaches were applied. Each of these, despite displaying certain limitations, produced several findings of value. However, both depth and insight have been added to the discussions of these findings by taking the results of all the investigations into account together. It is clearly the case, therefore, that the use of these three, very different methodological approaches has progressed the search for greater knowledge and understanding in this area far more than a reliance on any one of them alone could have done. This thesis therefore represents a dual achievement: first, it has reinforced the importance of accepting that many types of research question can appropriately be asked by health psychologists and that a wide range of methodologies and methods can usefully be applied in addressing them; second, it has provided a number of clear directions for future research and theoretical development with which knowledge and understanding of the nature and operation of influences on attempts to adopt health behaviours might usefully be progressed.

APPENDIX A

Material Relating to the Study Reported in Chapter 2

SURVEY OF SOCIAL INFLUENCES AND WEIGHT-RELATED ISSUES

1. Please give the following details about yourself:-

a) Your age .....

b) Your height .....

c) Your current weight .....

d) Your religion (if any).....

2. Please indicate, by ticking the relevant box, which of the following most closely describes your relationship status:-

Married	❑	Single, currently in a relationship	❑
Co-habiting	❑	Single, not currently in a relationship	❑
Divorced//Separated	❑		

3. Which of the following most closely describes your ethnic background?

White	❑	Indian	❑
Black British	❑	Pakistani	❑
Black Caribbean	❑	Bangladeshi	❑
Black African	❑	Chinese	❑
Black Other	❑	Other	❑
British Asian	❑		

4. Which of the following most closely describes how you see your weight?

very underweight	❑	slightly overweight	❑
slightly underweight	❑	very overweight	❑
neither underweight nor overweight	❑		

5. How satisfied are you with your current weight?

very satisfied	❑	quite dissatisfied	❑
quite satisfied	❑	very dissatisfied	❑
neither satisfied nor dissatisfied	❑		

Please turn over.../

6. **Please indicate, by circling the relevant numbers, the extent to which you agree with the statements given below:-**

1 = Strongly Agree
2 = Agree
3 = Neither Agree nor Disagree
4 = Disagree
5 = Strongly Disagree

a) I would like to lose weight in the near future.....1 2 3 4 5
b) I intend to try to lose weight in the near future.....1 2 3 4 5
c) I am going to lose weight in the near future.....1 2 3 4 5

7. **How often have you tried to lose weight during the past 5 years?**

Never ❑
Once ❑
A couple of times ❑
Several times ❑
Many times ❑

8. **If your weight has changed in the last six months, please answer the following questions, if not, please move straight on to Question 9:-**

a) How much weight did you lose or put on? .....
b) Did you put on or lose weight? I put on weight ❑ I lost weight ❑
c) Were you trying to change your weight? Yes ❑ No ❑

9. **Please indicate how strongly you agree with the following statements:-**

1 = Strongly Agree
2 = Agree
3 = Neither Agree or Disagree
4 = Disagree
5 = Strongly Disagree

I am confident I can control my weight ***<u>even if</u>***...

a)...I am feeling bored.....1 2 3 4 5
b)...I am feeling angry with myself.....1 2 3 4 5
c)... I am eating with friends and/or family.....1 2 3 4 5
d)...I am feeling stressed..... 1 2 3 4 5
e)...I am having relationship problems..... 1 2 3 4 5
f)...I keep feeling hungry.....1 2 3 4 5
g)...I am anxious or worried.....1 2 3 4 5
h)...I am away from home.....1 2 3 4 5
i)...I am feeling bad about myself.....1 2 3 4 5
j)...I lack motivation to do so.....1 2 3 4 5

Please turn over.../

10. Please indicate the extent to which you agree that each of the following statements is true:-

1 = Strongly agree
2 = Agree
3 = Neither agree nor disagree
4 = Disagree
5 = Strongly disagree

a) Most of my friends...
...think my weight is about right.....1 2 3 4 5
...think I should lose weight.....1 2 3 4 5
...put pressure on me to lose weight.....1 2 3 4 5

b) Most of my family...
...think my weight is about right.....1 2 3 4 5
...think I should lose weight.....1 2 3 4 5
...put pressure on me to lose weight.....1 2 3 4 5

c) With respect to my weight, I want to do...
...what my friends think I should.....1 2 3 4 5
...what my family thinks I should.....1 2 3 4 5

11. Please indicate how often you think or behave in the following ways:-

1 = always 2 = usually 3 = often
4 = sometimes 5 = rarely 6 = never

a) I eat sweets and carbohydrates without feeling nervous... 1 2 3 4 5 6
b) I think about dieting..... 1 2 3 4 5 6
c) I feel extremely guilty after eating..... 1 2 3 4 5 6
d) I am terrified of gaining weight..... 1 2 3 4 5 6
e) I exaggerate or magnify the importance of weight..... 1 2 3 4 5 6
f) I am preoccupied with the desire to be thinner..... 1 2 3 4 5 6
g) If I gain a pound, I worry that I will keep gaining..... 1 2 3 4 5 6

h) I think that my stomach is too big..... 1 2 3 4 5 6
i) I think that my thighs are too large..... 1 2 3 4 5 6
j) I think that my stomach is just the right size..... 1 2 3 4 5 6
k) I feel satisfied with the shape of my body..... 1 2 3 4 5 6
l) I like the shape of my buttocks..... 1 2 3 4 5 6
m) I think my hips are too big..... 1 2 3 4 5 6
n) I think my thighs are just the right size..... 1 2 3 4 5 6
o) I think my buttocks are too large..... 1 2 3 4 5 6
p) I think that my hips are just the right size..... 1 2 3 4 5 6

Thank you for Completing this Questionnaire

Raw Scores on Determination Subscale

Participant	qA	qB	qC	Total Score
1	5.00	5.00	5.00	15.00
2	5.00	4.00	4.00	13.00
3	5.00	5.00	3.00	13.00
4	1.00	1.00	1.00	3.00
5	5.00	5.00	4.00	14.00
6	5.00	4.00	3.00	12.00
7	3.00	3.00	3.00	9.00
8	2.00	1.00	3.00	6.00
9	1.00	1.00	1.00	3.00
10	4.00	4.00	3.00	11.00
11	5.00	5.00	4.00	14.00
12	5.00	5.00	4.00	14.00
13	3.00	3.00	3.00	9.00
14	4.00	4.00	4.00	12.00
15	2.00	2.00	2.00	6.00
16	4.00	4.00	4.00	12.00
17	3.00	3.00	3.00	9.00
18	3.00	3.00	3.00	9.00
19	2.00	2.00	2.00	6.00
20	2.00	2.00	2.00	6.00
21	1.00	1.00	1.00	3.00
22	5.00	5.00	4.00	14.00
23	2.00	1.00	1.00	4.00
24	4.00	4.00	3.00	11.00
25	5.00	5.00	5.00	15.00
26	5.00	4.00	4.00	13.00
27	4.00	4.00	4.00	12.00
28	3.00	3.00	3.00	9.00
29	1.00	1.00	1.00	3.00
30	5.00	4.00	5.00	14.00
31	5.00	4.00	3.00	12.00
32	5.00	5.00	4.00	14.00
33	3.00	3.00	3.00	9.00
34	3.00	2.00	2.00	7.00
35	4.00	3.00	3.00	10.00
36	2.00	1.00	1.00	4.00
37	5.00	4.00	3.00	12.00
38	5.00	5.00	5.00	15.00
39	4.00	4.00	4.00	12.00
40	1.00	1.00	1.00	3.00
41	5.00	4.00	3.00	12.00
42	4.00	4.00	4.00	12.00
43	3.00	3.00	3.00	9.00
44	1.00	1.00	1.00	3.00
45	1.00	1.00	1.00	3.00
46	3.00	5.00	1.00	9.00

47	3.00	3.00	2.00	8.00
48	3.00	3.00	3.00	9.00
49	4.00	4.00	3.00	11.00
50	1.00	1.00	1.00	3.00
51	3.00	3.00	3.00	9.00
52	5.00	4.00	5.00	14.00
53	1.00	1.00	1.00	3.00
54	3.00	3.00	3.00	9.00
55	5.00	3.00	3.00	11.00
56	3.00	3.00	3.00	9.00
57	2.00	1.00	1.00	4.00
58	5.00	4.00	3.00	12.00
59	5.00	5.00	5.00	15.00
60	3.00	3.00	3.00	9.00
61	5.00	3.00	3.00	11.00
62	5.00	3.00	3.00	11.00
63	5.00	3.00	3.00	11.00
64	4.00	4.00	4.00	12.00
65	4.00	4.00	4.00	12.00
66	5.00	5.00	4.00	14.00
67	2.00	2.00	2.00	6.00
68	1.00	1.00	1.00	3.00
69	4.00	4.00	4.00	12.00
70	4.00	4.00	3.00	11.00
71	3.00	2.00	2.00	7.00
72	2.00	2.00	2.00	6.00
73	5.00	4.00	5.00	14.00
74	4.00	4.00	4.00	12.00
75	5.00	5.00	5.00	15.00
76	5.00	5.00	5.00	15.00
77	4.00	3.00	3.00	10.00
78	1.00	1.00	1.00	3.00
79	5.00	5.00	5.00	15.00
80	2.00	2.00	2.00	6.00
81	5.00	5.00	5.00	15.00
82	4.00	4.00	4.00	12.00
83	2.00	2.00	2.00	6.00
84	3.00	2.00	3.00	8.00
85	4.00	3.00	2.00	9.00
86	1.00	1.00	1.00	3.00
87	3.00	5.00	3.00	11.00
88	5.00	5.00	5.00	15.00
89	4.00	4.00	5.00	13.00
90	4.00	4.00	4.00	12.00
91	4.00	4.00	3.00	11.00
92	4.00	4.00	4.00	12.00
93	4.00	4.00	3.00	11.00
94	5.00	5.00	4.00	14.00
95	2.00	2.00	2.00	6.00
96	4.00	4.00	3.00	11.00
97	1.00	1.00	1.00	3.00

98	4.00	4.00	3.00	11.00
99	2.00	2.00	2.00	6.00
100	3.00	2.00	1.00	6.00
101	1.00	1.00	1.00	3.00
102	1.00	1.00	1.00	3.00
103	4.00	4.00	4.00	12.00
104	4.00	3.00	3.00	10.00
105	2.00	3.00	3.00	8.00
106	1.00	1.00	1.00	3.00
107	5.00	5.00	5.00	15.00
108	4.00	4.00	2.00	10.00
109	4.00	4.00	3.00	11.00
110	3.00	3.00	3.00	9.00
111	2.00	2.00	2.00	6.00
112	4.00	3.00	4.00	11.00
113	4.00	4.00	5.00	13.00
114	5.00	5.00	5.00	15.00
115	3.00	2.00	2.00	7.00
116	5.00	5.00	5.00	15.00
117	2.00	2.00	2.00	6.00
118	4.00	3.00	3.00	10.00
119	1.00	1.00	1.00	3.00
120	3.00	3.00	3.00	9.00
121	3.00	3.00	3.00	9.00
122	1.00	1.00	1.00	3.00
123	5.00	5.00	5.00	15.00
124	4.00	4.00	4.00	12.00
125	4.00	4.00	5.00	13.00
126	4.00	4.00	4.00	12.00
127	4.00	5.00	5.00	14.00
128	5.00	4.00	3.00	12.00

RAW SCORES ON SOCIAL INFLUENCE SUBSCALE

Part[nt]	q1	q2	q3	q4	q5	q6	q7	q8	Total Score
1	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	15.00
2	3.00	4.00	1.00	4.00	4.00	1.00	3.00	3.00	23.00
3	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	8.00
4	3.00	1.00	1.00	3.00	1.00	1.00	4.00	4.00	18.00
5	2.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	11.00
6	3.00	4.00	4.00	5.00	5.00	5.00	4.00	4.00	34.00
7	2.00	3.00	2.00	3.00	4.00	2.00	2.00	2.00	20.00
8	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	9.00
9	2.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	10.00
10	1.00	1.00	1.00	3.00	4.00	3.00	3.00	4.00	20.00
11	2.00	2.00	1.00	2.00	2.00	2.00	5.00	2.00	18.00
12	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	14.00
13	2.00	3.00	1.00	1.00	3.00	1.00	1.00	1.00	13.00
14	2.00	2.00	2.00	1.00	2.00	2.00	1.00	1.00	13.00
15	2.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	10.00
16	3.00	2.00	1.00	4.00	4.00	4.00	1.00	1.00	20.00
17	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	8.00
18	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	9.00
19	2.00	3.00	1.00	3.00	3.00	1.00	1.00	1.00	15.00
20	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	9.00
21	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	14.00
22	2.00	3.00	1.00	3.00	3.00	1.00	1.00	1.00	15.00
23	2.00	2.00	1.00	2.00	2.00	1.00	1.00	1.00	12.00
24	3.00	3.00	2.00	2.00	3.00	2.00	2.00	2.00	19.00
25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	8.00
26	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	11.00
27	2.00	2.00	1.00	2.00	4.00	1.00	1.00	2.00	15.00
28	2.00	2.00	2.00	2.00	1.00	1.00	3.00	3.00	16.00
29	2.00	3.00	1.00	2.00	1.00	1.00	1.00	1.00	12.00
30	2.00	2.00	1.00	3.00	4.00	1.00	1.00	1.00	15.00
31	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	8.00
32	3.00	2.00	1.00	3.00	2.00	1.00	3.00	1.00	16.00
33	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	21.00
34	2.00	2.00	1.00	3.00	2.00	1.00	3.00	3.00	17.00
35	2.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	10.00
36	1.00	1.00	1.00	2.00	2.00	2.00	3.00	3.00	15.00
37	2.00	2.00	1.00	2.00	2.00	2.00	1.00	1.00	13.00
38	3.00	3.00	3.00	3.00	3.00	3.00	1.00	1.00	20.00
39	2.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	11.00
40	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	14.00
41	4.00	4.00	2.00	4.00	4.00	2.00	2.00	2.00	24.00
42	2.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	10.00
43	2.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	20.00
44	2.00	3.00	2.00	2.00	4.00	3.00	3.00	1.00	20.00
45	3.00	3.00	3.00	2.00	2.00	2.00	2.00	3.00	20.00
46	1.00	9.00	9.00	1.00	9.00	9.00	1.00	1.00	99.00

47	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	10.00
48	1.00	2.00	2.00	1.00	2.00	2.00	1.00	1.00	12.00
49	3.00	2.00	1.00	2.00	2.00	1.00	3.00	3.00	17.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	8.00
51	1.00	4.00	3.00	1.00	4.00	3.00	1.00	1.00	18.00
52	2.00	3.00	1.00	4.00	4.00	4.00	9.00	4.00	99.00
53	1.00	1.00	1.00	3.00	3.00	3.00	1.00	1.00	14.00
54	1.00	9.00	9.00	1.00	9.00	9.00	1.00	1.00	99.00
55	2.00	4.00	2.00	2.00	4.00	4.00	1.00	1.00	20.00
56	2.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	10.00
57	1.00	1.00	1.00	3.00	2.00	2.00	3.00	3.00	16.00
58	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	16.00
59	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	16.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	8.00
61	3.00	4.00	3.00	3.00	4.00	3.00	1.00	1.00	22.00
62	2.00	2.00	1.00	2.00	2.00	1.00	1.00	1.00	12.00
63	1.00	9.00	9.00	1.00	9.00	9.00	3.00	3.00	99.00
64	2.00	2.00	1.00	2.00	3.00	1.00	3.00	3.00	17.00
65	2.00	3.00	1.00	4.00	5.00	4.00	9.00	9.00	99.00
66	2.00	3.00	1.00	2.00	2.00	1.00	1.00	2.00	14.00
67	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	14.00
68	1.00	9.00	9.00	1.00	9.00	9.00	1.00	1.00	99.00
69	2.00	2.00	2.00	4.00	2.00	2.00	1.00	1.00	16.00
70	2.00	2.00	2.00	1.00	2.00	2.00	1.00	1.00	13.00
71	1.00	1.00	1.00	1.00	1.00	1.00	4.00	4.00	14.00
72	2.00	1.00	1.00	2.00	1.00	1.00	2.00	2.00	12.00
73	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	13.00
74	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00	19.00
75	2.00	1.00	2.00	4.00	4.00	4.00	2.00	2.00	21.00
76	2.00	4.00	2.00	4.00	4.00	4.00	4.00	4.00	28.00
77	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	8.00
78	2.00	2.00	1.00	2.00	2.00	1.00	3.00	3.00	16.00
79	2.00	1.00	1.00	2.00	1.00	1.00	1.00	2.00	11.00
80	1.00	9.00	9.00	1.00	9.00	9.00	3.00	3.00	99.00
81	2.00	2.00	1.00	2.00	2.00	2.00	2.00	1.00	14.00
82	2.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	10.00
83	2.00	2.00	1.00	2.00	2.00	1.00	3.00	2.00	15.00
84	2.00	2.00	1.00	2.00	1.00	1.00	3.00	3.00	15.00
85	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	24.00
86	2.00	2.00	2.00	2.00	2.00	2.00	4.00	4.00	20.00
87	2.00	2.00	1.00	2.00	1.00	1.00	1.00	1.00	11.00
88	2.00	9.00	9.00	2.00	9.00	9.00	1.00	1.00	99.00
89	4.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	18.00
90	2.00	2.00	1.00	2.00	2.00	1.00	3.00	3.00	16.00
91	2.00	1.00	1.00	4.00	1.00	1.00	1.00	1.00	12.00
92	2.00	3.00	1.00	2.00	1.00	1.00	3.00	3.00	16.00
93	2.00	2.00	1.00	2.00	2.00	1.00	4.00	4.00	18.00
94	2.00	1.00	1.00	2.00	1.00	1.00	3.00	3.00	14.00
95	2.00	4.00	2.00	2.00	3.00	2.00	2.00	2.00	19.00
96	4.00	5.00	3.00	4.00	5.00	3.00	1.00	1.00	26.00
97	4.00	1.00	4.00	4.00	3.00	3.00	2.00	2.00	23.00

98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	8.00
99	2.00	9.00	9.00	2.00	9.00	9.00	3.00	9.00	99.00
100	3.00	4.00	4.00	2.00	2.00	2.00	2.00	4.00	23.00
101	2.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	10.00
102	3.00	3.00	1.00	4.00	4.00	4.00	3.00	3.00	25.00
103	1.00	1.00	1.00	4.00	1.00	1.00	4.00	2.00	15.00
104	2.00	2.00	2.00	2.00	4.00	4.00	3.00	2.00	21.00
105	1.00	1.00	1.00	1.00	1.00	1.00	9.00	9.00	99.00
106	3.00	4.00	3.00	3.00	3.00	2.00	2.00	2.00	22.00
107	2.00	1.00	1.00	4.00	1.00	1.00	4.00	5.00	19.00
108	1.00	3.00	3.00	1.00	3.00	3.00	3.00	3.00	20.00
109	1.00	9.00	9.00	1.00	9.00	9.00	3.00	9.00	99.00
110	1.00	9.00	9.00	1.00	9.00	9.00	9.00	9.00	99.00
111	3.00	1.00	1.00	4.00	1.00	1.00	1.00	1.00	13.00
112	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	14.00
113	2.00	2.00	1.00	2.00	2.00	1.00	3.00	3.00	16.00
114	3.00	1.00	1.00	3.00	1.00	1.00	1.00	1.00	12.00
115	2.00	2.00	2.00	3.00	2.00	1.00	2.00	2.00	16.00
116	2.00	5.00	2.00	2.00	4.00	2.00	3.00	3.00	23.00
117	2.00	2.00	2.00	2.00	2.00	2.00	1.00	2.00	15.00
118	3.00	2.00	1.00	2.00	2.00	1.00	1.00	1.00	13.00
119	1.00	9.00	9.00	1.00	9.00	9.00	1.00	1.00	99.00
120	2.00	2.00	1.00	2.00	2.00	1.00	1.00	1.00	12.00
121	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	16.00
122	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	24.00
123	4.00	2.00	5.00	5.00	4.00	2.00	1.00	1.00	24.00
124	2.00	2.00	2.00	2.00	2.00	2.00	4.00	4.00	20.00
125	2.00	2.00	1.00	3.00	5.00	2.00	2.00	5.00	22.00
126	1.00	1.00	1.00	1.00	1.00	1.00	3.00	3.00	12.00
127	3.00	4.00	3.00	4.00	5.00	4.00	1.00	1.00	25.00
128	1.00	9.00	9.00	1.00	9.00	9.00	1.00	1.00	99.00
129	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	14.00
130	2.00	9.00	9.00	2.00	9.00	9.00	2.00	2.00	99.00
131	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	9.00
132	3.00	4.00	2.00	4.00	4.00	4.00	2.00	2.00	25.00
133	2.00	2.00	1.00	2.00	3.00	5.00	1.00	1.00	17.00
134	5.00	5.00	5.00	4.00	5.00	1.00	4.00	5.00	34.00
135	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	14.00
136	4.00	4.00	3.00	4.00	3.00	3.00	3.00	3.00	27.00
137	4.00	2.00	1.00	4.00	2.00	1.00	2.00	2.00	18.00
138	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.00	9.00

RAW SCORES ON SELF-EFFICACY SUBSCALE

Pnt	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	Total Score
1	3.00	2.00	2.00	2.00	1.00	2.00	2.00	3.00	1.00	3.00	21.00
2	3.00	2.00	4.00	2.00	2.00	4.00	2.00	3.00	2.00	3.00	27.00
3	1.00	1.00	3.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.00
4	5.00	5.00	5.00	3.00	3.00	4.00	3.00	4.00	3.00	3.00	38.00
5	4.00	3.00	3.00	2.00	2.00	3.00	2.00	5.00	4.00	3.00	31.00
6	2.00	3.00	3.00	3.00	3.00	1.00	3.00	2.00	3.00	3.00	26.00
7	4.00	3.00	2.00	2.00	4.00	4.00	4.00	3.00	4.00	3.00	33.00
8	5.00	5.00	3.00	5.00	3.00	4.00	4.00	4.00	3.00	2.00	38.00
9	5.00	5.00	5.00	3.00	5.00	3.00	4.00	5.00	5.00	5.00	45.00
10	3.00	2.00	2.00	3.00	2.00	1.00	3.00	4.00	3.00	1.00	24.00
11	4.00	3.00	4.00	2.00	2.00	2.00	2.00	3.00	2.00	2.00	26.00
12	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	20.00
13	2.00	5.00	4.00	2.00	5.00	5.00	5.00	5.00	4.00	2.00	39.00
14	4.00	5.00	2.00	4.00	5.00	1.00	3.00	2.00	4.00	2.00	32.00
15	4.00	4.00	4.00	3.00	5.00	5.00	3.00	5.00	5.00	5.00	43.00
16	3.00	4.00	4.00	4.00	2.00	3.00	2.00	4.00	2.00	3.00	31.00
17	2.00	5.00	2.00	5.00	5.00	1.00	5.00	4.00	1.00	1.00	31.00
18	2.00	3.00	4.00	4.00	4.00	2.00	4.00	2.00	2.00	1.00	28.00
19	2.00	2.00	3.00	2.00	3.00	3.00	2.00	4.00	3.00	3.00	27.00
20	4.00	4.00	4.00	2.00	4.00	2.00	2.00	3.00	3.00	2.00	30.00
21	3.00	4.00	4.00	3.00	4.00	2.00	4.00	2.00	4.00	4.00	34.00
22	4.00	4.00	3.00	4.00	4.00	2.00	4.00	2.00	5.00	2.00	34.00
23	1.00	1.00	4.00	3.00	2.00	2.00	3.00	4.00	1.00	1.00	22.00
24	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	4.00	37.00
25	5.00	5.00	5.00	1.00	1.00	5.00	1.00	2.00	5.00	3.00	33.00
26	2.00	4.00	2.00	5.00	2.00	1.00	1.00	4.00	4.00	1.00	26.00
27	3.00	1.00	1.00	1.00	1.00	1.00	1.00	3.00	2.00	1.00	15.00
28	3.00	2.00	4.00	3.00	2.00	2.00	2.00	4.00	2.00	2.00	26.00
29	2.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1.00	12.00
30	3.00	3.00	3.00	1.00	1.00	2.00	2.00	3.00	2.00	1.00	21.00
31	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	50.00
32	2.00	2.00	3.00	1.00	1.00	3.00	2.00	4.00	1.00	2.00	21.00
33	1.00	3.00	2.00	3.00	4.00	2.00	2.00	3.00	3.00	1.00	24.00
34	3.00	2.00	4.00	1.00	3.00	1.00	3.00	4.00	5.00	1.00	27.00
35	2.00	2.00	3.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	22.00
36	4.00	3.00	2.00	3.00	2.00	2.00	3.00	3.00	2.00	2.00	26.00
37	3.00	2.00	4.00	2.00	3.00	3.00	2.00	3.00	2.00	2.00	26.00
38	5.00	5.00	3.00	3.00	4.00	4.00	4.00	2.00	4.00	2.00	36.00
39	5.00	5.00	5.00	1.00	1.00	4.00	1.00	2.00	3.00	3.00	30.00
40	2.00	2.00	2.00	2.00	2.00	2.00	2.00	5.00	2.00	2.00	23.00
41	3.00	2.00	4.00	4.00	4.00	2.00	4.00	2.00	4.00	2.00	31.00
42	4.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	22.00
43	3.00	4.00	4.00	4.00	2.00	3.00	4.00	5.00	2.00	3.00	34.00
44	3.00	3.00	3.00	4.00	3.00	1.00	2.00	4.00	2.00	1.00	26.00
45	2.00	3.00	3.00	2.00	2.00	3.00	2.00	3.00	2.00	2.00	24.00
46	1.00	1.00	5.00	3.00	1.00	4.00	2.00	3.00	2.00	3.00	25.00

47	4.00	5.00	3.00	5.00	5.00	4.00	4.00	3.00	4.00	5.00	42.00
48	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	40.00
49	4.00	4.00	4.00	3.00	2.00	2.00	3.00	4.00	3.00	3.00	32.00
50	2.00	2.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	44.00
51	3.00	2.00	2.00	2.00	1.00	2.00	3.00	2.00	4.00	4.00	25.00
52	2.00	2.00	4.00	1.00	3.00	3.00	1.00	4.00	1.00	2.00	23.00
53	3.00	3.00	3.00	3.00	3.00	2.00	2.00	3.00	3.00	3.00	28.00
54	2.00	2.00	2.00	3.00	2.00	2.00	3.00	3.00	3.00	2.00	24.00
55	3.00	3.00	3.00	1.00	1.00	4.00	1.00	3.00	3.00	1.00	23.00
56	5.00	5.00	5.00	3.00	5.00	5.00	3.00	3.00	3.00	4.00	41.00
57	3.00	3.00	2.00	2.00	2.00	3.00	2.00	3.00	2.00	2.00	24.00
58	2.00	4.00	2.00	2.00	5.00	2.00	2.00	2.00	3.00	3.00	27.00
59	4.00	3.00	4.00	3.00	3.00	4.00	2.00	4.00	3.00	4.00	34.00
60	2.00	2.00	3.00	2.00	2.00	2.00	4.00	2.00	2.00	2.00	23.00
61	3.00	3.00	3.00	3.00	5.00	3.00	3.00	3.00	2.00	1.00	29.00
62	1.00	3.00	2.00	4.00	4.00	4.00	4.00	4.00	3.00	1.00	30.00
63	3.00	4.00	3.00	4.00	4.00	2.00	4.00	4.00	4.00	2.00	34.00
64	2.00	2.00	1.00	2.00	2.00	2.00	2.00	1.00	2.00	1.00	17.00
65	1.00	3.00	3.00	1.00	1.00	1.00	1.00	3.00	1.00	1.00	16.00
66	3.00	3.00	3.00	3.00	4.00	3.00	3.00	3.00	4.00	3.00	32.00
67	2.00	2.00	4.00	2.00	2.00	2.00	2.00	4.00	3.00	4.00	27.00
68	2.00	5.00	5.00	2.00	2.00	5.00	2.00	5.00	2.00	5.00	35.00
69	3.00	3.00	2.00	2.00	3.00	1.00	3.00	2.00	2.00	1.00	22.00
70	3.00	1.00	3.00	1.00	1.00	1.00	1.00	3.00	1.00	3.00	18.00
71	2.00	2.00	2.00	2.00	2.00	1.00	2.00	2.00	2.00	2.00	19.00
72	4.00	3.00	4.00	3.00	2.00	2.00	3.00	4.00	2.00	3.00	30.00
73	2.00	4.00	2.00	2.00	2.00	4.00	4.00	4.00	2.00	3.00	29.00
74	2.00	4.00	2.00	4.00	2.00	2.00	4.00	4.00	4.00	2.00	30.00
75	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	20.00
76	2.00	2.00	2.00	2.00	3.00	2.00	2.00	4.00	3.00	3.00	25.00
77	3.00	2.00	4.00	2.00	3.00	2.00	3.00	4.00	3.00	4.00	30.00
78	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	30.00
79	5.00	5.00	5.00	5.00	4.00	4.00	4.00	5.00	5.00	5.00	47.00
80	4.00	4.00	3.00	5.00	2.00	2.00	4.00	3.00	5.00	2.00	34.00
81	4.00	4.00	5.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	33.00
82	2.00	2.00	2.00	2.00	1.00	2.00	2.00	2.00	2.00	2.00	19.00
83	2.00	1.00	3.00	3.00	2.00	1.00	1.00	5.00	1.00	3.00	22.00
84	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	40.00
85	2.00	2.00	4.00	2.00	1.00	2.00	3.00	4.00	2.00	2.00	24.00
86	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	2.00	38.00
87	1.00	3.00	3.00	2.00	2.00	2.00	4.00	4.00	4.00	4.00	29.00
88	1.00	4.00	4.00	2.00	1.00	1.00	2.00	4.00	2.00	2.00	23.00
89	5.00	4.00	2.00	4.00	4.00	2.00	5.00	5.00	3.00	3.00	37.00
90	1.00	1.00	4.00	1.00	1.00	1.00	1.00	3.00	1.00	1.00	15.00
91	2.00	2.00	4.00	2.00	4.00	4.00	2.00	4.00	2.00	3.00	29.00
92	4.00	5.00	5.00	3.00	4.00	4.00	4.00	5.00	4.00	3.00	41.00
93	2.00	5.00	4.00	5.00	4.00	2.00	5.00	5.00	3.00	3.00	38.00
94	5.00	5.00	5.00	5.00	5.00	5.00	3.00	3.00	3.00	3.00	42.00
95	4.00	3.00	3.00	2.00	3.00	4.00	4.00	3.00	3.00	3.00	32.00
96	3.00	3.00	1.00	2.00	3.00	3.00	4.00	4.00	4.00	4.00	31.00
97	2.00	3.00	4.00	1.00	2.00	3.00	1.00	4.00	4.00	3.00	27.00

98	5.00	5.00	5.00	2.00	5.00	4.00	2.00	5.00	5.00	5.00	43.00
99	3.00	4.00	2.00	2.00	4.00	4.00	3.00	4.00	4.00	1.00	31.00
100	3.00	4.00	3.00	4.00	5.00	4.00	4.00	3.00	4.00	3.00	37.00
101	3.00	4.00	2.00	2.00	4.00	2.00	2.00	4.00	4.00	4.00	31.00
102	5.00	5.00	2.00	5.00	5.00	2.00	5.00	2.00	5.00	1.00	37.00
103	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	20.00
104	4.00	3.00	4.00	2.00	2.00	2.00	1.00	2.00	1.00	2.00	23.00
105	4.00	4.00	4.00	5.00	5.00	3.00	5.00	5.00	4.00	3.00	42.00
106	3.00	4.00	3.00	2.00	2.00	2.00	3.00	4.00	4.00	3.00	30.00
107	4.00	4.00	4.00	1.00	2.00	1.00	1.00	1.00	4.00	2.00	24.00
108	3.00	5.00	4.00	1.00	5.00	2.00	3.00	4.00	1.00	1.00	29.00
109	3.00	1.00	4.00	1.00	4.00	1.00	1.00	5.00	1.00	1.00	22.00
110	4.00	4.00	5.00	4.00	5.00	4.00	5.00	5.00	5.00	4.00	45.00
111	4.00	4.00	2.00	2.00	2.00	3.00	2.00	4.00	2.00	2.00	27.00
112	2.00	2.00	4.00	2.00	3.00	4.00	2.00	4.00	2.00	4.00	29.00
113	4.00	2.00	5.00	4.00	2.00	1.00	3.00	4.00	2.00	3.00	30.00
114	4.00	2.00	4.00	3.00	4.00	2.00	3.00	4.00	2.00	2.00	30.00
115	4.00	4.00	4.00	2.00	3.00	2.00	3.00	3.00	4.00	3.00	32.00
116	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	20.00
117	2.00	4.00	3.00	2.00	3.00	2.00	2.00	4.00	3.00	2.00	27.00
118	2.00	4.00	5.00	3.00	4.00	2.00	3.00	4.00	4.00	4.00	35.00
119	5.00	5.00	5.00	4.00	5.00	5.00	4.00	4.00	5.00	5.00	47.00
120	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	50.00
121	3.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	2.00	23.00
122	2.00	2.00	2.00	2.00	2.00	2.00	2.00	4.00	2.00	2.00	22.00
123	2.00	2.00	2.00	1.00	2.00	1.00	1.00	3.00	1.00	4.00	19.00
124	4.00	4.00	4.00	3.00	2.00	3.00	2.00	3.00	3.00	3.00	31.00
125	1.00	3.00	4.00	1.00	1.00	4.00	4.00	5.00	3.00	1.00	27.00
126	4.00	4.00	4.00	4.00	4.00	3.00	4.00	4.00	4.00	4.00	39.00
127	3.00	2.00	2.00	2.00	3.00	2.00	3.00	3.00	2.00	1.00	23.00
128	5.00	5.00	5.00	4.00	4.00	5.00	5.00	5.00	5.00	5.00	48.00
129	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	30.00
130	4.00	4.00	4.00	3.00	4.00	4.00	3.00	4.00	4.00	4.00	38.00
131	4.00	2.00	3.00	2.00	3.00	4.00	2.00	3.00	2.00	5.00	30.00
132	3.00	3.00	3.00	2.00	3.00	2.00	3.00	3.00	3.00	2.00	27.00
133	2.00	3.00	4.00	2.00	2.00	2.00	2.00	3.00	2.00	3.00	25.00
134	1.00	4.00	1.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	14.00
135	3.00	4.00	2.00	3.00	3.00	2.00	3.00	3.00	3.00	4.00	30.00
136	1.00	2.00	1.00	1.00	1.00	1.00	3.00	4.00	1.00	2.00	17.00
137	2.00	4.00	1.00	2.00	2.00	2.00	4.00	4.00	4.00	3.00	28.00
138	4.00	4.00	4.00	2.00	2.00	5.00	2.00	4.00	4.00	3.00	34.00

DETERMINATION TO LOSE WEIGHT

		Mean	Std Dev	Cases
1.	QA	3.4297	1.3843	128.0
2.	QB	3.2109	1.3554	128.0
3.	QC	3.0156	1.2980	128.0

Statistics for	Mean	Variance	Std Dev	No. of Variables
SCALE	9.6563	14.9045	3.8606	3

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
QA	6.2266	6.5703	.9044	.9280
QB	6.4453	6.6269	.9230	.9132
QC	6.6406	7.1454	.8753	.9494

Reliability Coefficients

N of Cases = 128.0 N of Items = 3
Alpha = .9527

One-Sample Kolmogorov-Smirnov Test

		DETERMIN
N		128
Normal Parameters(a,b)	Mean	9.6563
	Std. Deviation	3.86064
Most Extreme Differences	Absolute	.152
	Positive	.098
	Negative	-.152
Kolmogorov-Smirnov Z		1.717
Asymp. Sig. (2-tailed)		.006

a Test distribution is Normal.
b Calculated from data.

SOCIAL INFLUENCE

		Mean	Std Dev	Cases
1.	Q1	2.1138	.8017	123.0
2.	Q2	2.0732	1.0494	123.0
3.	Q3	1.5691	.8785	123.0
4.	Q4	2.3089	.9928	123.0
5.	Q5	2.2439	1.1618	123.0
6.	Q6	1.7480	1.0130	123.0
7.	Q7	1.9593	1.0433	123.0
8.	Q8	1.9675	1.0784	123.0

Statistics for	Mean	Variance	Std Dev	No. of Variables
SCALE	15.9837	29.2292	5.4064	8

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q1	13.8699	24.3436	.5364	.8079
Q2	13.9106	21.8526	.6396	.7915
Q3	14.4146	23.2775	.6110	.7979
Q4	13.6748	22.7294	.5825	.8000
Q5	13.7398	20.4564	.7063	.7801
Q6	14.2358	22.9194	.5448	.8051
Q7	14.0244	24.2371	.3800	.8278
Q8	14.0163	23.6883	.4171	.8236

Reliability Coefficients

N of Cases = 123.0 N of Items = 8
Alpha = .8250

One-Sample Kolmogorov-Smirnov Test

		SOCINF
N		123
Normal Parameters(a,b)	Mean	15.9837
	Std. Deviation	5.40641
Most Extreme Differences	Absolute	.117
	Positive	.117
	Negative	-.070
Kolmogorov-Smirnov Z		1.294
Asymp. Sig. (2-tailed)		.070

a Test distribution is Normal.
b Calculated from data.

SELF-EFFICACY FOR WEIGHT CONTROL

		Mean	Std Dev	Cases
1.	Q1	3.0145	1.1651	138.0
2.	Q2	3.2101	1.1989	138.0
3.	Q3	3.2536	1.1402	138.0
4.	Q4	2.6594	1.1807	138.0
5.	Q5	2.8768	1.2982	138.0
6.	Q6	2.6449	1.2250	138.0
7.	Q7	2.7899	1.1555	138.0
8.	Q8	3.4275	1.0386	138.0
9.	Q9	2.8986	1.2100	138.0
10.	Q10	2.6377	1.1896	138.0

Statistics for	Mean	Variance	Std Dev	No. of Variables
SCALE	29.4130	64.9157	8.0570	10

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q1	26.3986	53.6283	.5819	.8605
Q2	26.2029	52.0461	.6609	.8541
Q3	26.1594	55.3175	.4892	.8674
Q4	26.7536	53.3111	.5922	.8597
Q5	26.5362	50.9366	.6634	.8537
Q6	26.7681	52.5444	.6121	.8581
Q7	26.6232	53.1416	.6197	.8576
Q8	25.9855	57.3283	.4139	.8721
Q9	26.5145	51.4925	.6887	.8518
Q10	26.7754	53.5477	.5717	.8613

Reliability Coefficients

N of Cases = 138.0 N of Items = 10
Alpha = .8720

One-Sample Kolmogorov-Smirnov Test

		SELFEFF
N		138
Normal Parameters(a,b)	Mean	29.4130
	Std. Deviation	8.05703
Most Extreme Differences	Absolute	.089
	Positive	.089
	Negative	-.041
Kolmogorov-Smirnov Z		1.041
Asymp. Sig. (2-tailed)		.229

a Test distribution is Normal.

b Calculated from data.

DEMOGRAPHIC DATA FOR SOCIAL COGNITIONS STUDY

Participant	q1	q2	q3	q4
1	18.00	3.00	5.00	8.00
2	19.00	4.00	5.00	6.00
3	18.00	8.00	5.00	6.00
4	19.00	4.00	4.00	6.00
5	20.00	8.00	5.00	1.00
6	21.00	5.00	4.00	11.00
7	18.00	1.00	4.00	1.00
8	19.00	8.00	4.00	1.00
9	18.00	8.00	4.00	1.00
10	18.00	1.00	4.00	1.00
11	18.00	8.00	5.00	2.00
12	18.00	1.00	2.00	1.00
13	18.00	3.00	5.00	8.00
14	21.00	1.00	5.00	1.00
15	18.00	1.00	5.00	3.00
16	21.00	1.00	5.00	1.00
17	18.00	8.00	5.00	1.00
18	21.00	8.00	4.00	1.00
19	29.00	8.00	5.00	1.00
20	25.00	8.00	2.00	11.00
21	18.00	3.00	4.00	7.00
22	18.00	1.00	4.00	2.00
23	20.00	1.00	5.00	1.00
24	25.00	1.00	1.00	1.00
25	36.00	1.00	4.00	1.00
26	19.00	6.00	4.00	6.00
27	32.00	1.00	5.00	1.00
28	18.00	1.00	4.00	1.00
29	22.00	8.00	2.00	1.00
30	19.00	8.00	5.00	10.00
31	24.00	8.00	5.00	1.00
32	19.00	8.00	5.00	1.00
33	18.00	3.00	4.00	7.00
34	18.00	1.00	4.00	1.00
35	18.00	1.00	5.00	1.00
36	20.00	1.00	4.00	1.00
37	20.00	3.00	5.00	7.00
38	26.00	1.00	5.00	11.00
39	18.00	4.00	5.00	9.00
40	18.00	3.00	1.00	9.00
41	18.00	4.00	5.00	6.00
42	18.00	3.00	5.00	9.00
43	24.00	1.00	5.00	11.00
44	18.00	1.00	5.00	1.00
45	40.00	8.00	2.00	1.00
46	39.00	8.00	3.00	1.00
47	38.00	8.00	1.00	1.00

48	42.00	1.00	4.00	1.00
49	38.00	8.00	3.00	1.00
50	38.00	1.00	3.00	1.00
51	46.00	1.00	1.00	1.00
52	25.00	2.00	5.00	1.00
53	31.00	8.00	1.00	1.00
54	25.00	1.00	4.00	1.00
55	33.00	8.00	2.00	11.00
56	29.00	1.00	4.00	3.00
57	29.00	3.00	4.00	11.00
58	22.00	8.00	2.00	1.00
59	27.00	1.00	5.00	1.00
60	25.00	8.00	1.00	1.00
61	26.00	8.00	2.00	1.00
62	23.00	1.00	2.00	1.00
63	33.00	2.00	3.00	1.00
64	28.00	1.00	2.00	1.00
65	25.00	8.00	1.00	1.00
66	21.00	8.00	4.00	6.00
67	26.00	8.00	4.00	1.00
68	39.00	8.00	4.00	1.00
69	40.00	8.00	3.00	1.00
70	38.00	1.00	1.00	1.00
71	31.00	8.00	1.00	1.00
72	31.00	8.00	4.00	1.00
73	26.00	8.00	4.00	1.00
74	23.00	1.00	5.00	1.00
75	23.00	4.00	4.00	11.00
76	37.00	2.00	1.00	1.00
77	34.00	8.00	4.00	1.00
78	25.00	8.00	2.00	1.00
79	24.00	8.00	4.00	1.00
80	23.00	1.00	5.00	11.00
81	25.00	1.00	5.00	1.00
82	27.00	8.00	4.00	1.00
83	24.00	8.00	2.00	1.00
84	24.00	8.00	5.00	1.00
85	26.00	8.00	2.00	1.00
86	25.00	1.00	2.00	1.00
87	30.00	1.00	2.00	1.00
88	29.00	1.00	1.00	1.00
89	26.00	8.00	4.00	1.00
90	22.00	3.00	5.00	8.00
91	22.00	8.00	4.00	11.00
92	28.00	8.00	5.00	11.00
93	24.00	8.00	4.00	1.00
94	25.00	8.00	4.00	2.00
95	23.00	1.00	4.00	1.00
96	23.00	1.00	5.00	1.00
97	26.00	1.00	4.00	1.00
98	35.00	8.00	5.00	1.00

99	26.00	8.00	4.00	1.00
100	23.00	1.00	4.00	1.00
101	24.00	8.00	1.00	6.00
102	31.00	8.00	1.00	1.00
103	24.00	8.00	5.00	1.00
104	27.00	1.00	4.00	1.00
105	33.00	1.00	5.00	1.00
106	26.00	1.00	4.00	1.00
107	30.00	8.00	4.00	1.00
108	39.00	1.00	1.00	1.00
109	23.00	1.00	5.00	1.00
110	24.00	1.00	5.00	1.00
111	23.00	8.00	4.00	1.00
112	48.00	1.00	1.00	1.00
113	30.00	8.00	2.00	1.00
114	28.00	1.00	4.00	1.00
115	24.00	1.00	4.00	1.00
116	26.00	3.00	1.00	11.00
117	43.00	1.00	1.00	1.00
118	24.00	1.00	2.00	1.00
119	26.00	8.00	5.00	1.00
120	40.00	8.00	1.00	1.00
121	26.00	2.00	5.00	1.00
122	39.00	1.00	1.00	1.00
123	25.00	8.00	2.00	1.00
124	45.00	1.00	2.00	1.00
125	23.00	1.00	4.00	1.00
126	28.00	8.00	5.00	1.00
127	25.00	2.00	5.00	1.00
128	41.00	8.00	2.00	1.00
129	43.00	8.00	1.00	1.00
130	26.00	8.00	2.00	1.00
131	24.00	4.00	5.00	9.00
132	25.00	8.00	4.00	1.00
133	25.00	7.00	4.00	1.00
134	34.00	1.00	1.00	1.00
135	41.00	1.00	1.00	4.00
136	35.00	1.00	4.00	2.00
137	24.00	1.00	4.00	1.00
138	26.00	3.00	1.00	11.00

RAW SCORES FOR MAIN VARIABLES IN SOCIAL COGNITION STUDY

Pnt	BMI	Wt Perc	Wt Sat	Deter -min	Past Beh	DT	BD	Self -eff	Soc Inf
1	20.00	3.00	4.00	15.00	4.00	11.00	27.00	21.00	15.00
2	24.00	4.00	4.00	13.00	2.00	8.00	17.00	27.00	23.00
3	21.00	4.00	4.00	13.00	3.00	8.00	27.00	12.00	8.00
4	19.00	2.00	4.00	3.00	.00	.00	1.00	38.00	18.00
5	22.00	3.00	3.00	14.00	3.00	5.00	23.00	31.00	11.00
6	19.00	5.00	5.00	12.00	.00	1.00	22.00	26.00	34.00
7	21.00	4.00	3.00	9.00	2.00	.00	12.00	33.00	20.00
8	22.00	3.00	2.00	6.00	.00	2.00	.00	38.00	9.00
9	19.00	3.00	1.00	3.00	.00	.00	3.00	45.00	10.00
10	20.00	4.00	3.00	11.00	2.00	.00	12.00	24.00	20.00
11	25.00	4.00	4.00	14.00	3.00	6.00	19.00	26.00	18.00
12	23.00	3.00	4.00	14.00	3.00	6.00	25.00	20.00	14.00
13	20.00	4.00	3.00	9.00	.00	.00	8.00	39.00	13.00
14	19.00	3.00	2.00	12.00	2.00	2.00	8.00	32.00	13.00
15	20.00	3.00	2.00	6.00	.00	.00	.00	43.00	10.00
16	24.00	4.00	3.00	12.00	3.00	.00	11.00	10.00	20.00
17	19.00	3.00	1.00	9.00	.00	1.00	14.00	31.00	8.00
18	22.00	4.00	4.00	9.00	2.00	.00	8.00	28.00	9.00
19	21.00	4.00	3.00	99.00	2.00	.00	11.00	27.00	15.00
20	21.00	3.00	2.00	6.00	2.00	2.00	.00	30.00	9.00
21	20.00	3.00	2.00	6.00	1.00	.00	3.00	34.00	14.00
22	23.00	4.00	4.00	99.00	2.00	5.00	14.00	34.00	15.00
23	21.00	4.00	5.00	14.00	4.00	13.00	25.00	22.00	12.00
24	21.00	3.00	2.00	99.00	2.00	1.00	8.00	37.00	19.00
25	22.00	3.00	1.00	4.00	.00	.00	7.00	33.00	8.00
26	21.00	4.00	2.00	11.00	2.00	1.00	20.00	26.00	11.00
27	24.00	4.00	4.00	15.00	2.00	7.00	18.00	15.00	15.00
28	21.00	4.00	4.00	13.00	2.00	13.00	18.00	26.00	16.00
29	19.00	4.00	4.00	12.00	3.00	2.00	8.00	12.00	12.00
30	21.00	4.00	3.00	9.00	2.00	1.00	16.00	21.00	15.00
31	19.00	3.00	1.00	3.00	.00	.00	1.00	50.00	8.00
32	20.00	4.00	3.00	14.00	3.00	7.00	18.00	21.00	16.00
33	23.00	4.00	4.00	12.00	2.00	3.00	27.00	24.00	21.00
34	19.00	4.00	4.00	14.00	3.00	4.00	11.00	27.00	17.00
35	19.00	3.00	3.00	9.00	3.00	2.00	14.00	22.00	10.00
36	19.00	3.00	2.00	7.00	1.00	2.00	9.00	26.00	15.00
37	21.00	4.00	2.00	10.00	2.00	.00	7.00	26.00	13.00
38	22.00	3.00	3.00	4.00	.00	1.00	9.00	36.00	20.00
39	23.00	4.00	4.00	12.00	2.00	7.00	26.00	30.00	11.00
40	23.00	4.00	4.00	15.00	2.00	6.00	26.00	23.00	14.00
41	21.00	4.00	2.00	12.00	.00	4.00	19.00	31.00	24.00
42	22.00	3.00	2.00	3.00	.00	.00	14.00	22.00	10.00
43	20.00	4.00	3.00	12.00	2.00	5.00	13.00	34.00	20.00
44	20.00	3.00	2.00	12.00	2.00	5.00	9.00	26.00	20.00
45	23.00	3.00	1.00	9.00	2.00	.00	.00	24.00	20.00
46	20.00	3.00	2.00	3.00	2.00	.00	4.00	25.00	99.00

47	22.00	3.00	1.00	3.00	1.00	.00	2.00	42.00	10.00
48	24.00	3.00	2.00	9.00	.00	.00	3.00	40.00	12.00
49	21.00	3.00	3.00	8.00	.00	1.00	9.00	32.00	17.00
50	20.00	3.00	2.00	9.00	.00	.00	5.00	44.00	8.00
51	24.00	4.00	3.00	11.00	3.00	4.00	6.00	25.00	18.00
52	24.00	4.00	4.00	3.00	4.00	8.00	17.00	23.00	99.00
53	23.00	3.00	3.00	9.00	.00	2.00	1.00	28.00	14.00
54	22.00	3.00	3.00	99.00	2.00	2.00	11.00	24.00	99.00
55	23.00	4.00	4.00	14.00	3.00	5.00	9.00	23.00	20.00
56	23.00	3.00	2.00	3.00	2.00	.00	2.00	41.00	10.00
57	23.00	3.00	3.00	9.00	4.00	16.00	9.00	24.00	16.00
58	22.00	4.00	2.00	11.00	3.00	7.00	9.00	27.00	16.00
59	22.00	3.00	2.00	9.00	1.00	.00	8.00	34.00	16.00
60	22.00	3.00	1.00	4.00	3.00	.00	12.00	23.00	8.00
61	24.00	4.00	3.00	12.00	2.00	.00	11.00	29.00	22.00
62	19.00	4.00	4.00	15.00	3.00	9.00	12.00	30.00	12.00
63	20.00	3.00	2.00	9.00	3.00	6.00	5.00	34.00	99.00
64	24.00	4.00	4.00	11.00	2.00	.00	19.00	17.00	17.00
65	21.00	4.00	2.00	11.00	1.00	.00	9.00	16.00	99.00
66	22.00	4.00	3.00	11.00	1.00	.00	16.00	32.00	14.00
67	24.00	4.00	2.00	12.00	3.00	1.00	5.00	27.00	14.00
68	23.00	4.00	2.00	99.00	.00	.00	8.00	35.00	99.00
69	23.00	4.00	3.00	12.00	3.00	.00	10.00	22.00	16.00
70	25.00	4.00	4.00	14.00	.00	1.00	12.00	18.00	13.00
71	21.00	3.00	2.00	6.00	4.00	6.00	8.00	19.00	14.00
72	21.00	3.00	2.00	3.00	.00	.00	1.00	30.00	12.00
73	22.00	3.00	2.00	12.00	.00	1.00	5.00	29.00	13.00
74	20.00	3.00	3.00	99.00	3.00	3.00	5.00	30.00	19.00
75	21.00	3.00	5.00	99.00	3.00	9.00	17.00	20.00	21.00
76	25.00	4.00	2.00	11.00	3.00	2.00	11.00	25.00	28.00
77	22.00	3.00	2.00	99.00	.00	2.00	3.00	30.00	8.00
78	22.00	3.00	3.00	7.00	.00	.00	10.00	30.00	16.00
79	22.00	3.00	2.00	6.00	2.00	1.00	3.00	47.00	11.00
80	22.00	3.00	4.00	14.00	2.00	6.00	21.00	34.00	99.00
81	20.00	4.00	2.00	12.00	2.00	3.00	14.00	33.00	14.00
82	20.00	3.00	1.00	15.00	4.00	10.00	7.00	19.00	10.00
83	25.00	4.00	5.00	15.00	4.00	10.00	10.00	22.00	15.00
84	23.00	4.00	3.00	10.00	.00	.00	10.00	40.00	15.00
85	25.00	4.00	5.00	99.00	4.00	17.00	24.00	24.00	24.00
86	22.00	3.00	2.00	3.00	.00	1.00	11.00	38.00	20.00
87	21.00	4.00	4.00	15.00	2.00	.00	7.00	29.00	11.00
88	19.00	3.00	1.00	6.00	4.00	4.00	7.00	23.00	99.00
89	19.00	4.00	4.00	15.00	1.00	16.00	19.00	37.00	18.00
90	23.00	4.00	4.00	12.00	2.00	.00	25.00	15.00	16.00
91	20.00	3.00	2.00	6.00	2.00	1.00	9.00	29.00	12.00
92	23.00	3.00	3.00	8.00	.00	.00	4.00	41.00	16.00
93	23.00	3.00	2.00	9.00	2.00	7.00	14.00	38.00	18.00
94	21.00	2.00	4.00	3.00	.00	.00	5.00	42.00	14.00
95	21.00	3.00	2.00	11.00	1.00	1.00	7.00	32.00	19.00
96	24.00	4.00	4.00	15.00	.00	.00	10.00	31.00	26.00
97	22.00	4.00	2.00	13.00	4.00	3.00	8.00	27.00	23.00

98	24.00	4.00	2.00	12.00	.00	.00	99.00	43.00	8.00
99	24.00	4.00	3.00	11.00	3.00	2.00	6.00	31.00	99.00
100	21.00	4.00	4.00	12.00	3.00	9.00	8.00	37.00	23.00
101	19.00	3.00	2.00	11.00	2.00	.00	7.00	31.00	10.00
102	24.00	4.00	4.00	14.00	4.00	.00	26.00	37.00	25.00
103	19.00	3.00	2.00	6.00	.00	.00	3.00	20.00	15.00
104	21.00	4.00	2.00	11.00	2.00	.00	21.00	23.00	21.00
105	19.00	3.00	1.00	3.00	.00	.00	.00	42.00	99.00
106	23.00	4.00	3.00	11.00	2.00	.00	12.00	30.00	22.00
107	19.00	2.00	2.00	6.00	.00	2.00	18.00	24.00	19.00
108	23.00	4.00	4.00	99.00	3.00	14.00	20.00	29.00	20.00
109	20.00	4.00	2.00	6.00	1.00	.00	14.00	22.00	99.00
110	21.00	3.00	1.00	3.00	.00	.00	.00	45.00	99.00
111	19.00	2.00	2.00	3.00	.00	1.00	3.00	27.00	13.00
112	21.00	4.00	4.00	12.00	3.00	1.00	17.00	29.00	14.00
113	22.00	3.00	3.00	10.00	3.00	99.00	6.00	30.00	16.00
114	19.00	3.00	3.00	8.00	3.00	13.00	3.00	30.00	12.00
115	20.00	3.00	1.00	3.00	.00	.00	.00	32.00	16.00
116	24.00	4.00	4.00	15.00	3.00	4.00	16.00	20.00	23.00
117	22.00	4.00	2.00	10.00	3.00	1.00	16.00	27.00	15.00
118	23.00	4.00	2.00	11.00	2.00	3.00	8.00	35.00	13.00
119	21.00	3.00	2.00	9.00	3.00	.00	6.00	47.00	99.00
120	21.00	3.00	1.00	6.00	.00	.00	8.00	50.00	12.00
121	23.00	4.00	2.00	11.00	3.00	1.00	7.00	23.00	16.00
122	23.00	4.00	4.00	13.00	4.00	5.00	14.00	22.00	24.00
123	21.00	4.00	5.00	15.00	4.00	10.00	24.00	19.00	24.00
124	21.00	3.00	1.00	7.00	2.00	1.00	.00	31.00	20.00
125	19.00	4.00	5.00	15.00	2.00	15.00	24.00	27.00	22.00
126	20.00	3.00	2.00	6.00	.00	.00	2.00	39.00	12.00
127	24.00	4.00	3.00	10.00	2.00	.00	9.00	23.00	25.00
128	22.00	3.00	1.00	3.00	1.00	.00	99.00	48.00	99.00
129	24.00	4.00	4.00	9.00	3.00	3.00	8.00	30.00	14.00
130	23.00	3.00	3.00	9.00	2.00	2.00	4.00	38.00	99.00
131	19.00	2.00	2.00	3.00	2.00	.00	3.00	30.00	9.00
132	25.00	4.00	4.00	15.00	3.00	2.00	23.00	27.00	25.00
133	24.00	3.00	2.00	12.00	4.00	.00	8.00	25.00	17.00
134	21.00	2.00	2.00	13.00	2.00	18.00	21.00	14.00	34.00
135	25.00	4.00	4.00	12.00	3.00	2.00	8.00	30.00	14.00
136	25.00	4.00	3.00	14.00	3.00	6.00	11.00	17.00	27.00
137	23.00	4.00	5.00	12.00	2.00	6.00	26.00	28.00	18.00
138	19.00	3.00	2.00	99.00	.00	.00	5.00	34.00	9.00

DESCRIPTIVE STATISTICS ON DEMOGRAPHIC DATA FOR SOCIAL COGNITION STUDY

FREQUENCIES

		AGE	RELIGION	RELATE	ETHNIC
N	Valid	138	138	138	138
Mean		26.5435	4.3768	3.4855	2.7826
Median		25.0000	3.0000	4.0000	1.0000
Std. Deviation		7.32571	3.25151	1.47602	3.36304
Minimum		18.00	1.00	1.00	1.00
Maximum		48.00	8.00	5.00	11.00

FREQUENCY TABLES

Ethnicity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	101	73.2	73.2	73.2
	2.00	4	2.9	2.9	76.1
	3.00	2	1.4	1.4	77.5
	4.00	1	.7	.7	78.3
	6.00	7	5.1	5.1	83.3
	7.00	3	2.2	2.2	85.5
	8.00	3	2.2	2.2	87.7
	9.00	4	2.9	2.9	90.6
	10.00	1	.7	.7	91.3
	11.00	12	8.7	8.7	100.0
	Total	138	100.0	100.0	

Relationship Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	23	16.7	16.7	16.7
	2.00	20	14.5	14.5	31.2
	3.00	5	3.6	3.6	34.8
	4.00	47	34.1	34.1	68.8
	5.00	43	31.2	31.2	100.0
	Total	138	100.0	100.0	

Religion

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	55	39.9	39.9	39.9
	2.00	5	3.6	3.6	43.5
	3.00	11	8.0	8.0	51.4
	4.00	6	4.3	4.3	55.8
	5.00	1	.7	.7	56.5
	6.00	1	.7	.7	57.2
	7.00	1	.7	.7	58.0
	8.00	58	42.0	42.0	100.0
	Total	138	100.0	100.0	

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18.00	21	15.2	15.2	15.2
	19.00	6	4.3	4.3	19.6
	20.00	4	2.9	2.9	22.5
	21.00	5	3.6	3.6	26.1
	22.00	4	2.9	2.9	29.0
	23.00	10	7.2	7.2	36.2
	24.00	13	9.4	9.4	45.7
	25.00	14	10.1	10.1	55.8
	26.00	14	10.1	10.1	65.9
	27.00	3	2.2	2.2	68.1
	28.00	4	2.9	2.9	71.0
	29.00	4	2.9	2.9	73.9
	30.00	3	2.2	2.2	76.1
	31.00	4	2.9	2.9	79.0
	32.00	1	.7	.7	79.7
	33.00	3	2.2	2.2	81.9
	34.00	2	1.4	1.4	83.3
	35.00	2	1.4	1.4	84.8
	36.00	1	.7	.7	85.5
	37.00	1	.7	.7	86.2
	38.00	4	2.9	2.9	89.1
	39.00	4	2.9	2.9	92.0
	40.00	3	2.2	2.2	94.2
	41.00	2	1.4	1.4	95.7
	42.00	1	.7	.7	96.4
	43.00	2	1.4	1.4	97.8
	45.00	1	.7	.7	98.6
	46.00	1	.7	.7	99.3
	48.00	1	.7	.7	100.0
	Total	138	100.0	100.0	

DESCRIPTIVE STATISTICS FOR MAIN VARIABLES IN SOCIAL COGNITION STUDY

FREQUENCIES

	BMI	WT PERC	WT SAT	DETER -MIN	PAST BEH	DT	BD	SELF -EFF	SOC INF
Valid	138	138	138	128	138	137	136	138	123
Missing	0	0	0	10	0	1	2	0	15
Mean	21.65	3.47	2.79	9.66	1.84	3.12	10.97	29.26	15.98
Median	22.00	4.00	3.00	11.00	2.00	1.00	9.00	29.00	15.00
Std. Deviation	1.80	.59	1.12	3.86	1.34	4.27	7.41	8.22	5.41
Minimum	19.00	2.00	1.00	3.00	.00	.00	.00	10.00	8.00
Maximum	25.00	5.00	5.00	15.00	4.00	18.00	27.00	50.00	34.00

FREQUENCY TABLES

Drive for Thinness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	54	39.1	39.4	39.4
	1.00	19	13.8	13.9	53.3
	2.00	15	10.9	10.9	64.2
	3.00	6	4.3	4.4	68.6
	4.00	5	3.6	3.6	72.3
	5.00	6	4.3	4.4	76.6
	6.00	8	5.8	5.8	82.5
	7.00	5	3.6	3.6	86.1
	8.00	3	2.2	2.2	88.3
	9.00	3	2.2	2.2	90.5
	10.00	3	2.2	2.2	92.7
	11.00	1	.7	.7	93.4
	13.00	3	2.2	2.2	95.6
	14.00	1	.7	.7	96.4
	15.00	1	.7	.7	97.1
	16.00	2	1.4	1.5	98.5
	17.00	1	.7	.7	99.3
	18.00	1	.7	.7	100.0
	Total	137	99.3	100.0	
Missing	99.00	1	.7		
Total		138	100.0		

Body Dissatisfaction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	8	5.8	5.9	5.9
	1.00	4	2.9	2.9	8.8
	2.00	3	2.2	2.2	11.0
	3.00	9	6.5	6.6	17.6
	4.00	3	2.2	2.2	19.9
	5.00	7	5.1	5.1	25.0
	6.00	4	2.9	2.9	27.9
	7.00	8	5.8	5.9	33.8
	8.00	15	10.9	11.0	44.9
	9.00	10	7.2	7.4	52.2
	10.00	5	3.6	3.7	55.9
	11.00	8	5.8	5.9	61.8
	12.00	6	4.3	4.4	66.2
	13.00	1	.7	.7	66.9
	14.00	8	5.8	5.9	72.8
	16.00	4	2.9	2.9	75.7
	17.00	4	2.9	2.9	78.7
	18.00	4	2.9	2.9	81.6
	19.00	4	2.9	2.9	84.6
	20.00	2	1.4	1.5	86.0
	21.00	3	2.2	2.2	88.2
	22.00	1	.7	.7	89.0
	23.00	2	1.4	1.5	90.4
	24.00	3	2.2	2.2	92.6
	25.00	3	2.2	2.2	94.9
	26.00	4	2.9	2.9	97.8
	27.00	3	2.2	2.2	100.0
	Total	136	98.6	100.0	
Missing	99.00	2	1.4		
Total		138	100.0		

Body Mass Index

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	19.00	22	15.9	15.9	15.9
	20.00	18	13.0	13.0	29.0
	21.00	28	20.3	20.3	49.3
	22.00	22	15.9	15.9	65.2
	23.00	23	16.7	16.7	81.9
	24.00	17	12.3	12.3	94.2
	25.00	8	5.8	5.8	100.0
	Total	138	100.0	100.0	

Self-Efficacy for Weight Control

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10.00	1	.7	.7	.7
	12.00	2	1.4	1.4	2.2
	14.00	1	.7	.7	2.9
	15.00	2	1.4	1.4	4.3
	16.00	1	.7	.7	5.1
	17.00	2	1.4	1.4	6.5
	18.00	1	.7	.7	7.2
	19.00	3	2.2	2.2	9.4
	20.00	4	2.9	2.9	12.3
	21.00	3	2.2	2.2	14.5
	22.00	7	5.1	5.1	19.6
	23.00	8	5.8	5.8	25.4
	24.00	7	5.1	5.1	30.4
	25.00	4	2.9	2.9	33.3
	26.00	7	5.1	5.1	38.4
	27.00	10	7.2	7.2	45.7
	28.00	3	2.2	2.2	47.8
	29.00	6	4.3	4.3	52.2
	30.00	13	9.4	9.4	61.6
	31.00	7	5.1	5.1	66.7
	32.00	5	3.6	3.6	70.3
	33.00	3	2.2	2.2	72.5
	34.00	7	5.1	5.1	77.5
	35.00	2	1.4	1.4	79.0
	36.00	1	.7	.7	79.7
	37.00	4	2.9	2.9	82.6
	38.00	5	3.6	3.6	86.2
	39.00	2	1.4	1.4	87.7
	40.00	2	1.4	1.4	89.1
	41.00	2	1.4	1.4	90.6
	42.00	3	2.2	2.2	92.8
	43.00	2	1.4	1.4	94.2
	44.00	1	.7	.7	94.9
	45.00	2	1.4	1.4	96.4
	47.00	2	1.4	1.4	97.8
	48.00	1	.7	.7	98.6
	50.00	2	1.4	1.4	100.0
	Total	138	100.0	100.0	

Social Influence

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	8.00	8	5.8	6.5	6.5
	9.00	5	3.6	4.1	10.6
	10.00	8	5.8	6.5	17.1
	11.00	5	3.6	4.1	21.1
	12.00	9	6.5	7.3	28.5
	13.00	7	5.1	5.7	34.1
	14.00	12	8.7	9.8	43.9
	15.00	10	7.2	8.1	52.0
	16.00	12	8.7	9.8	61.8
	17.00	4	2.9	3.3	65.0
	18.00	6	4.3	4.9	69.9
	19.00	4	2.9	3.3	73.2
	20.00	11	8.0	8.9	82.1
	21.00	3	2.2	2.4	84.6
	22.00	3	2.2	2.4	87.0
	23.00	4	2.9	3.3	90.2
	24.00	4	2.9	3.3	93.5
	25.00	3	2.2	2.4	95.9
	26.00	1	.7	.8	96.7
	27.00	1	.7	.8	97.6
	28.00	1	.7	.8	98.4
	34.00	2	1.4	1.6	100.0
	Total	123	89.1	100.0	
Missing	99.00	15	10.9		
Total		138	100.0		

Past Weight Loss Behaviour

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	37	26.8	26.8	26.8
	1.00	10	7.2	7.2	34.1
	2.00	43	31.2	31.2	65.2
	3.00	34	24.6	24.6	89.9
	4.00	14	10.1	10.1	100.0
	Total	138	100.0	100.0	

Weight Perceptions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	6	4.3	4.3	4.3
	3.00	62	44.9	44.9	49.3
	4.00	69	50.0	50.0	99.3
	5.00	1	.7	.7	100.0
	Total	138	100.0	100.0	

Weight Satisfaction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	15	10.9	10.9	10.9
	2.00	50	36.2	36.2	47.1
	3.00	30	21.7	21.7	68.8
	4.00	35	25.4	25.4	94.2
	5.00	8	5.8	5.8	100.0
	Total	138	100.0	100.0	

Determination to Lose Weight

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3.00	18	13.0	14.1	14.1
	4.00	3	2.2	2.3	16.4
	6.00	13	9.4	10.2	26.6
	7.00	3	2.2	2.3	28.9
	8.00	3	2.2	2.3	31.3
	9.00	17	12.3	13.3	44.5
	10.00	5	3.6	3.9	48.4
	11.00	15	10.9	11.7	60.2
	12.00	21	15.2	16.4	76.6
	13.00	6	4.3	4.7	81.3
	14.00	11	8.0	8.6	89.8
	15.00	13	9.4	10.2	100.0
	Total	128	92.8	100.0	
Missing	99.00	10	7.2		
Total		138	100.0		

COMPARISONS OF BODY DISSATISFACTION AND DRIVE FOR THINNESS SCORES WITH THOSE OF GARNER'S (1991) FEMALE COLLEGE GROUP

Body Dissatisfaction

$$Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{N}} = \frac{12.2 - 10.97}{8.3/\sqrt{136}} = 5.06, \quad p < .0001$$

Drive for Thinness

$$Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{N}} = \frac{5.5 - 3.12}{5.5/\sqrt{137}} = 1.56, \quad p = .0594 \text{ (n.s.)}$$

Casewise Diagnostics

Case No.	Std. Residual	DETERMIN	Predicted Value	Residual
22	-3.708	3.00	11.4888	-8.4888

a Dependent Variable: DETERMIN

MULTIPLE REGRESSION EXCLUDING CASE NUMBER 22

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	SELFEFF, SOCINF, DT[a]	.	Enter
2	WTPERC	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
3	BD	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
4	PASTBEH	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a All requested variables entered.
b Dependent Variable: DETERMIN

Model Summary (Part 1)[e]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.651[a]	.424	.408	2.88134
2	.812[b]	.659	.647	2.22670
3	.823[c]	.677	.661	2.17940
4	.831[d]	.691	.673	2.14111

a Predictors: (Constant), SELFEFF, SOCINF, DT
b Predictors: (Constant), SELFEFF, SOCINF, DT, WTPERC
c Predictors: (Constant), SELFEFF, SOCINF, DT, WTPERC, BD
d Predictors: (Constant), SELFEFF, SOCINF, DT, WTPERC, BD, PASTBEH
e Dependent Variable: DETERMIN

Model Summary (Part 2)

Change Statistics				
R Square Change	F Change	df1	df2	Sig. F Change
.424	26.514	3	108	.000
.235	73.838	1	107	.000
.017	5.694	1	106	.019
.014	4.825	1	105	.030

ANOVA[e]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	660.364	3	220.121	26.514	.000[a]
	Residual	896.627	108	8.302		
	Total	1556.991	111			
2	Regression	1026.466	4	256.617	51.756	.000[b]
	Residual	530.525	107	4.958		
	Total	1556.991	111			
3	Regression	1053.512	5	210.702	44.360	.000[c]
	Residual	503.479	106	4.750		
	Total	1556.991	111			
4	Regression	1075.633	6	179.272	39.105	.000[d]
	Residual	481.358	105	4.584		
	Total	1556.991	111			

a Predictors: (Constant), SELFEFF, SOCINF, DT
b Predictors: (Constant), SELFEFF, SOCINF, DT, WTPERC
c Predictors: (Constant), SELFEFF, SOCINF, DT, WTPERC, BD
d Predictors: (Constant), SELFEFF, SOCINF, DT, WTPERC, BD, PASTBEH
e Dependent Variable: DETERMIN

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.868	1.543		7.042	.000
	DT	.297	.069	.334	4.313	.000
	SOCINF	.166	.053	.240	3.136	.002
	SELFEFF	-.154	.036	-.333	-4.230	.000
2	(Constant)	-.545	1.785		-.305	.761
	DT	.301	.053	.339	5.652	.000
	SOCINF	.068	.042	.098	1.603	.112
	SELFEFF	-.095	.029	-.205	-3.270	.001
	WTPERC	3.225	.375	.530	8.593	.000
3	(Constant)	-.559	1.747		-.320	.750
	DT	.255	.056	.287	4.594	.000
	SOCINF	.056	.042	.081	1.346	.181
	SELFEFF	-.076	.030	-.164	-2.574	.011
	WTPERC	2.890	.393	.475	7.350	.000
	BD	.086	.036	.172	2.386	.019
4	(Constant)	-1.245	1.745		-.713	.477
	DT	.206	.059	.232	3.489	.001
	SOCINF	.065	.041	.094	1.574	.118
	SELFEFF	-.048	.032	-.103	-1.511	.134
	WTPERC	2.611	.407	.429	6.417	.000
	BD	.091	.035	.184	2.579	.011
	PASTBEH	.444	.202	.159	2.197	.030

a Dependent Variable: DETERMIN

Excluded Variables[e]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	WTPERC	.530[a]	8.593	.000	.639	.838
	WTSAT	.368[a]	4.797	.000	.421	.753
	BD	.362[a]	4.385	.000	.390	.669
	BMI	.219[a]	2.901	.005	.270	.876
	PASTBEH	.321[a]	3.675	.000	.335	.628
2	WTSAT	.137[b]	1.888	.062	.180	.589
	BD	.172[b]	2.386	.019	.226	.584
	BMI	.078[b]	1.235	.219	.119	.805
	PASTBEH	.145[b]	1.967	.052	.188	.568
3	WTSAT	.094[c]	1.244	.216	.121	.535
	BMI	.083[c]	1.351	.180	.131	.804
	PASTBEH	.159[c]	2.197	.030	.210	.565
4	WTSAT	.103(d)	1.393	.167	.135	.533
	BMI	.058(d)	.932	.354	.091	.769

a Predictors in the Model: (Constant), SELFEFF, SOCINF, DT

b Predictors in the Model: (Constant), SELFEFF, SOCINF, DT, WTPERC

c Predictors in the Model: (Constant), SELFEFF, SOCINF, DT, WTPERC, BD

d Predictors in the Model: (Constant), SELFEFF, SOCINF, DT, WTPERC, BD, PASTBEH

e Dependent Variable: DETERMIN

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.3288	15.8672	10.0089	3.11294	112
Residual	-4.4568	5.2970	.0000	2.08244	112
Std. Pred. Value	-2.146	1.882	.000	1.000	112
Std. Residual	-2.082	2.474	.000	.973	112

a Dependent Variable: DETERMIN

POST HOC PEARSON CORRELATIONS FOR SOCIAL COGNITION STUDY

		BMI	WT PERC	DETER -MIN	PAST BEH	DT	BD	SELF -EFF
BMI	Corr[a]	1	.396	.312	.256	.028	.205	-.159
	Sig[a].	.	.000	.000	.002	.742	.017	.063
	N	138	138	127	138	137	136	138
WT PERC	Corr[a]	.396	1	.625	.334	.140	.472	-.315
	Sig[a].	.000	.	.000	.000	.102	.000	.000
	N	138	138	127	138	137	136	138
DETER -MIN	Corr[a]	.312	.625	1	.497	.464	.608	-.460
	Sig[a].	.000	.000	.	.000	.000	.000	.000
	N	127	127	127	127	126	125	127
PAST BEH	Corr[a]	.256	.334	.497	1	.493	.370	-.494
	Sig[a].	.002	.000	.000	.	.000	.000	.000
	N	138	138	127	138	137	136	138
DT	Corr[a]	.028	.140	.464	.493	1	.479	-.315
	Sig[a].	.742	.102	.000	.000	.	.000	.000
	N	137	137	126	137	137	135	137
BD	Corr[a]	.205	.472	.608	.370	.479	1	-.463
	Sig[a].	.017	.000	.000	.000	.000	.	.000
	N	136	136	125	136	135	136	136
SELF -EFF	Corr[a]	-.159	-.315	-.460	-.494	-.315	-.463	1
	Sig[a].	.063	.000	.000	.000	.000	.000	.
	N	138	138	127	138	137	136	138

a All probabilities are two-tailed

APPENDIX B

Material Relating to the Pilot Study Reported in Chapter 4

CITY UNIVERSITY

Department of Psychology

Generalised Self-Efficacy and Cognitive Stress Appraisals

Information Sheet (Pilot Study)

This pilot study is part of an investigation designed to explore the extent to which individuals' confidence that they can respond to and control the environmental demands and challenges of their daily lives (Generalised Self-Efficacy - GSE) affects the way they feel in response to their performance on a series of tasks.

People taking part in the pilot study are being asked, after a small number of practice items, to complete six sets of 15 computer-based anagrams and three sets of 15 pen-and-paper questions drawn from reasoning tests. They are given their score at the end of each set of tasks. After the first set of tasks, they are asked to fill in a short questionnaire to assess how confident they feel about doing the next set.

There are three aims of the pilot study:-

1. To check the level of difficulty of each of the anagrams and intelligence test tasks, so that they can be put together for the main study in such a way that items increase in difficulty within each set of 15.

2. To check that people can readily understand what they are required to do in each part of the study.

3. To find out what the various requirements of the study feel like for those taking part.

If you were to agree to participate in this study, you would be required give your written consent on the attached form. **This form would not be used for any other purpose and would not be connected with either your test results or your questionnaire responses.** A code number would be attached to your test results and to each questionnaire so that I would know which go together, **but no-one other than myself would be able to connect this number to you.**

You would be free to withdraw from the study at any time without having to give a reason.

Payment for participation in the pilot study is £10.

Frances Stanton, Lecturer in Psychology

CITY UNIVERSITY

Department of Psychology

Generalised Self-Efficacy and Cognitive Stress Appraisals

Informed Consent Signature Sheet (Pilot Study)

I acknowledge that I have read and understood the description of the investigation and give my consent to take part in the study. I understand that my name will be held separately from my responses to the study and that only the researcher will be able to connect me personally with my test results and questionnaire responses. I am aware that I may withdraw from the study at any time without giving a reason.

Name (please print) _____

Signature _____

Date _____

CITY UNIVERSITY

Department of Psychology

Generalised Self-Efficacy and Cognitive Stress Appraisals

Debriefing Sheet (Pilot Study)

As you were informed in advance of the study, this investigation is designed to explore the extent to which individuals' confidence that they can respond to and control the environmental demands and challenges of their daily lives (Generalised Self-Efficacy - GSE) affects the way they feel in response to their performance on a series of tasks. The study is very similar to one that was carried out in Germany about 10 years ago exploring the effects of repeated failure on cognitive stress appraisals (CSAs). CSAs are appraisals people make about their likely performance on an impending task and are divided into three types: challenge (where the person feels confident about their ability to meet the demands of the task), threat (where there is some doubt about this) and loss of control (where the person is almost certain they will fail at the task).

The German study found differences in the effects of repeated failure in those with high GSE compared to those with low GSE. Specifically, those with high GSE began the study with high levels of challenge and low levels of both threat and loss of control and, across the nine sets of tasks, showed a reduction in challenge appraisals but no significant increases in either threat or loss of control. For those with low GSE, however, challenge appraisals were weaker at the start of the study than those with high GSE, and appraisals of threat and loss of control were stronger. Over the course of the study, challenge appraisals became very weak in this group and those for threat and loss of control became much stronger. Since threat and loss of control appraisals are associated with lower levels of persistence with tasks, these are findings which could be of use in relation to a range of 'tasks', including behaviours related to the promotion of health.

I am hoping to reproduce these findings in the study which will follow this pilot. If I succeed, then I will carry out another investigation to see if the same results are found if tests are carried out weekly. If so, then I am going to see if the same kinds of changes in CSAs can be found in people trying to carry out particular health behaviours, such as trying to lose weight or reduce (or give up) smoking or drinking. Should the same pattern of appraisals be found in those with high and low GSE, then this information will be of use to health promoters, since they will be able to design interventions for those low in GSE aimed at helping them deal with their reactions to the setbacks inevitably associated with changing ingrained behaviours.

Thank you very much for your help.

Frances Stanton

JERUSALEM & SCHWARZER'S GERMAN CSA QUESTIONNAIRE & THE ORIGINAL ENGLISH TRANSLATION

HERAUSFORDERUNG: $\alpha = .78$ (Challenge)

Wenn die Aufgaben schweiriger werden, fühle ich mich so richtig herausgefordert
It's really challenging when the tasks get more difficult

Wenn ich mich anstrenge, kann ich die nächsten Aufgaben besser lösen
When I try hard, I can solve the next tasks better

Ich bin schon gespannt, wie ich mit den nächsten Aufgaben zurchtkomme
I am already curious about how I will manage the next tasks

Ich bin jetzt richtig motiviert, noch bessere Leistungen zu Erzielen
Now I feel challenged to perform better

BEDROHUNG: $\alpha = .81$ (Threat)

Ich fürchte, dass ich den nächsten Aufgaben nicht mehr gewachsen bin
I am afraid of not being equal to the next tasks

Ich zweifle an meiner Fähigkeit
I have doubts about my abilities

Die nächsten Aufgaben werden wohl zu schwierig für mich sein
I guess the following tasks are too difficult for me.

Verlust: $\alpha = .83$ (Loss)

Ich fühle mich jetzt entmutigt und niedergeschlagen
I feel discouraged and depressed now

Es lohnt sich gar nicht, dass ich mich noch weiter anstrenge
It's not worthwhile trying hard any longer

Bald ist der Punkt erreicht, an dem ich resigniere
I am about to give up

Wenn das so weitergeht, fühle ich mich überfordert
Demands are overtaxing me soon

Jerusalem & Schwarzer (1992) described the response format of the questionnaire as covering a four-point scale ranging from "not at all" to "a great deal". However, literal translations of the original German response options were :-

- don't agree at all
- scarcely/hardly agree
- somewhat agree
- agree exactly

These responses were close to the more commonly used ones given below and it was decided to use these instead:-

- strongly disagree
- disagree
- agree
- strongly agree

APPRAISAL QUESTIONNAIRE

Please circle the most appropriate response to each of the questions below, using the following key:-

SA	=	**Strongly Agree**
A	=	**Agree**
D	=	**Disagree**
SD	=	**Strongly Disagree**

---

1. I'm curious to see how I'll cope with the next set of problems.	SA	A	D	SD
2. I suspect that the next set of problems will be too hard for me.	SA	A	D	SD
3. I can't cope with much more of this.	SA	A	D	SD
4. I'll be more able to solve the next set of problems if I make a real effort.	SA	A	D	SD
5. I feel discouraged and depressed now.	SA	A	D	SD
6. I doubt my ability.	SA	A	D	SD
7. I feel more fully challenged as the problems get more difficult.	SA	A	D	SD
8. I'm very nearly at the point of giving up.	SA	A	D	SD
9. I'm worried that I won't be able to do the next set of problems.	SA	A	D	SD
10. There's no point in trying any more.	SA	A	D	SD
11. I'm really motivated to do better now.	SA	A	D	SD

NUMBER OF PARTICIPANTS REQUIRED FOR RELIABILITY ANALYSIS OF THE CSAQ

Using Kraemer & Thiemann (1987), p55 and Table 106:-

$\Delta = (p - p_0) / (1 - pp_0)$
$n = v = 2$

It was decided to recruit the number of participants needed in order to detect a difference between a sample drawn from a population where the underlying correlation is .9 and a sample drawn from one where it is .7, with 80% power. In this case:-

$\Delta = (.9 - .7) / 1 - (.9 \times .7) = .54$

Using the table, for $\Delta = .55$ and 80% power at 5% significance, one-tailed, $v = 17$

Therefore the number of participants required to conduct an effective reliability analysis on the scale, given the above parameters, is 19.

RAW SCORES FOR PILOT STUDY RELIABILITY ANALYSIS OF CSAQ

Challenge Subscale

Participant	C1 (q1)	C2 (q4)	C3 (q7)	C4 (q11)
1	4.00	2.00	2.00	3.00
2	2.00	2.00	1.00	2.00
3	3.00	3.00	2.00	3.00
4	2.00	2.00	2.00	1.00
5	4.00	2.00	3.00	2.00
6	2.00	2.00	3.00	2.00
7	4.00	2.00	3.00	3.00
8	4.00	3.00	3.00	3.00
9	2.00	2.00	1.00	1.00
10	4.00	3.00	4.00	3.00
11	4.00	1.00	4.00	2.00
12	3.00	2.00	3.00	3.00
13	2.00	2.00	2.00	2.00
14	3.00	2.00	3.00	3.00
15	3.00	2.00	3.00	3.00
16	2.00	1.00	1.00	1.00
17	2.00	2.00	3.00	2.00
18	4.00	3.00	4.00	3.00
19	3.00	2.00	2.00	2.00

Threat Subscale

Participant	T1 (q2)	T2 (6)	T3 (q9)
1	4.00	4.00	3.00
2	4.00	1.00	1.00
3	2.00	2.00	2.00
4	3.00	3.00	2.00
5	3.00	3.00	2.00
6	4.00	3.00	3.00
7	4.00	3.00	3.00
8	3.00	2.00	2.00
9	2.00	2.00	2.00
10	3.00	2.00	2.00
11	3.00	1.00	1.00
12	4.00	2.00	3.00
13	4.00	3.00	4.00
14	3.00	2.00	1.00
15	3.00	3.00	2.00
16	4.00	2.00	1.00
17	3.00	3.00	3.00
18	3.00	3.00	3.00
19	3.00	3.00	2.00

Loss Subscale

Participant	L1 (q3)	L2 (q5)	L3 (q8)	L4 (q10)
1	2.00	3.00	2.00	1.00
2	1.00	1.00	1.00	2.00
3	1.00	2.00	1.00	1.00
4	3.00	3.00	2.00	3.00
5	1.00	2.00	2.00	1.00
6	1.00	1.00	3.00	3.00
7	2.00	2.00	2.00	2.00
8	2.00	2.00	1.00	2.00
9	2.00	2.00	1.00	1.00
10	2.00	3.00	2.00	2.00
11	1.00	1.00	1.00	1.00
12	2.00	2.00	2.00	1.00
13	2.00	3.00	2.00	2.00
14	1.00	1.00	1.00	1.00
15	2.00	2.00	2.00	1.00
16	2.00	2.00	1.00	3.00
17	2.00	3.00	2.00	2.00
18	2.00	3.00	2.00	2.00
19	2.00	3.00	2.00	2.00

CHALLENGE SUBSCALE

		Mean	Std Dev	Cases
1.	C1	3.0000	.8819	19.0
2.	C2	2.1053	.5671	19.0
3.	C3	2.5789	.9612	19.0
4.	C4	2.3158	.7493	19.0

Statistics for	Mean	Variance	Std Dev	No. of Variables
SCALE	10.0000	6.5556	2.5604	4

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
C1	7.0000	3.4444	.7128	.7131
C2	7.8947	5.0994	.4429	.8343
C3	7.4211	3.3684	.6414	.7604
C4	7.6842	3.7836	.7584	.6978

Reliability Coefficients

N of Cases = 19.0 N of Items = 4
Alpha = .8076

Threat Subscale

		Mean	Std Dev	Cases
1.	T1	3.2632	.6534	19.0
2.	T2	2.4737	.7723	19.0
3.	T3	2.2105	.8550	19.0

Statistics for	Mean	Variance	Std Dev	No. of Variables
SCALE	7.9474	3.1637	1.7787	3

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
T1	4.6842	2.2281	.2608	.8084
T2	5.4737	1.4854	.5747	.4409
T3	5.7368	1.2047	.6543	.3010

Reliability Coefficients

N of Cases = 19.0 N of Items = 3
Alpha = .6682

LOSS SUBSCALE

		Mean	Std Dev	Cases
1.	L1	1.7368	.5620	19.0
2.	L2	2.1579	.7647	19.0
3.	L3	1.6842	.5824	19.0
4.	L4	1.7368	.7335	19.0

Statistics for	Mean	Variance	Std Dev	No. of Variables
SCALE	7.3158	3.6725	1.9164	4

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
L1	5.5789	2.2573	.6511	.5285
L2	5.1579	1.9181	.5522	.5671
L3	5.6316	2.5789	.4033	.6633
L4	5.5789	2.3684	.3393	.7148

Reliability Coefficients

N of Cases = 19.0 N of Items = 4
Alpha = .6879

First Anagram Sets

Set 1	
Anagram	**Solution(s)**
LAFUMUS	FAMULUS
TIEPY	PIETY
DENCIEO	CODEINE
ELYECH	LYCHEE
NGRACOE	ACROGEN
IALRNGIV	VIRGINAL
ITUNSETANEONSAN	INSTANTANEOUS
ERVAG	GRAVE
EGLNBDEI	BLEEDING
RHIASV	RAVISH
OTEERMESH	THREESOME
RAEQSU	SQUARE
DUIDRASNO	DIANDROUS
USLUPUROSC	SCRUPULOUS
SNOENNES	NONSENSE

Set 2	
Anagram	**Solution(s)**
ANMIDRNA	MANDARIN
RBIFE	FIBRE, BRIEF
IEMOSCUSRM	COMMISSURE
NTUANRDEA	REDUNDANT
HSIBLSTDIESA	DISESTABLISH
OTCTCAA	TOCCATA
WNONAT	WANTON
OFSEHOLD	SELFHOOD
MIRIIUD	IRIDIUM
EATHSTL	STEALTH
NUGEG	GUNGE
TELBOA	OBLATE
OHUBROG	BOROUGH
CHIASTIOR	AHISTORIC
ETARPTL	PLATTER

First Anagram Sets (Cont'd)

Set 3	
Anagram	**Solution(s)**
LKAYF	FLAKY
LTETBRI	BRITTLE
MMUAOS	OMASUM
OTRARTC	TRACTOR
ROVEME	REMOVE
TNMAELAR	MATERNAL, ALTERMAN
NJLEIG	JINGLE
RHEMTTIHAPAE	AMPHITHEATRE
UROEQCN	CONQUER
ONOLGPY	POLYGON
STENEETLTM	SETTLEMENT
LOYLD	DOLLY
ERHAM	HAREM
OETISDR	STORIED, STEROID
WLEKEY	WEEKLY

Set 4	
Anagram	**Solution(s)**
LOECBR	CORBEL
CSPPOAAROU	APOCARPOUS
ETTBRU	BUTTER
NGODRO	DRONGO
THSSIYL	STLYISH
LFOIO	FOLIO
OALHS	SHOAL
MREYR	MERRY
FLULEHP	HELPFUL
NGAORAZ	ORGANZA
CTAIRHBR	TRIBRACH
ORWPLEFU	POWERFUL
KHADARD	KHADDAR
TRLECIE	RETICLE
ESHWOMELO	WHOLESOME

First Anagram Sets (Cont'd)

SET 5	
Anagram	**Solution(s)**
EETRA	EATER
FRALI	FRAIL, FLAIR
SUEPR	SUPER, PURSE, SPRUE
IIRNAARP	RIPARIAN
LACNTA	CANTAL
REDOHL	HOLDER
GAHROVEN	OVERHANG, HANGOVER
IADLFY	LADIFY
LNAVSY	SYLVAN
SELNRMTI	MINSTREL
ODWCAR	COWARD
DWKOCHUCO	WOODCHUCK
PDERIC	PRICED
UTMLUUTSUO	TUMULTUOUS
NCANESADT	ASCENDANT

SET 6	
Anagram	**Solution(s)**
GHMPNOOAR	MONOGRAPH, NOMOGRAPH
SWEVER	SWERVE
LRESCYAINTL	CRYSTALLINE
NUROD	ROUND
AEEMTVRN	AVERMENT
BRELAUGANU	UNARGUABLE
HRCARAT	CATARRH
ELCHA	LEACH
ESPLERE	SLEEPER
SMTIUEER	EMERITUS
HEOUS	HOUSE
OFPOR	PROOF
WEBFLOUR	FURBELOW
ANOMEY	YEOMAN
NSAPY	PANSY

SET 1	
Anagram	**Solution(s)**
YETH	THEY
ENON	NONE, NEON
WAYN	YAWN
ROODN	DONOR, RONDO
OEYNV	ENVOY
PXOLH	PHLOX
LAEEND	LEADEN, LEANED
RPPIKE	KIPPER
BEARBT	RABBET
GBIECER	ICEBERG
LEOPAMY	MAYPOLE
FTAELRO	REFLOAT, FLOATER
NIOTINCA	INACTION
BHUSICIS	HIBISCUS
AGOROLMG	LOGOGRAM

SET 2	
Anagram	**Solution(s)**
MENO	OMEN
CEAP	PACE, CAPE
OOTH	HOOT
CTHEF	FETCH
ABBLE	BABEL
LZYTO	ZLOTY
SEAPIR	PRAISE, ASPIRE
RGIELB	GERBIL
NIKCUP	UNPICK
OBRGLBE	GOBBLER
ENFOUTR	FORTUNE
HTNIXCA	XANTHIC
RNAHDBIS	BRANDISH
NRALYGIG	GRAYLING
EDIURGME	DEMIURGE

Revised Anagram Sets (Cont'd)

SET 3	
Anagram	**Solution(s)**
TSAB	STAB
YNAZ	ZANY
YOPC	COPY
HKTEC	KETCH
FAFIX	AFFIX
IGNJO	JINGO
ACMCAO	MACACO
RXLEFO	FLEXOR
NECVIE	EVINCE
NKOBELB	KNOBBLE
ATANCAR	NACARAT
KACASJS	JACKASS
ETULTAAB	TABULATE
AISOPDHL	SHIPLOAD
YDPOASHR	RHAPSODY

SET 4	
Anagram	**Solution(s)**
ABDE	ABED, BEAD, BADE
EKLA	KALE, LAKE, LEAK
YNLI	INLY
OIESR	OSIER
RNEUI	INURE, URINE
AGLBE	GABLE, BAGEL
BNAAAC	CABANA
NOAGQU	QUANGO
ABETEN	BEATEN
EATEWRH	WEATHER, WREATHE
TAVEIGN	VINTAGE
ATEBKLN	BLANKET
ECNALLGO	COLLAGEN
BOUERTAD	OBDURATE
AEIHSMPS	MISSHAPE, EMPHASIS

Revised Anagram Sets (Cont'd)

SET 5	
Anagram	**Solution(s)**
LEES	ELSE, EELS
DTIN	DINT
PAEJ	JAPE
ERIRT	TRIER
EAUGV	VAGUE
LDIYE	YIELD
GYETZO	ZYGOTE
EWADLD	WADDLE
BILEHA	HABILE
MOEAHLR	ARMHOLE
BHBSTAA	SABBATH
ESBTRDA	DABSTER
OREAHENP	EARPHONE
NITOSMPE	NEPOTISM
KYAUALRM	YARMULKA

SET 6	
Anagram	**Solution(s)**
CEAF	FACE
GUYL	UGLY
NAYG	YANG
ELBLA	LABEL
UEDUN	UNDUE
QCAUK	QUACK
ANSAAN	ANANAS
ELVITN	VENTIL
OENCJU	JOUNCE
GNETHIL	LIGHTEN
UEENLYQ	QUEENLY
WTBKAIH	HAWKBIT
HCAPNERO	CHAPERON
SNWIELIS	WILINESS
AXCYRLOP	XYLOCARP

DATA AND ANALYSES RELATING TO PILOT STUDY ANAGRAMS

FREQUENCIES PER ANAGRAM

Practice Anagram1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	right	16	100.0	100.0	100.0

Practice Anagram2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	wrong	1	6.3	6.3	6.3
	right	15	93.8	93.8	100.0
	Total	16	100.0	100.0	

Practice Anagram3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	wrong	4	25.0	25.0	25.0
	right	12	75.0	75.0	100.0
	Total	16	100.0	100.0	

Practice Anagram4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	right	16	100.0	100.0	100.0

Practice Anagram5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	right	16	100.0	100.0	100.0

Set1 Anagram1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	6.3	6.3	6.3
	right	15	93.8	93.8	100.0
	Total	16	100.0	100.0	

Set1 Anagram2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	right	16	100.0	100.0	100.0

Set1 Anagram3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	6.3	6.3	6.3
	wrong	3	18.8	18.8	25.0
	right	12	75.0	75.0	100.0
	Total	16	100.0	100.0	

Set1 Anagram4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	10	62.5	62.5	62.5
	wrong	1	6.3	6.3	68.8
	right	5	31.3	31.3	100.0
	Total	16	100.0	100.0	

Set1 Anagram5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	12	75.0	75.0	75.0
	wrong	2	12.5	12.5	87.5
	right	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Set1 Anagram6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	5	31.3	31.3	31.3
	wrong	4	25.0	25.0	56.3
	right	7	43.8	43.8	100.0
	Total	16	100.0	100.0	

Set1 Anagram7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	13	81.3	81.3	81.3
	wrong	2	12.5	12.5	93.8
	right	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set1 Anagram8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	7	43.8	43.8	43.8
	wrong	2	12.5	12.5	56.3
	right	7	43.8	43.8	100.0
	Total	16	100.0	100.0	

Set1 Anagram9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	13	81.3	81.3	81.3
	wrong	3	18.8	18.8	100.0
	Total	16	100.0	100.0	

Set1 Anagram10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	13	81.3	81.3	81.3
	wrong	3	18.8	18.8	100.0
	Total	16	100.0	100.0	

Set1 Anagram11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	15	93.8	93.8	93.8
	wrong	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set1 Anagram12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	12	75.0	75.0	75.0
	wrong	3	18.8	18.8	93.8
	right	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set1 Anagram13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	8	50.0	50.0	50.0
	wrong	6	37.5	37.5	87.5
	right	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Set1 Anagram14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	10	62.5	62.5	62.5
	wrong	2	12.5	12.5	75.0
	right	4	25.0	25.0	100.0
	Total	16	100.0	100.0	

Set1 Anagram15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	15	93.8	93.8	93.8
	wrong	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set2 Anagram1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	3	18.8	18.8	18.8
	wrong	4	25.0	25.0	43.8
	right	9	56.3	56.3	100.0
	Total	16	100.0	100.0	

Set2 Anagram2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	6.3	6.3	6.3
	wrong	1	6.3	6.3	12.5
	right	14	87.5	87.5	100.0
	Total	16	100.0	100.0	

Set2 Anagram3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	right	16	100.0	100.0	100.0

Set2 Anagram4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	wrong	3	18.8	18.8	18.8
	right	13	81.3	81.3	100.0
	Total	16	100.0	100.0	

Set2 Anagram5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	6	37.5	37.5	37.5
	wrong	9	56.3	56.3	93.8
	right	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set2 Anagram6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	68.8	68.8	68.8
	wrong	3	18.8	18.8	87.5
	right	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Set2 Anagram7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	5	31.3	31.3	31.3
	wrong	6	37.5	37.5	68.8
	right	5	31.3	31.3	100.0
	Total	16	100.0	100.0	

Set2 Anagram8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	68.8	68.8	68.8
	wrong	4	25.0	25.0	93.8
	right	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set2 Anagram9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	8	50.0	50.0	50.0
	wrong	6	37.5	37.5	87.5
	right	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Set2 Anagram10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	10	62.5	62.5	62.5
	wrong	4	25.0	25.0	87.5
	right	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Set2 Anagram11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	9	56.3	56.3	56.3
	wrong	5	31.3	31.3	87.5
	right	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Set2 Anagram12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	14	87.5	87.5	87.5
	wrong	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Set2 Anagram13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	68.8	68.8	68.8
	wrong	2	12.5	12.5	81.3
	right	3	18.8	18.8	100.0
	Total	16	100.0	100.0	

Set2 Anagram14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	68.8	68.8	68.8
	wrong	4	25.0	25.0	93.8
	right	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set2 Anagram15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	68.8	68.8	68.8
	wrong	5	31.3	31.3	100.0
	Total	16	100.0	100.0	

Set3 Anagram1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	6.3	6.3	6.3
	wrong	5	31.3	31.3	37.5
	right	10	62.5	62.5	100.0
	Total	16	100.0	100.0	

Set3 Anagram2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	2	12.5	12.5	12.5
	wrong	2	12.5	12.5	25.0
	right	12	75.0	75.0	100.0
	Total	16	100.0	100.0	

Set3 Anagram3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	right	16	100.0	100.0	100.0

Set3 Anagram4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	8	50.0	50.0	50.0
	wrong	4	25.0	25.0	75.0
	right	4	25.0	25.0	100.0
	Total	16	100.0	100.0	

Set3 Anagram5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	2	12.5	12.5	12.5
	wrong	2	12.5	12.5	25.0
	right	12	75.0	75.0	100.0
	Total	16	100.0	100.0	

Set3 Anagram6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	6	37.5	37.5	37.5
	wrong	6	37.5	37.5	75.0
	right	4	25.0	25.0	100.0
	Total	16	100.0	100.0	

Set3 Anagram7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	6	37.5	37.5	37.5
	wrong	10	62.5	62.5	100.0
	Total	16	100.0	100.0	

Set3 Anagram8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	4	25.0	25.0	25.0
	wrong	9	56.3	56.3	81.3
	right	3	18.8	18.8	100.0
	Total	16	100.0	100.0	

Set3 Anagram9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	10	62.5	62.5	62.5
	wrong	5	31.3	31.3	93.8
	right	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set3 Anagram10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	68.8	68.8	68.8
	wrong	3	18.8	18.8	87.5
	right	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Set3 Anagram11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	7	43.8	43.8	43.8
	wrong	9	56.3	56.3	100.0
	Total	16	100.0	100.0	

Set3 Anagram12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	9	56.3	56.3	56.3
	wrong	2	12.5	12.5	68.8
	right	5	31.3	31.3	100.0
	Total	16	100.0	100.0	

Set3 Anagram13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	68.8	68.8	68.8
	wrong	2	12.5	12.5	81.3
	right	3	18.8	18.8	100.0
	Total	16	100.0	100.0	

Set3 Anagram14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	10	62.5	62.5	62.5
	wrong	6	37.5	37.5	100.0
	Total	16	100.0	100.0	

Set3 Anagram15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	68.8	68.8	68.8
	wrong	4	25.0	25.0	93.8
	right	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set4 Anagram1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	6.3	6.3	6.3
	wrong	1	6.3	6.3	12.5
	right	14	87.5	87.5	100.0
	Total	16	100.0	100.0	

Set4 Anagram2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	wrong	1	6.3	6.3	6.3
	right	15	93.8	93.8	100.0
	Total	16	100.0	100.0	

Set4 Anagram3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	9	56.3	56.3	56.3
	wrong	7	43.8	43.8	100.0
	Total	16	100.0	100.0	

Set4 Anagram4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	7	43.8	43.8	43.8
	wrong	8	50.0	50.0	93.8
	right	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set4 Anagram5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	9	56.3	56.3	56.3
	wrong	3	18.8	18.8	75.0
	right	4	25.0	25.0	100.0
	Total	16	100.0	100.0	

Set4 Anagram6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	6.3	6.3	6.3
	wrong	9	56.3	56.3	62.5
	right	6	37.5	37.5	100.0
	Total	16	100.0	100.0	

Set4 Anagram7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	6	37.5	37.5	37.5
	wrong	7	43.8	43.8	81.3
	right	3	18.8	18.8	100.0
	Total	16	100.0	100.0	

Set4 Anagram8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	9	56.3	56.3	56.3
	wrong	3	18.8	18.8	75.0
	right	4	25.0	25.0	100.0
	Total	16	100.0	100.0	

Set4 Anagram9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	3	18.8	18.8	18.8
	wrong	3	18.8	18.8	37.5
	right	10	62.5	62.5	100.0
	Total	16	100.0	100.0	

Set4 Anagram10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	5	31.3	31.3	31.3
	wrong	6	37.5	37.5	68.8
	right	5	31.3	31.3	100.0
	Total	16	100.0	100.0	

Set4 Anagram11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	13	81.3	81.3	81.3
	wrong	3	18.8	18.8	100.0
	Total	16	100.0	100.0	

Set4 Anagram12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	68.8	68.8	68.8
	wrong	2	12.5	12.5	81.3
	right	3	18.8	18.8	100.0
	Total	16	100.0	100.0	

Set4 Anagram13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	10	62.5	62.5	62.5
	wrong	6	37.5	37.5	100.0
	Total	16	100.0	100.0	

Set4 Anagram14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	68.8	68.8	68.8
	wrong	5	31.3	31.3	100.0
	Total	16	100.0	100.0	

Set4 Anagram15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	68.8	68.8	68.8
	wrong	5	31.3	31.3	100.0
	Total	16	100.0	100.0	

Set5 Anagram1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	6.3	6.3	6.3
	wrong	9	56.3	56.3	62.5
	right	6	37.5	37.5	100.0
	Total	16	100.0	100.0	

Set5 Anagram2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	2	12.5	12.5	12.5
	wrong	3	18.8	18.8	31.3
	right	11	68.8	68.8	100.0
	Total	16	100.0	100.0	

Set5 Anagram3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	6.3	6.3	6.3
	wrong	4	25.0	25.0	31.3
	right	11	68.8	68.8	100.0
	Total	16	100.0	100.0	

Set5 Anagram4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	5	31.3	31.3	31.3
	wrong	5	31.3	31.3	62.5
	right	6	37.5	37.5	100.0
	Total	16	100.0	100.0	

Set5 Anagram5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	3	18.8	18.8	18.8
	wrong	3	18.8	18.8	37.5
	right	10	62.5	62.5	100.0
	Total	16	100.0	100.0	

Set5 Anagram6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	5	31.3	31.3	31.3
	wrong	7	43.8	43.8	75.0
	right	4	25.0	25.0	100.0
	Total	16	100.0	100.0	

Set5 Anagram7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	9	56.3	56.3	56.3
	wrong	6	37.5	37.5	93.8
	right	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set5 Anagram8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	4	25.0	25.0	25.0
	wrong	4	25.0	25.0	50.0
	right	8	50.0	50.0	100.0
	Total	16	100.0	100.0	

Set5 Anagram9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	9	56.3	56.3	56.3
	wrong	4	25.0	25.0	81.3
	right	3	18.8	18.8	100.0
	Total	16	100.0	100.0	

Set5 Anagram10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	15	93.8	93.8	93.8
	wrong	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set5 Anagram11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	12	75.0	75.0	75.0
	wrong	4	25.0	25.0	100.0
	Total	16	100.0	100.0	

Set5 Anagram12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	14	87.5	87.5	87.5
	wrong	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Set5 Anagram13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	68.8	68.8	68.8
	wrong	4	25.0	25.0	93.8
	right	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set5 Anagram14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	68.8	68.8	68.8
	wrong	5	31.3	31.3	100.0
	Total	16	100.0	100.0	

Set5 Anagram15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	12	75.0	75.0	75.0
	wrong	4	25.0	25.0	100.0
	Total	16	100.0	100.0	

Set6 Anagram1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	6.3	6.3	6.3
	wrong	4	25.0	25.0	31.3
	right	11	68.8	68.8	100.0
	Total	16	100.0	100.0	

Set6 Anagram2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	2	12.5	12.5	12.5
	wrong	7	43.8	43.8	56.3
	right	7	43.8	43.8	100.0
	Total	16	100.0	100.0	

Set6 Anagram3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	5	31.3	31.3	31.3
	wrong	6	37.5	37.5	68.8
	right	5	31.3	31.3	100.0
	Total	16	100.0	100.0	

Set6 Anagram4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	2	12.5	12.5	12.5
	wrong	3	18.8	18.8	31.3
	right	11	68.8	68.8	100.0
	Total	16	100.0	100.0	

Set6 Anagram5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	8	50.0	50.0	50.0
	wrong	4	25.0	25.0	75.0
	right	4	25.0	25.0	100.0
	Total	16	100.0	100.0	

Set6 Anagram6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	right	16	100.0	100.0	100.0

Set6 Anagram7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	10	62.5	62.5	62.5
	wrong	4	25.0	25.0	87.5
	right	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Set6 Anagram8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	68.8	68.8	68.8
	wrong	5	31.3	31.3	100.0
	Total	16	100.0	100.0	

Set6 Anagram9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	14	87.5	87.5	87.5
	wrong	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Set6 Anagram10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	12	75.0	75.0	75.0
	wrong	4	25.0	25.0	100.0
	Total	16	100.0	100.0	

Set6 Anagram11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	3	18.8	18.8	18.8
	right	13	81.3	81.3	100.0
	Total	16	100.0	100.0	

Set6 Anagram12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	15	93.8	93.8	93.8
	wrong	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set6 Anagram13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	12	75.0	75.0	75.0
	wrong	4	25.0	25.0	100.0
	Total	16	100.0	100.0	

Set6 Anagram14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	12	75.0	75.0	75.0
	wrong	3	18.8	18.8	93.8
	right	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Set6 Anagram15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	12	75.0	75.0	75.0
	wrong	4	25.0	25.0	100.0
	Total	16	100.0	100.0	

MEAN SCORES ON ANAGRAM TASK IN THE PILOT STUDY

Part[nr]	Gender[a]	No. of Correct Anagrams						
		Set1	Set2	Set3	Set4	Set5	Set6	$\overline{X}$
1	2	9.00	9.00	9.00	9.00	9.00	9.00	N/A
2	2	9.00	9.00	9.00	9.00	9.00	9.00	N/A
3	1	9.00	9.00	9.00	9.00	9.00	9.00	N/A
4	2	6.00	4.00	4.00	6.00	4.00	6.00	5.00
5	2	9.00	7.00	8.00	8.00	7.00	7.00	7.67
6	1	2.00	2.00	3.00	3.00	1.00	1.00	2.00
7	2	5.00	5.00	4.00	4.00	5.00	6.00	4.83
8	1	3.00	3.00	3.00	3.00	2.00	5.00	3.33
9	2	3.00	5.00	4.00	3.00	4.00	4.00	3.33
10	1	3.00	2.00	1.00	3.00	1.00	3.00	2.17
11	1	8.00	5.00	7.00	4.00	5.00	4.00	5.50
12	1	3.00	3.00	4.00	3.00	3.00	5.00	3.50
13	2	3.00	7.00	4.00	5.00	6.00	5.00	5.00
14	1	6.00	6.00	7.00	6.00	4.00	4.00	5.50
15	2	6.00	7.00	9.00	6.00	8.00	7.00	7.17
16	2	3.00	3.00	5.00	2.00	5.00	3.00	3.50
17	2	5.00	6.00	8.00	7.00	5.00	7.00	6.33
18	2	3.00	3.00	1.00	3.00	2.00	2.00	2.33
19	2	4.00	3.00	1.00	.00	.00	2.00	1.67

a GENDER, 1 = Male, 2 = Female

PEARSON CORRELATIONS OF PILOT ANAGRAM SET SCORES

		Set 1	Set 2	Set 3	Set 4	Set 5	Set 6
Set 1	Correlation	1.000	.633(**)	.705(**)	.668(**)	.598(*)	.579(*)
	Sig. (2-tailed)	.	.009	.002	.005	.014	.019
	N	16	16	16	16	16	16
Set 2	Correlation	.633(**)	1.000	.781(**)	.762(**)	.861(**)	.726(**)
	Sig. (2-tailed)	.009	.	.000	.001	.000	.001
	N	16	16	16	16	16	16
Set 3	Correlation	.705(**)	.781(**)	1.000	.763(**)	.840(**)	.695(**)
	Sig. (2-tailed)	.002	.000	.	.001	.000	.003
	N	16	16	16	16	16	16
Set 4	Correlation	.668(**)	.762(**)	.763(**)	1.000	.723(**)	.770(**)
	Sig. (2-tailed)	.005	.001	.001	.	.002	.000
	N	16	16	16	16	16	16
Set 5	Correlation	.598(*)	.861(**)	.840(**)	.723(**)	1.000	.765(**)
	Sig. (2-tailed)	.014	.000	.000	.002	.	.001
	N	16	16	16	16	16	16
Set 6	Correlation	.579(*)	.726(**)	.695(**)	.770(**)	.765(**)	1.000
	Sig. (2-tailed)	.019	.001	.003	.000	.001	.
	N	16	16	16	16	16	16

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

ANOVA OF MEAN NUMBER OF CORRECTLY SOLVED ANAGRAMS ACROSS SETS IN THE PILOT STUDY

Within-subjects Factors

Measure: MEASURE_1

ANAGSP	Dependent Variable
1	ANAGSP1
2	ANAGSP2
3	ANAGSP3
4	ANAGSP4
5	ANAGSP5
6	ANAGSP6

Mauchly's Test of Sphericity(b)

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx Chi-Square	df	Sig.	Epsilon(a)		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
ANAGSP	.494	9.236	14	.820	.810	1.000	.200

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b Design: Intercept Within Subjects Design: ANAGSP

Multivariate Tests(b)

Effect		Value	F	Hypothesis df	Error df	Sig.
ANAGSP	Pillai's Trace	.393	1.423(a)	5.000	11.000	.290
	Wilks' Lambda	.607	1.423(a)	5.000	11.000	.290
	Hotelling's Trace	.647	1.423(a)	5.000	11.000	.290
	Roy's Largest Root	.647	1.423(a)	5.000	11.000	.290

a Exact statistic

b Design: Intercept Within Subjects Design: ANAGSP

NUMBER OF PARTICIPANTS ATTEMPTING EACH ANAGRAM

Anagram	Set 1	Set 2	Set 3	Set 4	Set 5	Set 6	Mean
1	15	13	15	15	15	15	14.7
2	16	15	14	15	14	14	14.7
3	15	16	16	7	15	11	13.3
4	6	16	8	9	11	14	10.7
5	4	10	14	7	13	8	9.3
6	11	5	10	15	11	16	11.3
7	3	11	10	10	7	6	7.8
8	9	5	12	7	12	5	8.3
9	3	8	6	13	7	2	6.5
10	3	6	5	11	1	4	5.0
11	1	7	9	3	4	13	6.2
12	4	2	7	5	2	1	3.5
13	8	5	5	6	5	4	5.5
14	6	5	6	5	5	4	5.2
15	1	5	5	5	4	4	4.0

PERCENTAGE OF ATTEMPTS MADE WHICH WERE CORRECT

Anagram	Set 1	Set 2	Set 3	Set 4	Set 5	Set 6	Mean
1	100.0	69.2	66.7	93.3	60.0	73.3	77.1
2	100.0	93.3	85.7	93.8	78.6	50.0	83.6
3	80.0	100.0	100.0	.0	73.3	45.5	66.5
4	83.3	81.3	50.0	11.1	54.5	78.6	59.8
5	50.0	10.0	85.7	57.1	76.9	50.0	54.9
6	63.6	40.0	40.0	40.0	36.4	100.0	53.3
7	33.3	45.5	.0	30.0	14.3	33.3	26.1
8	77.8	20.0	25.0	57.1	66.7	.0	41.1
9	.0	25.0	16.7	76.9	42.9	.0	26.9
10	.0	33.3	40.0	45.5	.0	.0	19.8
11	.0	28.6	.0	.0	.0	100.0	21.4
12	25.0	.0	71.4	60.0	.0	.0	26.7
13	25.0	60.0	60.0	.0	20.0	.0	27.5
14	66.7	20.0	.0	.0	.0	25.0	18.6
15	.0	.0	20.0	.0	.0	.0	3.3

PEARSON CORRELATIONS OF THE POSITION OF ANAGRAMS WITHIN SETS WITH THE MEAN NUMBER OF PARTICIPANTS ATTEMPTING THEM AND THE MEAN PERCENTAGE CORRECT

Across Sets

		Anagram position	Mean no. attempted	Mean % correct
Anagram position	Correlation	1.000	-.941(**)	-.934(**)
	Sig. (2-tailed)	.	.000	.000
	N	15	15	15
Mean no. attempted	Correlation	-.941(**)	1.000	.954(**)
	Sig. (2-tailed)	.000	.	.000
	N	15	15	15
Mean % correct	Correlation	-.934(**)	.954(**)	1.000
	Sig. (2-tailed)	.000	.000	.
	N	15	15	15

** Correlation is significant at the 0.01 level (2-tailed).

Anagram Position By Set with Number of Attempts Made

		Number of Attempts Made by Set						
		Anag Pos[n]	Set 1	Set 2	Set 3	Set 4	Set 5	Set 6
Anag Pos[n]	Corr[n]	1.000	-.702(**)	-.824(**)	-.842(**)	-.657(**)	-.872(**)	-.726(**)
	Sig[a].	.	.004	.000	.000	.008	.000	.002
	N	15	15	15	15	15	15	15
Atts Set 1	Corr[n]	-.702(**)	1.000	.523(*)	.704(**)	.534(*)	.776(**)	.578(*)
	Sig.	.004	.	.045	.003	.040	.001	.024
	N	15	15	15	15	15	15	15
Atts Set 2	Corr[n]	-.824(**)	.523(*)	1.000	.648(**)	.393	.718(**)	.621(*)
	Sig.	.000	.045	.	.009	.148	.003	.013
	N	15	15	15	15	15	15	15
Atts Set 3	Corr[n]	-.842(**)	.704(**)	.648(**)	1.000	.322	.885(**)	.615(*)
	Sig.	.000	.003	.009	.	.242	.000	.015
	N	15	15	15	15	15	15	15
Atts Set 4	Corr[n]	-.657(**)	.534(*)	.393	.322	1.000	.473	.450
	Sig.	.008	.040	.148	.242	.	.075	.093
	N	15	15	15	15	15	15	15
Atts Set 5	Corr[n]	-.872(**)	.776(**)	.718(**)	.885(**)	.473	1.000	.661(**)
	Sig.	.000	.001	.003	.000	.075	.	.007
	N	15	15	15	15	15	15	15
Atts Set 6	Corr[n]	-.726(**)	.578(*)	.621(*)	.615(*)	.450	.661(**)	1.000
	Sig.	.002	.024	.013	.015	.093	.007	.
	N	15	15	15	15	15	15	15

a All probabilities are two-tailed

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed)

Anagram Position by Set and Percentage of Attempts Made that were Correct

		Percentage of Attempts that were Correct by Set						
		Anag Pos[a]	Set 1	Set 2	Set 3	Set 4	Set 5	Set 6
Anag Pos[a]	Corr[a]	1.000	-.733(**)	-.704(**)	-.570(*)	-.520(*)	-.835(**)	-.548(*)
	Sig.[a]	.	.002	.003	.026	.047	.000	.035
	N	15	15	15	15	15	15	15
% Set 1	Corr[a]	-.733(**)	1.000	.621(*)	.479	.298	.724(**)	.408
	Sig.	.002	.	.013	.071	.281	.002	.131
	N	15	15	15	15	15	15	15
% Set 2	Corr[a]	-.704(**)	.621(*)	1.000	.486	.041	.549(*)	.402
	Sig.	.003	.013	.	.066	.885	.034	.137
	N	15	15	15	15	15	15	15
% Set 3	Corr[a]	-.570(*)	.479	.486	1.000	.321	.631(*)	.082
	Sig.	.026	.071	.066	.	.244	.012	.771
	N	15	15	15	15	15	15	15
% Set 4	Corr[a]	-.520(*)	.298	.041	.321	1.000	.470	-.037
	Sig.	.047	.281	.885	.244	.	.077	.897
	N	15	15	15	15	15	15	15
% Set 5	Corr[a]	-.835(**)	.724(**)	.549(*)	.631(*)	.470	1.000	.271
	Sig.	.000	.002	.034	.012	.077	.	.328
	N	15	15	15	15	15	15	15
% Set 6	Corr[a]	-.548(*)	.408	.402	.082	-.037	.271	1.000
	Sig.	.035	.131	.137	.771	.897	.328	.
	N	15	15	15	15	15	15	15

a All probabilities are two-tailed

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

PEARSON CORRELATIONS OF MEAN PILOT STUDY ANAGRAM AND REASONING TASK SCORES

		mean scores across pilot anagram sets	mean scores across pilot AH6 sets
mean scores across pilot anagram sets	**Correlation**	1.000	.699(**)
	Sig. (2-tailed)	.	.003
	N	16	16
mean scores across pilot AH6 sets	**Correlation**	.699(**)	1.000
	Sig. (2-tailed)	.003	.
	N	16	19

** Correlation is significant at the 0.01 level (2-tailed).

REASONING TASK
Practice Items (Pilot)

i) In the following list, two series are jumbled together. Write down the letter printed above the word which would come in the middle of the longer series, if it were arranged in order according to meaning.

A	B	C	D	E	F	G	H	I
paragraph.	semicolon.	phrase.	word.	full-stop.	comma.	chapter.	colon.	sentence.

ii) Give the next but one member of the series: $\frac{9}{8}$, $\frac{7}{8}$, $\frac{7}{6}$, $\frac{5}{6}$, $\frac{5}{4}$, $\frac{3}{4}$, ...

iii)  Which one of the following comes next?

A 
B 
C 
D 
E 

iv) Tree is to twig as book is to .....

A	B	C	D	E
stem,	volume,	library,	wood,	leaf.

v) 309 kg. is to 600 parcels as 206 kg. is to ....

A	B	C	D	E
400 parcels.	450 parcels,	390 parcels,	415 parcels,	420 parcels.

vi)

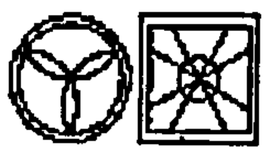
				A	B	C	D	E
M	is to	W	as	X	is to	N	U	X	O

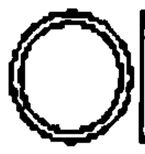
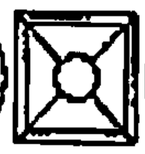
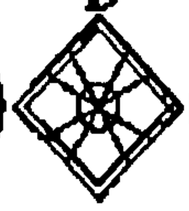
vii) Which one of the five words on the right bears a similar relation to each of the two words on the left?

		A	B	C	D	E
chorus.	abstain.	verse.	averse.	report.	refrain.	ignore.

viii) If it takes 6 hr. 45 min. to go 900 km., how far can one go in 2 hr. 15 min.?

ix) The two figures on the left have a feature in common. One, and one only, of the figures on the right has this feature. Which is it?

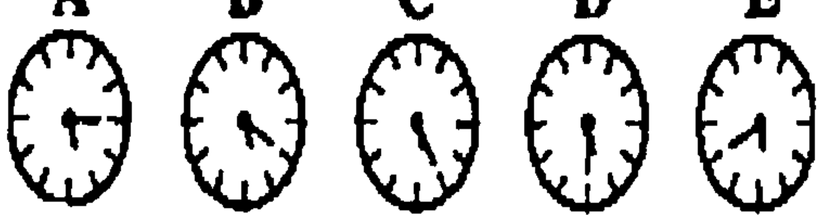


A 
B 
C 
D 
E 

i Write down the letter printed above the word which would come in the middle, if the following words were arranged in order according to their meaning.

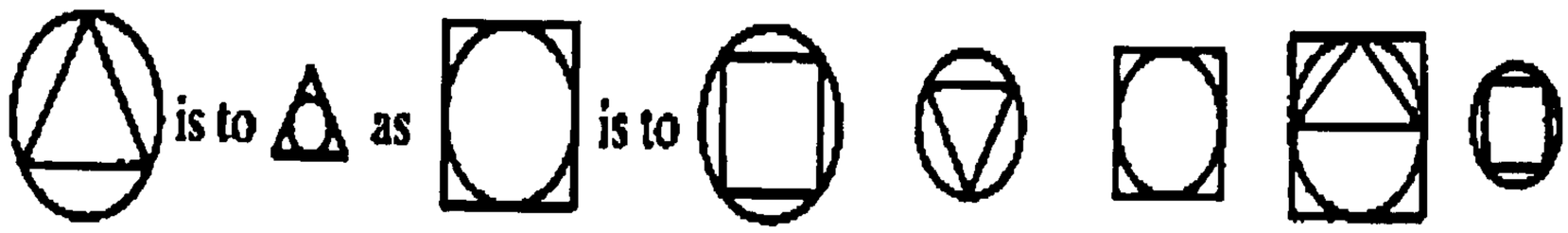
A	B	C	D	E	F	G
eye.	neck.	ankle.	chest.	knee.	thigh.	foot.

ii The third member of this series is missing. What is it? 7, 14, ... 56, 112.

iii  Which one of the following comes next but one? 

	A	B	C	D	E
iv Here is to there as these is to	yonder,	that,	others,	those,	this.

	A	B	C	D	E
v 10 cm. is to 20 m. as 30 cm. is to	50 m.,	40 m.,	60 m.,	65 m.,	45 m.

	A	B	C	D	E
vi 	is to	as	is to		

vii **Which one of the five words on the right bears a similar relation to each of the two words on the left?**

		A	B	C	D	E
dark.	heavy.	night.	unseen.	weight.	light.	bright.

---

viii **Working from the left, multiply the third whole number by the fourth decimal:**

0.6, 3, 9, 0.7, 0.1, 0.8, 2, 4, 0.5.

---

ix **The two figures on the left have a feature in common. One, and one only, of the figures on the right has this feature. Which is it?**

A B C D E

End of Practice Items

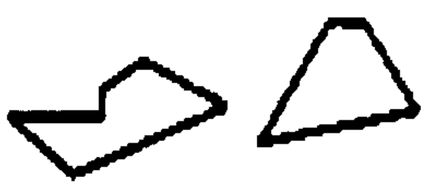
1. Write down the letter printed above the word which would come sixth if the following were arranged in order, with the shortest period on the extreme left.

A	B	C	D	E	F	G	H
eternity.	year.	hour.	century.	generation.	month.	week.	day.

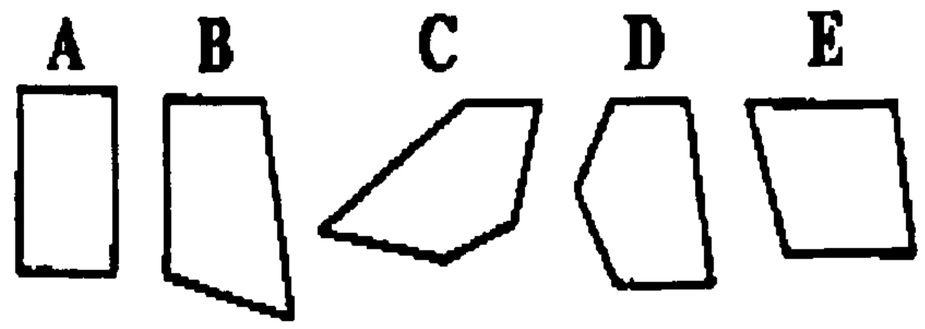
	A	B	C	D	E
2. 7.5 is to 22.5 as 6.25 is to	19.75,	18.625,	17.5,	18.75,	19.25.

---

3. The two figures on the left have a feature in common. One, and one only, of the figures on the right lacks this feature. Which is it?



A B C D E



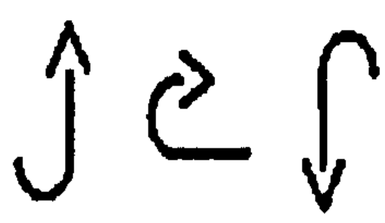
	A	B	C	D	E
4. Tool is to spanner as tree is to	plane,	lathe,	blackberry,	timber,	carnation.

---

5. Working from the left, divide the fifth whole number by the fourth fraction:

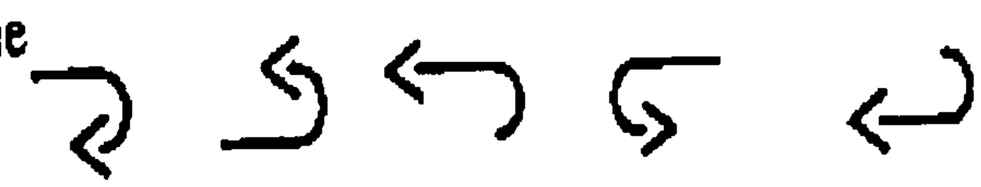
2. 9. 5. $\frac{31}{22}$. 7. 6. $\frac{2}{3}$. $\frac{4}{9}$. 8. $\frac{42}{49}$. $\frac{17}{32}$. 3.

---

6. 

Which one of the following comes next?

A B C D E



Please Turn Over

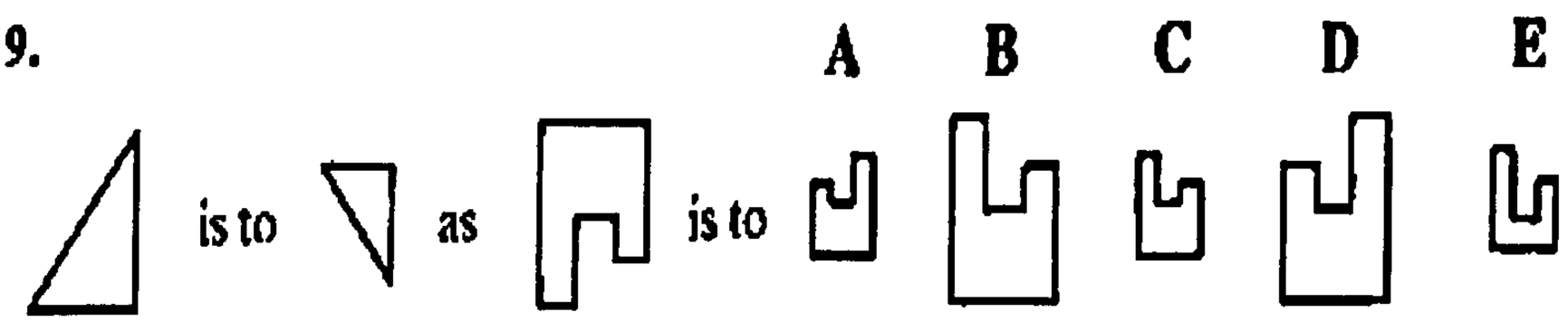
7. Which one of the five words on the right bears a similar relation to each of the two words on the left?

		A	B	C	D	E
float.	rise.	swim.	sink.	bath.	climb.	cast.

---

8. Give the next but two member of the series: 85, 68, 51, 34, ...

9.



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10. Here are five classes. Write down the letter printed above the class which contains two, and two only, of the other four classes.

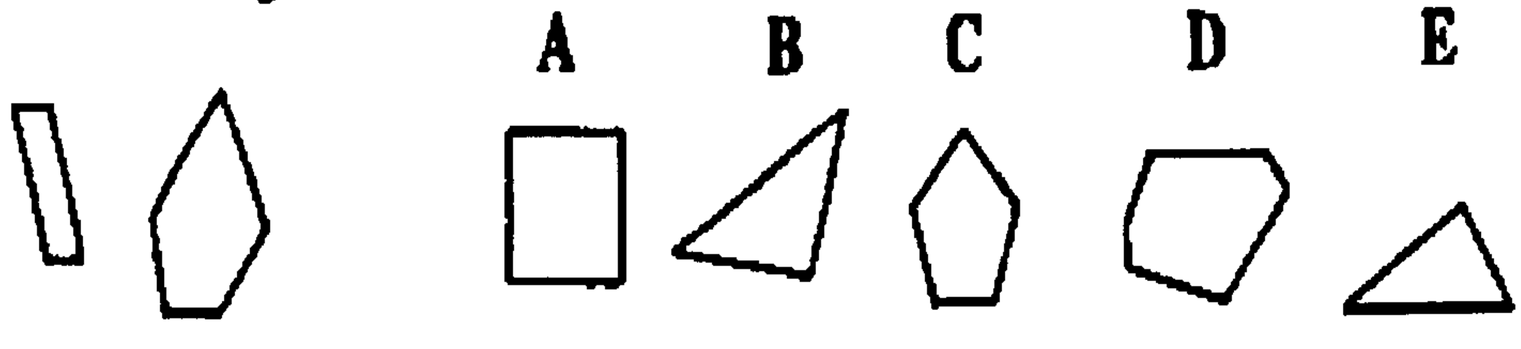
A	B	C	D	E
animal.	Swiss.	living organism.	man.	mammal.

11.

	A	B	C	D	E
$\sqrt{49}$ is to $\frac{1}{7}$ as 6 is to	$\left(\frac{1}{6}\right)^2$	$\sqrt{6}$	36	0.6	$\frac{1}{6}$

Please Turn Over

12. The two figures on the left have a feature in common. One, and one only, of the figures on the right has this feature. Which is it?



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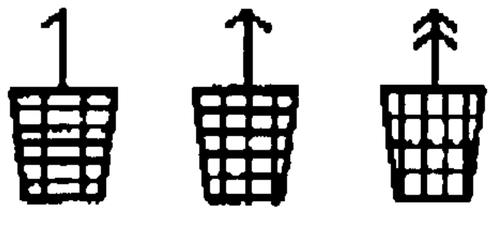
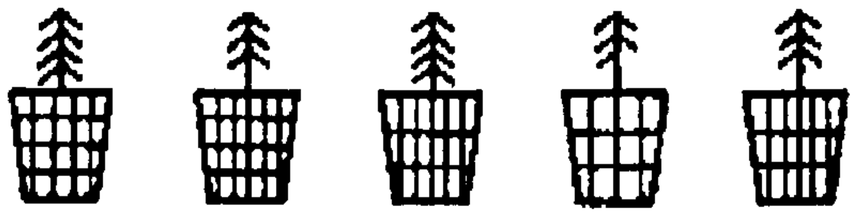
13. **Hope** is to **go-getter** as **silver lining** is to .....

A	B	C	D	E
dark horse,	cat's whiskers,	early bird,	pig in poke,	dog in manger.

---

14. If a clock gains 36 seconds in 3hr. 45min., how long will it take to gain one minute?

---

15. 
Which one of the following comes next?


End of Set 1

16. Space is to volume as time is to ..... A tome, B orbit, C duration, D area, E hour-glass.

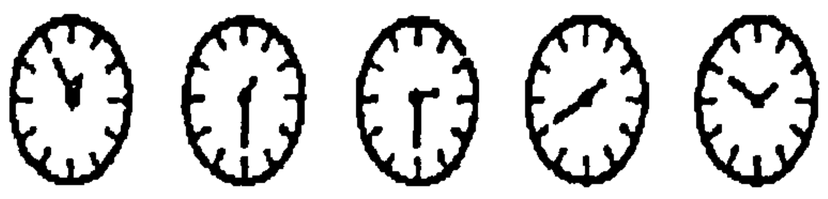
---

17. Subtract the second smallest from the third largest:
5346.8, 471.85, 96.873, 88.85, 91.7452, 83.56, 8971.4, 397.26.

18.

Which one of the following comes next but one?

A B C D E



---

19. Which one of the five words on the right bears a similar relation to each of the two words on the left?

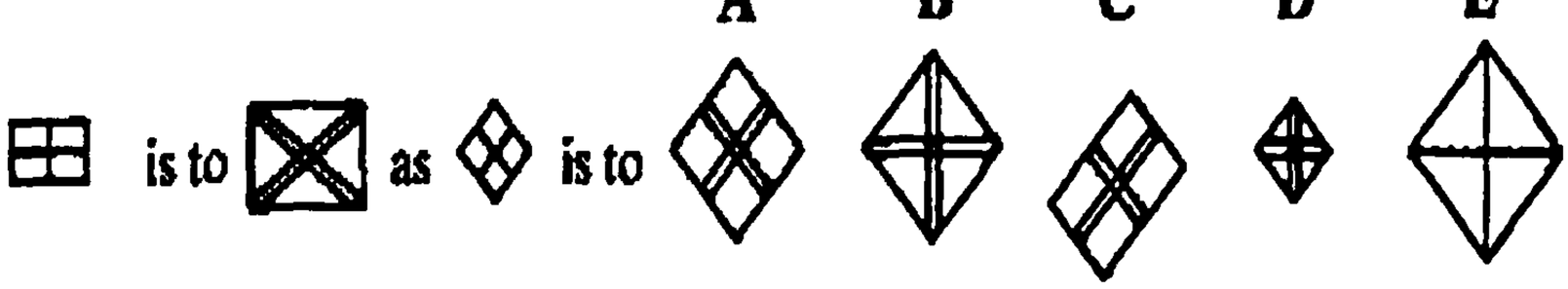
find. win.

A discover. B seek. C achieve. D conquer. E lose.

---

20. The third member of this series is omitted. What is it? 0.1, 0.9, ... 72.9, 656.1

21.



A B C D E

---

22. Here are five classes. Write down the letter printed above the class which contains two, and two only, of the other four classes.

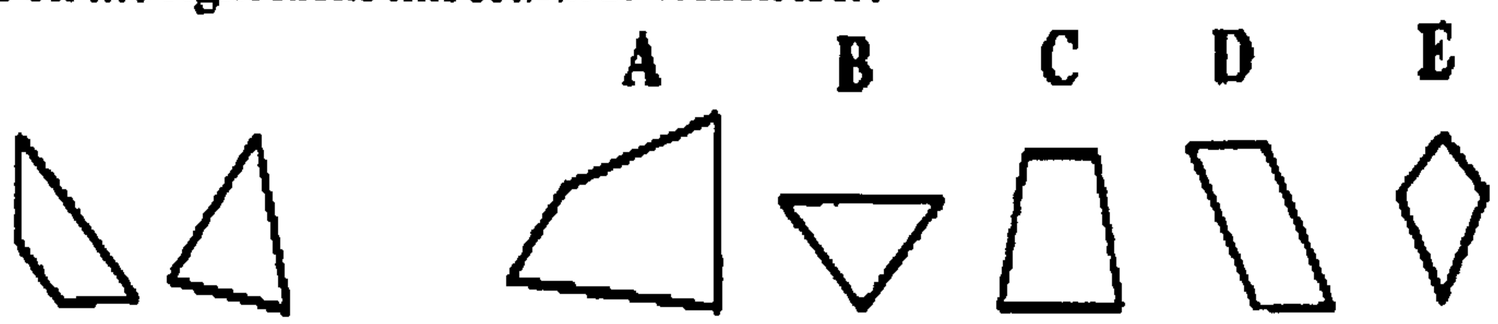
A	B	C	D	E
meat.	animate matter.	beef.	food.	sirloin.

23.

	A	B	C	D	E
880 is to 0.88 as 2 is to	2.0,	0.0002,	0.20,	0.02,	0.002.

---

24. The two figures on the left have a feature in common. One, and one only, of the figures on the right lacks this feature. Which is it?



---

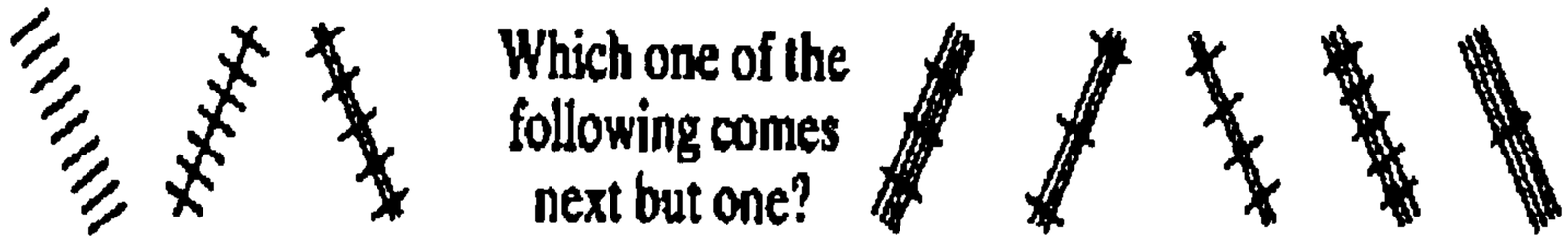
25. Delight is to difficulty as rose-coloured glasses is to ....

A	B	C	D	E
sticky wicket,	empty vessels,	broken reed,	horse's mouth,	glass houses.

---

26. Divide £7 by $\frac{1}{8}$ and express your answer in pence.

27.



Please Turn Over

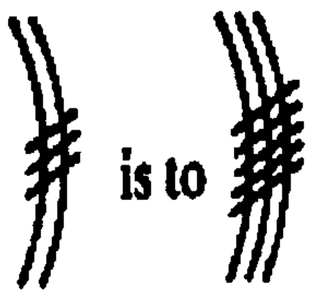
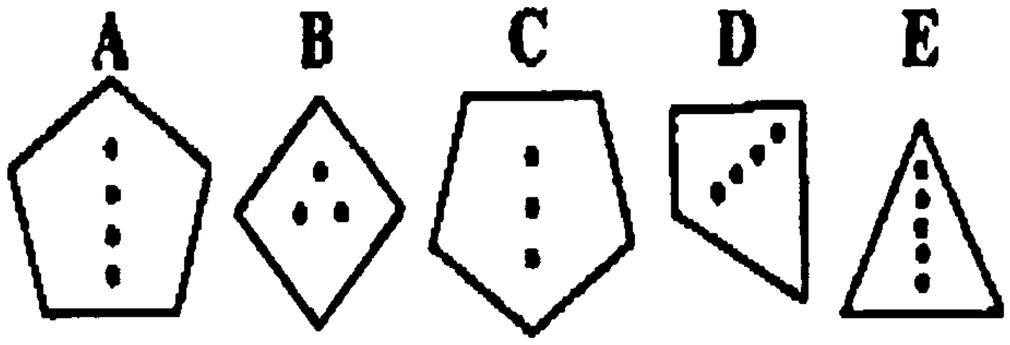
28. Which one of the five words on the right bears a similar relation to each of the two words on the left?

		A	B	C	D	E
lenient.	bow.	tolerant.	subdue.	arrow.	stern.	incline.

---

29. Give the next but one member of this series: 1, $\frac{2}{4}$, $\frac{4}{9}$, $\frac{7}{16}$, ...

---

30.  is to as  is to 

End of Set 2

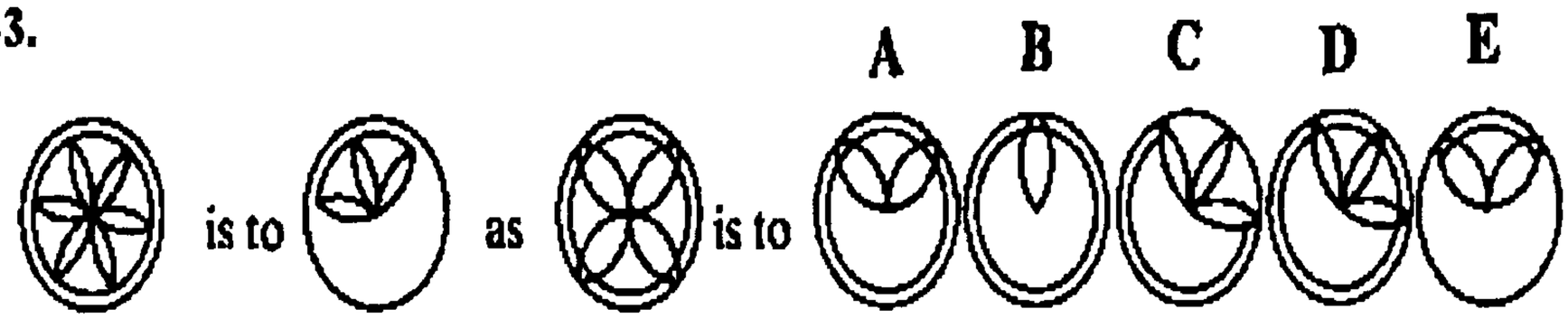
31. Which one of the five words on the right bears a similar relation to each of the two words on the left?

		A	B	C	D	E
decline.	rubbish.	garbage.	descent.	accept.	refuse.	ascent.

---

32. Give the next number of this series: 47, 42, 32, 12, ...

33.



---

34. Write down the letter printed above the word which would come in the middle, if the following were arranged in series.

A	B	C	D	E
chess.	rugger.	cricket.	bridge.	patience.

---

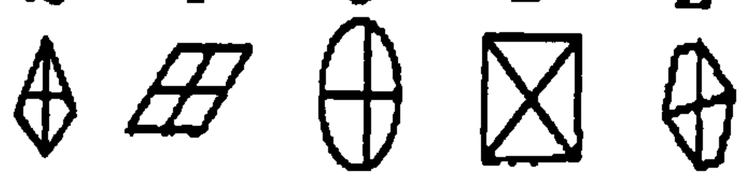
35. 2 min. 2 sec. is to 50 min. as 7 min. 7 sec. is to ....

A	B	C	D	E
3 hr. 25 min.,	2 hr. 55 min.,	2 hr. 50 min.,	3 hr. 5 min.,	3 hr. 30 min.

Please Turn Over

36. The two figures on the left have a feature in common. One, and one only, of the figures on the right lacks this feature. Which is it?

A B C D E



37.

	A	B	C	D	E
Line is to net as fish is to	hunt,	shoot,	quick lime,	butterfly,	shrew.

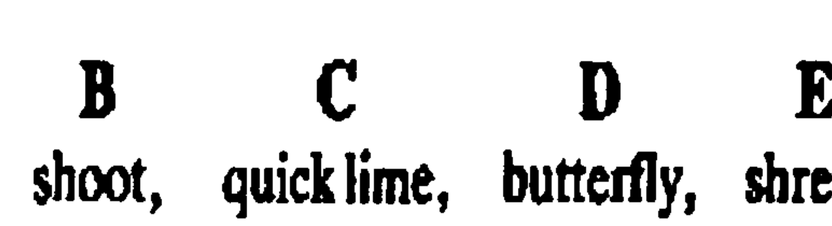
---

38. If it takes 4 men 9¾ hr. to build a wall, how long will it take 6 equally skilled and willing men?

39.

Which one of the following comes next but two?

A B C D E



---

40. Which one of the five words on the right bears a similar relation to each of the two words on the left?

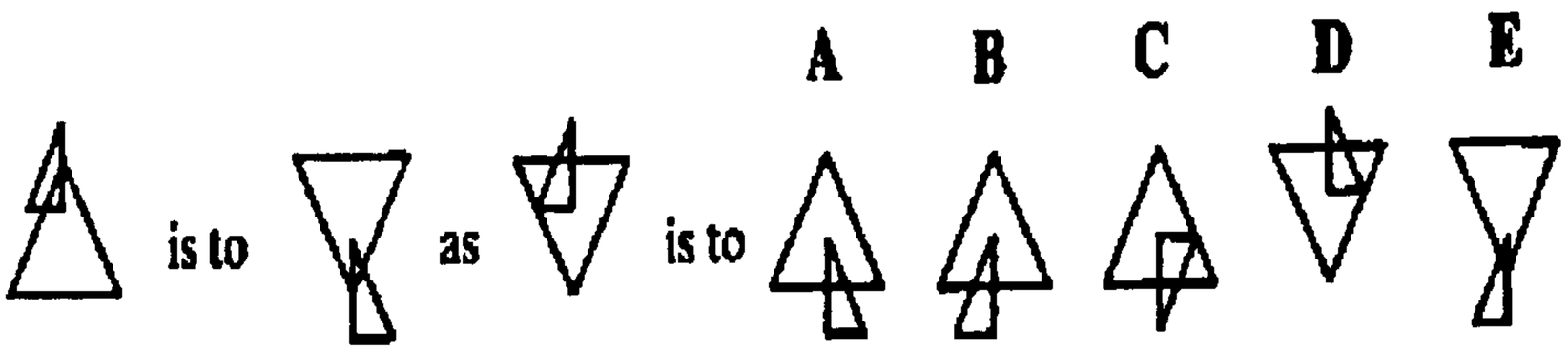
		A	B	C	D	E
useless.	unnecessary.	essential.	unknown.	negative.	possible.	probable.

---

41. The fifth member of this series is missing. What is it? 5, 10, 18, 32, ...

Please Turn Over

42.



---

43. Miss Diamond, Mrs. Jet and Miss Pearl are members of a big hospital staff. Miss Diamond, a night-nurse, has number B211/S. Mrs Jet, B484/M, and Miss Pearl, A732/S, are both day-workers, the former being a nurse, the latter an orderly. Which of the following numbers is most likely to belong to Mrs. Opal, an orderly on night-duty?

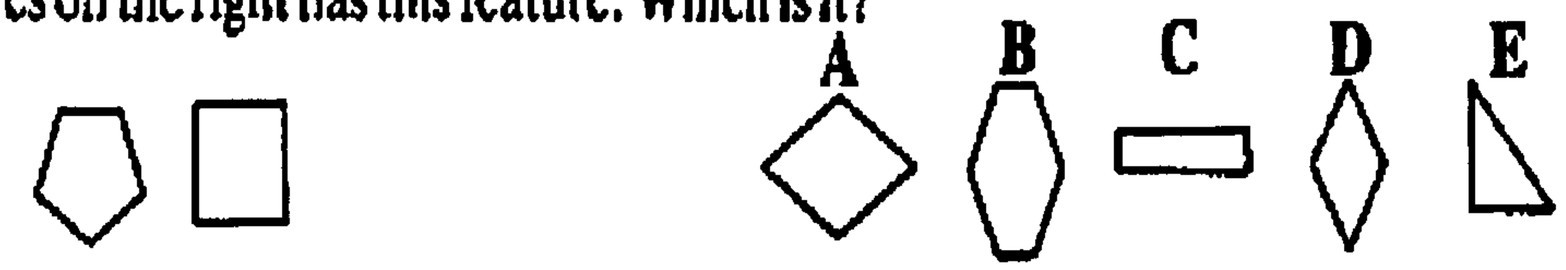
A	B	C	D	E	F	G
B642/S,	A693/M,	B681/M,	B726/S,	A865/M,	A518/M,	A677/S.

44.

	A	B	C	D	E
6.3 is to 3.12 as 10.5 is to	5.25,	5.24,	5.2,	5.46,	5.4.

---

45. The two figures on the left have a feature in common. One, and one only, of the figures on the right has this feature. Which is it?



End of Reasoning Test Questions

THANK YOU FOR YOUR PARTICIPATION IN THIS STUDY

Practice Items (Pilot Study)

Original No.	New No.	Answer
1	i	1
2	ii	0.5
3	iii	A
4	iv	E
5	v	A
6	vi	D
7	vii	D
8	viii	300
9	ix	C

Practice Items (Replication Study)

Original No.	New No.	Answer
2	i	F
4	ii	28
6	iii	E
8	iv	D
10	v	C
12	vi	E
14	vii	D
16	viii	1.6
18	ix	C

Set 1

Original No.	New No.	Answer
10	1	E
14	2	D
18	3	A
22	4	A
26	5	7
21	6	A
43	7	B
38	8	-17
42	9	C
55	10	E
59	11	E
63	12	A
67	13	C
71	14	6.25
66	15	C

Set 2

Original No.	New No.	Answer
13	16	C
17	17	383
12	18	B
25	19	E
20	20	8.1
24	21	B
37	22	A
41	23	E
45	24	A
58	25	A
62	26	5600
57	27	E
70	28	D
65	29	$^{16}/_{36}$
69	30	C

Set 3

Original No.	New No.	Answer
16	31	D
11	32	-28
15	33	E
19	34	D
23	35	B
27	36	C
40	37	D
44	38	6.5
39	39	D
61	40	A
56	41	58
60	42	A
64	43	B
68	44	C
72	45	C

DATA AND ANALYSES RELATING TO PILOT STUDY REASONING TASKS

FREQUENCIES PER REASONING TASK ITEM

AH6 PracticeQ1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	3	15.8	15.8	15.8
	wrong	4	21.1	21.1	36.8
	right	12	63.2	63.2	100.0
	Total	19	100.0	100.0	

AH6 PracticeQ2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	5.3	5.3	5.3
	wrong	6	31.6	31.6	36.8
	right	12	63.2	63.2	100.0
	Total	19	100.0	100.0	

AH6 PracticeQ3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	wrong	8	42.1	42.1	42.1
	right	11	57.9	57.9	100.0
	Total	19	100.0	100.0	

AH6 PracticeQ4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	wrong	7	36.8	36.8	36.8
	right	12	63.2	63.2	100.0
	Total	19	100.0	100.0	

AH6 PracticeQ5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	wrong	3	15.8	15.8	15.8
	right	16	84.2	84.2	100.0
	Total	19	100.0	100.0	

AH6 PracticeQ6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	5.3	5.3	5.3
	wrong	5	26.3	26.3	31.6
	right	13	68.4	68.4	100.0
	Total	19	100.0	100.0	

AH6 PracticeQ7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	2	10.5	10.5	10.5
	wrong	4	21.1	21.1	31.6
	right	13	68.4	68.4	100.0
	Total	19	100.0	100.0	

AH6 PracticeQ8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	wrong	1	5.3	5.3	5.3
	right	18	94.7	94.7	100.0
	Total	19	100.0	100.0	

AH6 PracticeQ9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	9	47.4	47.4	47.4
	wrong	7	36.8	36.8	84.2
	right	3	15.8	15.8	100.0
	Total	19	100.0	100.0	

AH6 Set1Q1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	2	10.5	10.5	10.5
	wrong	6	31.6	31.6	42.1
	right	11	57.9	57.9	100.0
	Total	19	100.0	100.0	

AH6 Set1Q2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	3	15.8	15.8	15.8
	wrong	2	10.5	10.5	26.3
	right	14	73.7	73.7	100.0
	Total	19	100.0	100.0	

AH6 Set1Q3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	8	42.1	42.1	42.1
	wrong	6	31.6	31.6	73.7
	right	5	26.3	26.3	100.0
	Total	19	100.0	100.0	

AH6 Set1Q4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	5.3	5.3	5.3
	wrong	13	68.4	68.4	73.7
	right	5	26.3	26.3	100.0
	Total	19	100.0	100.0	

AH6 Set1Q5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	10	52.6	52.6	52.6
	wrong	5	26.3	26.3	78.9
	right	4	21.1	21.1	100.0
	Total	19	100.0	100.0	

AH6 Set1Q6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	2	10.5	10.5	10.5
	wrong	8	42.1	42.1	52.6
	right	9	47.4	47.4	100.0
	Total	19	100.0	100.0	

AH6 Set1Q7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	5	26.3	26.3	26.3
	wrong	7	36.8	36.8	63.2
	right	7	36.8	36.8	100.0
	Total	19	100.0	100.0	

AH6 Set1Q8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	8	42.1	42.1	42.1
	wrong	8	42.1	42.1	84.2
	right	3	15.8	15.8	100.0
	Total	19	100.0	100.0	

AH6 Set1Q9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	7	36.8	36.8	36.8
	wrong	7	36.8	36.8	73.7
	right	5	26.3	26.3	100.0
	Total	19	100.0	100.0	

AH6 Set1Q10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	9	47.4	47.4	47.4
	wrong	5	26.3	26.3	73.7
	right	5	26.3	26.3	100.0
	Total	19	100.0	100.0	

AH6 Set1Q11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	12	63.2	63.2	63.2
	wrong	4	21.1	21.1	84.2
	right	3	15.8	15.8	100.0
	Total	19	100.0	100.0	

AH6 Set1Q12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	15	78.9	78.9	78.9
	wrong	4	21.1	21.1	100.0
	Total	19	100.0	100.0	

AH6 Set1Q13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	15	78.9	78.9	78.9
	wrong	2	10.5	10.5	89.5
	right	2	10.5	10.5	100.0
	Total	19	100.0	100.0	

AH6 Set1Q14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	17	89.5	89.5	89.5
	right	2	10.5	10.5	100.0
	Total	19	100.0	100.0	

AH6 Set1Q15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	13	68.4	68.4	68.4
	wrong	5	26.3	26.3	94.7
	right	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

AH6 Set2Q1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	wrong	1	5.3	5.3	5.3
	right	18	94.7	94.7	100.0
	Total	19	100.0	100.0	

AH6 Set2Q2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	8	42.1	42.1	42.1
	wrong	3	15.8	15.8	57.9
	right	8	42.1	42.1	100.0
	Total	19	100.0	100.0	

AH6 Set2Q3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	5	26.3	26.3	26.3
	wrong	5	26.3	26.3	52.6
	right	9	47.4	47.4	100.0
	Total	19	100.0	100.0	

AH6 Set2Q4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	5.3	5.3	5.3
	wrong	5	26.3	26.3	31.6
	right	13	68.4	68.4	100.0
	Total	19	100.0	100.0	

AH6 Set2Q5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	13	68.4	68.4	68.4
	wrong	2	10.5	10.5	78.9
	right	4	21.1	21.1	100.0
	Total	19	100.0	100.0	

AH6 Set2Q6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	2	10.5	10.5	10.5
	wrong	6	31.6	31.6	42.1
	right	11	57.9	57.9	100.0
	Total	19	100.0	100.0	

AH6 Set2Q7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	3	15.8	15.8	15.8
	wrong	6	31.6	31.6	47.4
	right	10	52.6	52.6	100.0
	Total	19	100.0	100.0	

AH6 Set2Q8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	5.3	5.3	5.3
	wrong	5	26.3	26.3	31.6
	right	13	68.4	68.4	100.0
	Total	19	100.0	100.0	

AH6 Set2Q9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	57.9	57.9	57.9
	wrong	6	31.6	31.6	89.5
	right	2	10.5	10.5	100.0
	Total	19	100.0	100.0	

AH6 Set2Q10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	9	47.4	47.4	47.4
	wrong	4	21.1	21.1	68.4
	right	6	31.6	31.6	100.0
	Total	19	100.0	100.0	

AH6 Set2Q11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	12	63.2	63.2	63.2
	wrong	6	31.6	31.6	94.7
	right	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

AH6 Set2Q12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	9	47.4	47.4	47.4
	wrong	6	31.6	31.6	78.9
	right	4	21.1	21.1	100.0
	Total	19	100.0	100.0	

AH6 Set2Q13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	6	31.6	31.6	31.6
	wrong	9	47.4	47.4	78.9
	right	4	21.1	21.1	100.0
	Total	19	100.0	100.0	

AH6 Set2Q14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	14	73.7	73.7	73.7
	wrong	5	26.3	26.3	100.0
	Total	19	100.0	100.0	

AH6 Set2Q15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	9	47.4	47.4	47.4
	wrong	10	52.6	52.6	100.0
	Total	19	100.0	100.0	

AH6 Set3Q1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	wrong	2	10.5	10.5	10.5
	right	17	89.5	89.5	100.0
	Total	19	100.0	100.0	

AH6 Set3Q2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	1	5.3	5.3	5.3
	wrong	6	31.6	31.6	36.8
	right	12	63.2	63.2	100.0
	Total	19	100.0	100.0	

AH6 Set3Q3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	3	15.8	15.8	15.8
	wrong	3	15.8	15.8	31.6
	right	13	68.4	68.4	100.0
	Total	19	100.0	100.0	

AH6 Set3Q4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	3	15.8	15.8	15.8
	wrong	7	36.8	36.8	52.6
	right	9	47.4	47.4	100.0
	Total	19	100.0	100.0	

AH6 Set3Q5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	9	47.4	47.4	47.4
	wrong	7	36.8	36.8	84.2
	right	3	15.8	15.8	100.0
	Total	19	100.0	100.0	

AH6 Set3Q6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	4	21.1	21.1	21.1
	wrong	6	31.6	31.6	52.6
	right	9	47.4	47.4	100.0
	Total	19	100.0	100.0	

AH6 Set3Q7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	8	42.1	42.1	42.1
	wrong	10	52.6	52.6	94.7
	right	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

AH6 Set3Q8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	10	52.6	52.6	52.6
	wrong	3	15.8	15.8	68.4
	right	6	31.6	31.6	100.0
	Total	19	100.0	100.0	

AH6 Set3Q9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	8	42.1	42.1	42.1
	wrong	7	36.8	36.8	78.9
	right	4	21.1	21.1	100.0
	Total	19	100.0	100.0	

AH6 Set3Q10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	3	15.8	15.8	15.8
	wrong	7	36.8	36.8	52.6
	right	9	47.4	47.4	100.0
	Total	19	100.0	100.0	

AH6 Set3Q11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	14	73.7	73.7	73.7
	wrong	3	15.8	15.8	89.5
	right	2	10.5	10.5	100.0
	Total	19	100.0	100.0	

AH6 Set3Q12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	9	47.4	47.4	47.4
	wrong	7	36.8	36.8	84.2
	right	3	15.8	15.8	100.0
	Total	19	100.0	100.0	

AH6 Set3Q13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	17	89.5	89.5	89.5
	wrong	2	10.5	10.5	100.0
	Total	19	100.0	100.0	

AH6 Set3Q14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	11	57.9	57.9	57.9
	wrong	3	15.8	15.8	73.7
	right	5	26.3	26.3	100.0
	Total	19	100.0	100.0	

AH6 Set3Q15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no response	12	63.2	63.2	63.2
	wrong	5	26.3	26.3	89.5
	right	2	10.5	10.5	100.0
	Total	19	100.0	100.0	

MEAN SCORES ON REASONING TASK SETS IN THE PILOT STUDY

Part[nt]	Gender[a]	Reasoning Tasks			
		Set1	Set2	Set3	$\overline{X}$
1	2	6.00	7.00	4.00	5.67
2	2	3.00	5.00	6.00	4.67
3	1	3.00	3.00	2.00	2.67
4	2	5.00	7.00	4.00	5.33
5	2	4.00	7.00	7.00	6.00
6	1	2.00	3.00	3.00	2.67
7	2	2.00	5.00	6.00	4.33
8	1	4.00	4.00	4.00	4.00
9	2	5.00	5.00	4.00	4.67
10	1	2.00	4.00	3.00	3.00
11	1	5.00	6.00	6.00	5.67
12	1	2.00	4.00	4.00	3.33
13	2	4.00	7.00	9.00	6.67
14	1	3.00	4.00	4.00	3.67
15	2	7.00	9.00	8.00	8.00
16	2	5.00	5.00	8.00	6.00
17	2	7.00	9.00	5.00	7.00
18	2	1.00	5.00	2.00	2.67
19	2	6.00	4.00	6.00	5.33

a 1 = Male; 2 = Female

PEARSON CORRELATIONS OF PILOT AH6 SET SCORES

		Set 1	Set 2	Set 3
Set 1	Correlation	1.000	.686(**)	.473(*)
	Sig. (2-tailed)	.	.001	.041
Set 2	Correlation	.686(**)	1.000	.531(*)
	Sig. (2-tailed)	.001	.	.019
Set 3	Correlation	.473(*)	.531(*)	1.000
	Sig. (2-tailed)	.041	.019	.

N = 19 throughout

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

ANOVA OF MEAN NUMBER OF CORRECTLY SOLVED REASONING TASK ITEMS ACROSS SETS IN THE PILOT STUDY

Within-subjects Factors

Measure: MEASURE_1

AH6P	Dependent Variable
1	AH6P1
2	AH6P2
3	AH6P3

Mauchly's Test of Sphericity(b)

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon(a)		
					Greenhouse -Geisser	Huynh-Feldt	Lower-bound
AH6P	.871	2.342	2	.307	.886	.976	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b Design: Intercept Within Subjects Design: AH6P

Multivariate Tests(b)

Effect		Value	F	Hypothesis df	Error df	Sig.
AH6P	Pillai's Trace	.513	8.964(a)	2.000	17.000	.002
	Wilks' Lambda	.487	8.964(a)	2.000	17.000	.002
	Hotelling's Trace	1.055	8.964(a)	2.000	17.000	.002
	Roy's Largest Root	1.055	8.964(a)	2.000	17.000	.002

a Exact statistic

b Design: Intercept Within Subjects Design: AH6P

PAIRED SAMPLES t-TESTS OF AH6 SETS

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	scores for AH6 pilot set 1	4.0000	19	1.7951	.4118
	scores for AH6 pilot set 2	5.4211	19	1.8048	.4140
Pair 2	scores for AH6 pilot set 2	5.4211	19	1.8048	.4140
	scores for AH6 pilot set 3	5.0000	19	2.0276	.4652
Pair 3	scores for AH6 pilot set 1	4.0000	19	1.7951	.4118
	scores for AH6 pilot set 3	5.0000	19	2.0276	.4652

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Dev[n]	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	set 1 - set 2	-1.4211	1.4266	.3273	-2.1086	-.7335	-4.342	18	.000
Pair 2	set 2 - set 3	.4211	1.8654	.4279	-.4780	1.3201	.984	18	.338
Pair 3	set 1 - set 3	-1.0000	1.9720	.4524	-1.9505	-.0495	-2.210	18	.040

NUMBER OF PARTICIPANTS ATTEMPTING EACH TASK

Task	Set 1	Set 2	Set 3	Mean
1	17	19	17	17.7
2	16	11	18	15.0
3	11	14	16	13.7
4	18	18	16	17.3
5	9	6	10	8.3
6	17	17	15	16.3
7	14	16	11	13.7
8	11	18	9	12.7
9	12	8	11	10.3
10	10	10	16	12.0
11	7	7	5	6.3
12	4	10	10	8.0
13	4	13	2	6.3
14	2	5	8	5.0
15	6	10	7	7.7

PERCENTAGE OF ATTEMPTS MADE WHICH WERE CORRECT

Task	Set 1	Set 2	Set 3	Mean
1	64.7	94.7	89.5	83.0
2	87.5	72.7	66.7	75.6
3	45.5	64.3	81.3	63.7
4	27.8	72.2	56.3	52.1
5	44.4	66.7	30.0	47.0
6	52.9	64.7	60.0	59.2
7	50.0	62.5	90.9	67.8
8	27.3	72.2	66.7	65.4
9	41.7	25.0	36.4	34.4
10	50.0	60.0	56.3	55.4
11	42.9	14.3	40.0	32.4
12	.0	40.0	30.0	23.3
13	50.0	30.8	.0	26.9
14	100.0	.0	62.5	54.2
15	20.0	.0	28.6	16.2

PEARSON CORRELATIONS OF THE POSITION OF REASONING TASKS WITHIN SETS WITH THE MEAN NUMBER OF PARTICIPANTS ATTEMPTING THEM AND THE MEAN PERCENTAGE CORRECT

Across Sets

		AH6 Q. No.	Mean no. attempted	Mean % correct
AH6 Q. No.	Correlation	1.000	-.835(**)	-.785(**)
	Sig. (2-tailed)	.	.000	.001
	N	15	15	15
Mean no. attempted	Correlation	-.835(**)	1.000	.738(**)
	Sig. (2-tailed)	.000	.	.002
	N	15	15	15
Mean % correct	Correlation	-.785(**)	.738(**)	1.000
	Sig. (2-tailed)	.001	.002	.
	N	15	15	15

** Correlation is significant at the 0.01 level (2-tailed).

Reasoning Task Position by Set and Number of Attempts Made

		Number of Attempts Made by Set			
		AH6 Q. No.	Set 1	Set 2	Set 3
AH6 Q. No.	Correlation	1.000	-.843(**)	-.530(*)	-.790(**)
	Sig.[a]	.	.000	.042	.000
	N	15	15	15	15
Att Set 1	Correlation	-.843(**)	1.000	.682(**)	.777(**)
	Sig.	.000	.	.005	.001
	N	15	15	15	15
Att Set 2	Correlation	-.530(*)	.682(**)	1.000	.415
	Sig.	.042	.005	.	.124
	N	15	15	15	15
Att Set 3	Correlation	-.790(**)	.777(**)	.415	1.000
	Sig.	.000	.001	.124	.
	N	15	15	15	15

a All probabilities are two-tailed

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Reasoning Task Position by Set and Percentage of Attempts Made that were Correct

		Percentage of Attempts Made that were Correct by Set			
		AH6 Q. No.	Set 1	Set 2	Set 3
AH6 Q. No.	Correlation	1.000	-.223	-.879(**)	-.626(*)
	Sig.[a]	.	.425	.000	.012
	N	15	15	15	15
% Set 1	Correlation	-.223	1.000	.033	.373
	Sig.	.425	.	.908	.171
	N	15	15	15	15
% Set 2	Correlation	-.879(**)	.033	1.000	.564(*)
	Sig.	.000	.908	.	.028
	N	15	15	15	15
% Set 3	Correlation	-.626(*)	.373	.564(*)	1.000
	Sig.	.012	.171	.028	.
	N	15	15	15	15

a All probabilities are two-tailed

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

APPENDIX C

Material Relating to the Replication Study Reported in Chapter 4

GENERALIZED SELF-EFFICACY SCALE

	Not at all true	Barely true	Moderately true	Exactly true
1. I can always manage to solve difficult problems if I try hard enough.	1	2	3	4
2. If someone opposes me, I can find means and ways to get what I want.	1	2	3	4
3. It is easy for me to stick to my aims and accomplish my goals.	1	2	3	4
4. I am confident that I could deal efficiently with unexpected events.	1	2	3	4
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.	1	2	3	4
6. I can solve most problems if I invest the necessary effort.	1	2	3	4
7. I can remain calm when facing difficulties because I can rely on my coping abilities.	1	2	3	4
8. When I am confronted with a problem, I can usually find several solutions.	1	2	3	4
9. If I am in a bind, I can usually think of something to do.	1	2	3	4
10. No matter what comes my way, I'm usually able to handle it.	1	2	3	4

SELF-EFFICACY MEASUREMENT: Generalized Self-Efficacy Scale (GSES)

Whereas most studies of self-efficacy follow Bandura's (1977) approach in measuring situation-specific beliefs (the belief in one's ability to perform a specific action), there is a growing interest in generalized self-efficacy beliefs. These are general beliefs in one's ability to respond to and control environmental demands and challenges. Much of this work has been developed by Ralf Schwarzer and colleagues (Schwarzer, 1992) and it is their scale which is included here.

Directions for use

Description

The Generalized Self-Efficacy Scale (GSES) is a ten-item scale, which has been translated by Mary Wegner from the original German version by Schwarzer and Jerusalem (in Schwarzer, 1992). It assesses the strength of an individual's belief in his or her own ability to respond to novel or difficult situations and to deal with any associated obstacles or setbacks.

Administration

This is a self-administered scale which normally takes two to three minutes to complete. Respondents are required to indicate the extent to which each statement applies to them.

Scoring

For each item there is a four choice response from 'Not at all true' which scores 1 to 'Exactly true' which scores 4. The scores for each of the ten items are summed to give a total score.

Interpretation

The score on this scale reflects the strength of an individual's generalized self-efficacy belief. Thus the higher the score, the greater is the individual's generalized sense of self-efficacy. For comparison purposes, Schwarzer (1993) presents accumulated data from 1,660 German adults who ranged in age from students to a group of older people, although the majority were adults in the community. The mean score for this whole sample was 29.28 (standard deviation = 4.6) and there were no age or gender differences found between samples.

Evaluation and psychometric status

All the normative data and psychometric analyses have been conducted with German samples. High internal consistency ratings have been found for each of the five samples studied and the alphas ranged from 0.82 to 0.93. In a sample of 991

migrants from what was then East Germany, the retest reliability was found to be 0.47 for men and 0.63 for women over a two-year period.

Concurrent validity (*see glossary*) has been established on the basis of appropriate correlations with other tests. Expected positive correlations have been found with measures of self-esteem (0.52), internal control beliefs (0.40) and optimism (0.49). Expected negative correlations have been obtained with general anxiety (–0.54), performance anxiety (–0.42), shyness (–0.58) and pessimism (–0.28).

Predictive validity has also been assessed in a one-year follow-up of East German migrants. In women, self-efficacy correlated positively with measures of self-esteem (0.40) and optimism (0.56) obtained two years later. However, less impressive correlations (0.20 and 0.34) were found for men over a two-year period.

The scale has been tested for unidimensionality with factor analyses (*see glossary*) and a single factor solution has been found, indicating that the GSES is measuring a unitary concept.

Comparison

This is a very new measure which has only been tested formally on German populations so far. It has been translated into eight other languages and is beginning to be quite widely used. However, as yet, there are no normative or other psychometric data on the English language version. Since it is a dispositional measure, it can be usefully compared with some of the measures described in 'Individual and Demographic Differences', particularly the self-esteem and optimism scales. Clearly these measures are somewhat similar but Schwarzer (1994) argues convincingly for their separateness.

References

BANDURA, A. (1977). 'Self-efficacy: towards a unifying theory of behaviour change', *Psychological Review*, 84, 191–215.

JERUSALEM, M. and SCHWARZER, R. (1992). 'Self-efficacy as a resource factor in stress appraisal process.' In: SCHWARZER, R. (Ed.) *Self-Efficacy: Thought Control of Action*. Washington, DC: Hemisphere.

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SCHWARZER, R. (1993). *Measurement of Perceived Self-Efficacy: Psychometric Scales for Cross-Cultural Research*. Berlin: Freie Universität.

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GSE Scores for All 50 People Who Completed Questionnaires

36.00	33.00	32.00
27.00	31.00	33.00
36.00	36.00	33.00
23.00	37.00	33.00
25.00	34.00	34.00
23.00	33.00	34.00
30.00	30.00	29.00
37.00	31.00	27.00
25.00	25.00	37.00
34.00	32.00	36.00
27.00	26.00	35.00
29.00	31.00	21.00
35.00	35.00	25.00
36.00	38.00	28.00
27.00	30.00	38.00
27.00	31.00	38.00
36.00	34.00	

ONE-SAMPLE KOLMOGOROV-SMIRNOV TEST ON GSE SCORES

		GSESCORE
N		50
Normal Parameters(a,b)	Mean	31.4600
	Std. Deviation	4.5320
Most Extreme Differences	Absolute	.133
	Positive	.097
	Negative	-.133
Kolmogorov-Smirnov Z		.940
Asymp. Sig. (2-tailed)		.339

a Test distribution is Normal.
b Calculated from data.

DESCRIPTIVE AND COMPARATIVE STATISTICS OF HIGH- AND LOW- GSE GROUPS' SCORES ON GSE

		Low-GSE Group	High-GSE Group
N	Valid	14	14
	Missing	0	0
Mean		26.07	36.50
Std. Deviation		1.86	1.02
Minimum		23	35
Maximum		29	38

LOW-GSE GROUP

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	23	2	14.3	14.3	14.3
	25	4	28.6	28.6	42.9
	26	1	7.1	7.1	50.0
	27	5	35.7	35.7	85.7
	29	2	14.3	14.3	100.0
	Total	14	100.0	100.0	

One-Sample Kolmogorov-Smirnov Test

		GSE SCORE
N		14
Normal Parameters(a,b)	Mean	26.07
	Std. Deviation	1.86
Most Extreme Differences	Absolute	.191
	Positive	.166
	Negative	-.191
Kolmogorov-Smirnov Z		.716
Asymp. Sig. (2-tailed)		.685

a Test distribution is Normal.

b Calculated from data.

HIGH-GSE GROUP

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	35	2	14.3	14.3	14.3
	36	6	42.9	42.9	57.1
	37	3	21.4	21.4	78.6
	38	3	21.4	21.4	100.0
	Total	14	100.0	100.0	

One-Sample Kolmogorov-Smirnov Test

		GSE Score
N		14
Normal Parameters(a,b)	Mean	36.50
	Std. Deviation	1.02
Most Extreme Differences	Absolute	.260
	Positive	.260
	Negative	-.169
Kolmogorov-Smirnov Z		.971
Asymp. Sig. (2-tailed)		.302

a Test distribution is Normal.
b Calculated from data.

Group Statistics

	High/Low GSE Group	N	Mean	Std. Deviation	Std. Error Mean
GSE Score	High GSE	14	36.50	1.02	.27
	Low GSE	14	26.07	1.86	.50

Independent Samples Test

		Levene's Test[a]		t-test for Equality of Means						
		F	Sig.[b]	t	df	Sig.	Mean Diff.	Std. Error Diff.	95% Conf. Int. of the Diff.	
									Lower	Upper
GSE Score	Equal vars assed	4.52	.043	18.41	26	.000	10.43	.57	9.26	11.59
	Equal vars not assed			18.41	20.17	.000	10.43	.57	9.25	11.61

a for Equality of Variances
b two-tailed

CITY UNIVERSITY

Department of Psychology

Generalised Self-Efficacy and Cognitive Stress Appraisals

Information Sheet (Main Study)

This investigation is designed to explore the extent to which individuals' confidence that they can respond to and control the environmental demands and challenges of their daily lives (Generalised Self-Efficacy - GSE) affects the way they feel in response to their performance on a series of tasks. Those taking part are asked to complete six sets of 15 computer-based anagrams and three sets of 15 pen-and-paper reasoning test questions, having been given the opportunity to practice each type of task in advance. After each of the nine sets of tasks they are given their score for that set and asked to fill in a brief questionnaire assessing their confidence in relation to the next set of tasks.

Participation in the study depends on scores on a questionnaire measuring GSE, with only those who score towards the upper or lower end of the scale being asked to take part.

If you were to agree to participate in this study, you would be required to give your written consent on the attached form, together with details of how you may be contacted (e.g. an email address or telephone number) should your GSE score show you to be eligible to take part. **These details would not be used for any other purpose and would not be connected with either your test results or your questionnaire responses.** A code number would be attached to your test results and to each questionnaire so that I would know which go together, **but no-one other than myself would be able to connect this number to you.**

If you were to agree to take part, you would be free to withdraw from the study at any time without having to give a reason.

Payment for participation in the study is £15.

Frances Stanton, Lecturer in Psychology

CITY UNIVERSITY

Department of Psychology

Generalised Self-Efficacy and Cognitive Stress Appraisals

Informed Consent Signature Sheet (Main Study)

I acknowledge that I have read and understood the description of the investigation and give my consent to take part in the study. I understand that my name and contact details will be held separately from my responses to the study and that only the researcher will be able to connect me personally with my test results and questionnaire responses. I am aware that I may withdraw from the study at any time without giving a reason and without incurring any penalty.

Name (please print) _____

Signature _____

Date _____

Contact Details: Tel _____

email _____

CITY UNIVERSITY

Department of Psychology

Generalised Self-Efficacy and Cognitive Stress Appraisals

Debriefing Sheet (Main Study)

As you were informed in advance of the study, this investigation is designed to explore the extent to which individuals' confidence that they can respond to and control the environmental demands and challenges of their daily lives (Generalised Self-Efficacy - GSE) affects the way they feel in response to their performance on a series of tasks. The study is very similar to one that was carried out in Germany about 10 years ago exploring the effects of repeated failure on cognitive stress appraisals (CSAs). CSAs are appraisals people make about their likely performance on an impending task and are divided into three types: challenge (where the person feels confident about their ability to meet the demands of the task), threat (where there is some doubt about this) and loss of control (where the person is almost certain they will fail at the task).

The German study found differences in the effects of repeated failure in those with high GSE compared to those with low GSE. Specifically, those with high GSE began the study with high levels of challenge and low levels of both threat and loss of control and, across the nine sets of tasks, showed a reduction in challenge appraisals but no significant increases in either threat or loss of control. For those with low GSE, however, challenge appraisals were weaker at the start of the study than those with high GSE, and appraisals of threat and loss of control were stronger. Over the course of the study, challenge appraisals became very weak in this group and those for threat and loss of control became much stronger. Since threat and loss of control appraisals are associated with lower levels of persistence with tasks, these are findings which could be of use in relation to a range of 'tasks', including behaviours related to the promotion of health.

I am hoping to reproduce these findings in this study. If I succeed, then I will carry out another investigation to see if the same results are found if tests are carried out weekly. If so, then I am going to see if the same kinds of changes in CSAs can be found in people trying to carry out particular health behaviours, such as trying to lose weight or reduce (or give up) smoking or drinking. Should the same pattern of appraisals be found in those with high and low GSE, then this information will be of use to health promoters, since they will be able to design interventions for those low in GSE aimed at helping them deal with their reactions to the setbacks inevitably associated with changing ingrained behaviours.

Thank you very much for your help.

Frances Stanton

DEMOGRAPHIC DATA FROM REPLICATION STUDY

Participant	GSE group[a]	GSE score	Age	Education[b]	Gender[c]
1	1	36	27	3	2
2	2	25	55	3	1
3	2	23	18	1	2
4	2	25	25	1	2
5	2	29	58	3	1
6	2	27	35	3	2
7	1	35	33	1	2
8	1	36	36	3	2
9	1	38	54	3	1
10	1	35	50	4	2
11	2	29	48	6	2
12	1	36	29	3	1
13	1	37	44	5	2
14	2	23	22	6	2
15	2	27	40	3	1
16	2	25	51	3	2
17	1	36	25	3	2
18	1	36	23	3	1
19	1	37	23	3	1
20	2	27	21	3	1
21	1	37	28	3	2
22	2	26	26	3	2
23	1	36	37	3	2
24	2	27	56	3	1
25	2	27	30	4	2
26	1	38	23	2	2
27	2	25	19	2	2
28	1	38	19	2	2

a 1 = High GSE, 2 = Low GSE

b 1 = GSEs; 2 = A Levels; 3 = Bachelor's Degree; 4 = Master's Degree; 5 = MPhil /PhD; 6 = Professional qualifications

c 1 = Male; 2 = Female

AGE ACROSS HIGH- AND LOW-GSE GROUPS

Group Statistics

	High/Low GSE Group	N	Mean	Std. Deviation	Std. Error Mean
Age in years	High GSE	14	32.21	10.757	2.875
	Low GSE	14	36.00	14.992	4.007

Independent Samples Test

		Levene's Test[a]		t-test for Equality of Means						
		F	Sig.[b]	t	df	Sig.	Mean Diff.	Std. Error Diff.	95% Conf. Int. of the Diff.	
									Lower	Upper
Age	Equal vars assed	3.81	.062	-.77	26	.450	-3.79	4.93	-13.92	6.35
	Equal vars not assed			-.77	23.58	.450	-3.79	4.93	-13.97	6.40

a for Equality of Variances
b two-tailed

PERFORMANCE ON ANAGRAM AND REASONING TASKS ACROSS HIGH- AND LOW-GSE GROUPS

Group Statistics

	High/Low GSE Group	N	Mean	Std. Deviation	Std. Error Mean
Mean Number of Correct Anagrams Across Sets	High GSE	14	4.536	1.276	.341
	Low GSE	14	4.524	1.654	.442
Mean Number of Correct AH6 Answers Across Sets	High GSE	14	4.190	1.123	.300
	Low GSE	14	4.857	1.448	.3871

Independent t-tests

		Levene's Test[a]		t-test for Equality of Means						
		F	Sig.[b]	t	df	Sig.	Mean Diff.	Std. Error Diff.	95% Conf. Int. of the Diff.	
									Lower	Upper
mean correct anags[c]	Equal vars assed	.61	.444	.02	26	.983	.01	.56	-1.14	1.16
	Equal vars not assed			.02	24.43	.983	.01	.56	-1.14	1.16
mean correct AH6s[c]	Equal vars assed	.72	.405	-1.36	26	.185	-.67	.49	-1.67	.34
	Equal vars not assed			-1.36	24.48	.186	-.67	.49	-1.68	.34

a for Equality of Variances
b two-tailed
c across sets

SINGLE COMPLETION CSAQ SCORES FROM PILOT & MAIN STUDIES

P[nt]	C1	C2	C3	C4	T1	T2	T3	L1	L2	L3	L4
1	4	2	2	3	4	4	3	2	3	2	1
2	2	2	1	2	4	1	1	1	1	1	2
3	3	3	2	3	2	2	2	1	2	1	1
4	2	2	2	1	3	3	2	3	3	2	3
5	4	2	3	2	3	3	2	1	2	2	1
6	2	2	3	2	4	3	3	1	1	3	3
7	4	2	3	3	4	3	3	2	2	2	2
8	4	3	3	3	3	2	2	2	2	1	2
9	2	2	1	1	2	2	2	2	2	1	1
10	4	3	4	3	3	2	2	2	3	2	2
11	4	1	4	2	3	1	1	1	1	1	1
12	3	2	3	3	4	2	3	2	2	2	1
13	2	2	2	2	4	3	4	2	3	2	2
14	3	2	3	3	3	2	1	1	1	1	1
15	3	2	3	3	3	3	2	2	2	2	1
16	2	1	1	1	4	2	1	2	2	1	3
17	2	2	3	2	3	3	3	2	3	2	2
18	4	3	4	3	3	3	3	2	3	2	2
19	3	2	2	2	3	3	2	2	3	2	2
20	4	3	3	4	2	1	2	1	1	1	1
21	3	3	3	3	2	2	2	2	2	2	1
22	3	1	3	3	3	3	3	2	2	2	2
23	3	3	2	3	4	3	3	2	2	1	1
24	4	3	3	3	3	2	3	1	1	1	1
25	3	2	4	2	3	3	3	2	2	1	1
26	4	2	4	4	3	2	2	1	1	1	1
27	4	2	4	3	1	2	1	1	1	1	1
28	4	3	3	3	2	1	1	1	1	1	1
29	3	3	3	3	3	2	2	2	2	2	1
30	4	1	1	3	4	3	2	2	2	2	2
31	4	2	3	3	3	2	2	1	1	1	1
32	4	3	3	3	2	1	1	1	1	1	1
33	3	3	3	3	3	2	3	2	2	1	1
34	4	3	3	3	3	1	1	2	1	1	1
35	4	3	2	3	2	3	1	1	2	1	1
36	4	3	4	4	2	3	4	1	2	1	1
37	3	3	3	4	3	3	3	2	1	1	1
38	4	3	3	3	2	2	2	1	2	1	1
39	3	3	2	3	3	2	3	2	2	2	2
40	4	3	4	3	3	3	3	1	1	1	1
41	3	2	3	2	3	3	2	1	1	2	2
42	3	2	1	3	4	1	1	1	1	1	1
43	3	3	3	2	4	4	3	2	4	2	2
44	3	1	4	3	3	3	3	3	3	2	2
45	4	2	2	3	3	3	3	2	1	1	1
46	4	3	2	3	4	3	4	3	3	3	2
47	4	3	3	4	3	2	2	3	2	1	2

RELIABILITY OF CSAQ BASED ON SINGLE COMPLETION PILOT AND MAIN STUDY SCORES

CHALLENGE SUBSCALE

		Mean	Std Dev	Cases
1.	C1	3.3404	.7306	47.0
2.	C2	2.3617	.6733	47.0
3.	C3	2.7660	.8899	47.0
4.	C4	2.7660	.7287	47.0

Correlation Matrix

	C1	C2	C3	C4
C1	1.0000			
C2	.3188	1.0000		
C3	.4262	.1807	1.0000	
C4	.6429	.4422	.3830	1.0000

N of Cases = 47.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	11.2340	5.0093	2.2381	4

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
C1	7.8936	2.9232	.6213	.4526	.5886
C2	8.8723	3.5920	.3777	.1975	.7247
C3	8.4681	2.9500	.4146	.2019	.7281
C4	8.4681	2.8631	.6550	.4876	.5680

Reliability Coefficients 4 items

Alpha = .7185 Standardized item alpha = .7264

THREAT SUBSCALE

		Mean	Std Dev	Cases
1.	T1	3.0213	.7369	47.0
2.	T2	2.3830	.7955	47.0
3.	T3	2.2766	.8773	47.0

Correlation Matrix

	T1	T2	T3
T1	1.0000		
T2	.3196	1.0000	
T3	.3270	.6548	1.0000

N of Cases = 47.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	7.6809	3.6568	1.9123	3

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
T1	4.6596	2.3164	.3555	.1264	.7891
T2	5.2979	1.7354	.6149	.4413	.4872
T3	5.4043	1.5504	.6118	.4442	.4833

Reliability Coefficients 3 items

Alpha = .7020 Standardized item alpha = .6968

LOSS SUBSCALE

		Mean	Std Dev	Cases
1.	L1	1.6809	.6292	47.0
2.	L2	1.8723	.7972	47.0
3.	L3	1.4894	.5850	47.0
4.	L4	1.4681	.6203	47.0

Correlation Matrix

	L1	L2	L3	L4
L1	1.0000			
L2	.6538	1.0000		
L3	.4335	.5564	1.0000	
L4	.4467	.4312	.5531	1.0000

N of Cases = 47.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	6.5106	4.4292	2.1046	4

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
L1	4.8298	2.7095	.6390	.4608	.7456
L2	4.6383	2.1924	.6783	.5197	.7316
L3	5.0213	2.8474	.6278	.4301	.7539
L4	5.0426	2.8677	.5601	.3594	.7815

Reliability Coefficients 4 items

Alpha = .8040 Standardized item alpha = .8078

RAW DATA FOR RELIABILITY ANALYSES OF CSAQ COMPLETIONS 2-9 IN THE REPLICATION STUDY

COMPLETION 2

P^{nt}	C1	C2	C3	C4	T1	T2	T3	L1	L2	L3	L4
1	4	3	3	3	2	2	2	2	2	1	1
2	3	3	3	3	3	2	2	2	3	2	2
3	3	3	3	3	2	2	2	2	2	2	2
4	4	2	4	2	3	2	2	2	1	2	2
5	3	2	2	2	3	3	3	2	2	2	2
6	3	3	3	3	3	1	2	1	1	1	1
7	3	2	2	2	3	3	3	2	2	1	1
8	4	2	1	3	2	2	2	1	1	1	1
9	1	2	4	3	2	2	2	1	1	1	1
10	4	3	3	3	1	1	1	1	1	1	1
11	3	2	3	3	2	2	3	2	2	2	2
12	1	2	2	2	4	3	2	2	3	3	3
13	3	2	3	3	3	2	2	1	1	1	1
14	4	3	3	3	2	3	1	1	1	1	1
15	3	3	3	3	3	2	3	2	2	1	1
16	3	3	3	4	3	1	1	1	1	1	1
17	3	3	2	3	2	2	2	1	1	2	2
18	2	2	4	3	3	3	4	2	1	3	2
19	3	2	2	3	3	3	3	2	1	1	1
20	3	3	3	3	3	3	3	2	3	3	2
21	3	3	2	3	2	2	2	2	2	2	2
22	4	2	2	3	4	4	4	2	2	2	1
23	3	2	3	2	3	3	2	2	2	2	2
24	2	2	2	3	4	3	2	2	2	2	1
25	3	2	2	1	4	4	4	2	3	2	2
26	4	1	1	2	3	3	3	1	1	1	1
27	3	2	2	2	4	3	4	2	3	3	4
28	3	3	3	3	3	1	3	2.5	2	2	2

COMPLETION 3

P[nt]	C1	C2	C3	C4	T1	T2	T3	L1	L2	L3	L4
1	4	3	3	3	2	2	2	1	1	1	1
2	3	2	3	3	2	2	2	2	2	2	2
3	3	2	3	3	2	2	2	2	2	2	2
4	3	2	2	2	3	3	3	3	2	2	2
5	3	3	3	3	2	1	1	1	1	1	1
6	3	2	4	4	3	3	3	2	3	1	1
7	4	2	3	3	2	1	1	1	1	1	1
8	4	2	4	4	2	2	2	1	1	1	1
9	4	4	3	3	1	1	1	1	1	1	1
10	3	2	3	3	2	3	2	2	2	2	2
11	2	2	2	2	3	3	3	3	3	3	2
12	3	2	3	3	2	2	2	1	1	1	1
13	4	3	3	3	2	3	1	1	1	1	1
14	3	2	3	3	3	2	3	2	2	1	2
15	3	3	3	3	3	1	1	1	1	1	1
16	4	3	2	2	2	2	1	2	2	2	1
17	4	2	4	4	3	3	3	2	1	2	1
18	3	4	3	3	2	2	1	1	1	1	1
19	3	3	3	3	3	2	3	2	2	2	2
20	3	2	2	2	3	3	3	3	3	2	2
21	4	2	4	4	4	4	4	2	2	3	1
22	3	2	3	3	3	3	2	2	2	1	1
23	3	2	2	2.5	3	3	2	2	2	2	2
24	2	1	1	1	4	4	4	2	4	2	3
25	4	2	3	3	4	3	3	2	3	2	2
26	3	1	1	1	3	3	3	1	1	1	1
27	3	2	2	2	4	3	4	4	3	3	3
28	2	3	3	3	3	2	3	2	2	2	3

COMPLETION 4

P[nt]	C1	C2	C3	C4	T1	T2	T3	L1	L2	L3	L4
1	4	3	3	3	3	2	3	1	1	1	1
2	3	3	3	2	2	2	2	2	2	2	2
3	3	2	3	2	3	2	3	2	2	2	1
4	2	2	2	2	3	3	3	3	2	2	2
5	3	3	3	3	2	1	2	1	1	1	1
6	3	2	4	2	4	3	3	2	3	2	2
7	4	2	2	3	2	2	3	1	1	1	1
8	4	2	4	3	2	2	2	1	1	1	1
9	4	3	4	4	1	1	1	1	1	1	1
10	3	3	3	2	3	3	3	2	2	2	2
11	1	1	1	1	4	4	3	3	3	3	3
12	3	2	3	3	2	2	2	1	1	1	1
13	4	3	3	3	2	3	1	1	1	1	1
14	3	3	3	2	3	2	3	2	2	2	2
15	3	3	3	4	1	1	1	1	1	1	1
16	3	2	2	2	2	2	1	1	2	2	1
17	4	2	3	3	3	3	3	1	1	1	1
18	3	3	3	3	2	2	3	1	1	1	1
19	3	3	3	3	3	3	3	2	2	2	2
20	3	3	2	2	2	2	2	2	2	2	2
21	4	2	4	2	3	4	4	3	2	3	1
22	3	2	3	2	2	2	2	2	2	2	1
23	3	3	2	2.5	3	3	2	2	2	2	2
24	2	1	1	1	4	4	4	3	4	3	4
25	3	2	3	3	4	3	3	2	3	2	2
26	4	1	2	1	3	4	4	1	1	1	1
27	2	2	2	2	4	3	4	3	3	4	4
28	3	3	3	4	2	2	2	2	2	2	2

COMPLETION 5

P^{nt}	C1	C2	C3	C4	T1	T2	T3	L1	L2	L3	L4
1	4	3	3	3	3	3	2	1	1	1	1
2	3	2	2	2	2	2	2	2	2	2	2
3	2	2	4	2	3	2	3	3	2	2	2
4	2	2	2	2	3	3	3	3	3	3	3
5	3	3	3	3	2	1	1	1	2	1	1
6	3	2	4	2	3	3	3	2	3	2	2
7	4	1	3	3	3	2	3	1	1	1	1
8	4	2	4	2	2	2	2	1	1	1	1
9	4	3	3	4	1	1	1	1	1	1	1
10	3	2	3	2	3	3	3	2	2	2	2
11	2	1	1	2	3	3	3	3	3	3	3
12	3	2	3	3	2	2	2	1	1	1	1
13	4	3	3	3	3	3	1	1	1	1	1
14	2	2	2	2	3	3	3	2	2	2	2
15	4	3	3	4	1	1	1	1	1	1	1
16	3	2	2	3	2	2	2	2	2	2	1
17	4	2	3	3	3	3	3	1	1	1	1
18	3	2	3	3	3	3	3	2	2	1	1
19	3	3	3	3	3	3	3	3	3	3	2
20	2	2	2	1	3	3	3	3	3	4	2
21	1	1	4	1	4	4	4	4	3	4	4
22	3	2	3	2	3	2	2	2	2	1	1
23	3	3	2	3	3	3	2	2	2	2	2
24	1	1	1	1	4	4	4	4	4	3	4
25	3	2	3	3	3	3	3	2	3	2	2
26	4	1	2	2	3	4	4	1	1	1	1
27	4	1	1	2	4	3	4	4	3	4	4
28	3	3	4	3	4	3	3	3	2.5	2	2

COMPLETION 6

P[nt]	C1	C2	C3	C4	T1	T2	T3	L1	L2	L3	L4
1	4	3	3	3	3	3	2	1	1	1	1
2	3	2	2	2	2	2	2	2	2	2	2
3	3	2	3	3	2	2	2	2	2	2	2
4	2	2	2	2	3	3	4	3	3	3	2
5	3	3	3	3	2	1	1	1	1	1	1
6	3	2	4	2	3	3	3	2	3	2	2
7	4	2	1	3	3	3	3	1	1	1	1
8	4	3	4	3	2	2	1	1	1	1	1
9	4	3	3	4	1	1	1	1	1	1	1
10	2	3	2	2	2	3	3	2	2	2	2
11	3	1	1	1	3	3	4	3	2	3	3
12	3	2	3	3	2	2	2	1	1	1	1
13	4	3	3	3	1	3	1	1	1	1	1
14	3	2	2	2	3	2	3	2	2	2	2
15	3	3	3	4	2	1	1	1	1	1	1
16	3	2	2	2	2	2	1	2	2	1	1
17	4	2	3	3	3	3	3	1	1	1	1
18	1	1	3	3	3	2	3	1	2	1	3
19	3	3	3	4	3	3	3	2	3	2	2
20	4	3	2	3	2	2	2	2	2	2	2
21	4	3	4	2	3	3	4	2	2	2	2
22	3	2	3	2	2	2	2	1	2	2	1
23	2	3	2	3	3	3	2	2	2	2	2
24	3	2	4	1	4	4	3	2	4	2	2
25	3	3	3	3	3	3	3	2	3	2	2
26	4	1	1	1	3	4	3	1	1	1	1
27	2	2	2	2	4	4	4	4	3	4	4
28	4	4	2	3	4	3	3	3	2	3	2

COMPLETION 7

P^{nt}	C1	C2	C3	C4	T1	T2	T3	L1	L2	L3	L4
1	4	4	3	4	2	2	2	1	1	1	1
2	3	3	2	2	2	2	2	2	2	2	2
3	3	3	3	2	3	2	2	2	2	2	2
4	3	2	2	2.5	2	2	2	2	2	2	2
5	3	3	3	3	1	1	1	1	1	1	1
6	4	3	3	3	2	2	2	1	2	1	1
7	4	2	2	3	3	2	3	1	1	1	1
8	4	3	4	3	2	2	2	1	1	1	1
9	4	3	4	4	1	1	1	1	1	1	1
10	3	2	2	2	3	3	3	2	2	3	2
11	3	3	2	2	2	3	3	2	2	3	2
12	3	2	3	3	2	2	2	1	1	1	1
13	4	3	3	3	1	2	1	1	1	1	1
14	3	2	2	3	3	2	3	2	2	2	2
15	3	3	3	3	2	1	1	1	1	1	1
16	4	3	2	3	2	2	2	2	2	1	1
17	4	4	4	4	2	1	1	1	1	1	1
18	3	3	3	3	2	2	2	1	1	1	1
19	3	3	3	3	2	1	1	2	1	2	1
20	4	3	3	3	2	2	2	2	2	1	1
21	4	3	3	3	1	1	2	1	1	1	1
22	3	2	3	2	3	3	3	2	1	1	2
23	3	3	2	3	2	2	2	2	2	2	2
24	3	3	3	2	3	3	3	2	2	2	2
25	3	3	3	3	3	3	3	2	2	2	2
26	4	3	1	1	4	4	3	1	1	1	2
27	4	3	3	3	3	3	3	2	3	2	2
28	3	3	3	3	3	3	2	3	2	2	2

COMPLETION 8

Pnt	C1	C2	C3	C4	T1	T2	T3	L1	L2	L3	L4
1	4	3	3	3	2	2	2	1	1	1	1
2	3	2	3	3	2	2	2	2	2	2	2
3	4	3	3	2	2	2	2	2	1	1	2
4	3	2	2	2	3	3	2	2	2	2	2
5	3	3	3	3	1	1	1	1	1	1	1
6	3	3	4	3	3	3	3	2	2	2	1
7	4	2	2	3	2	2	2	1	1	1	1
8	3	3	4	3	2	2	2	2	2	1	1
9	4	3	3	4	1	1	1	1	1	1	1
10	3	3	3	3	3	2	3	3	2	2	2
11	3	2	2	3	3	3	2	2	2	2	2
12	3	2	2	3	2	2	2	1	1	1	1
13	4	3	3	3	3	2	2	1	1	1	1
14	3	2	2	2	2	2	3	2	2	1	1
15	3	3	3	3	2	1	1	1	1	1	1
16	4	3	2	3	2	2	2	2	2	1	1
17	4	4	4	4	2	1	1	1	1	1	1
18	3	2	2	2	3	3	3	2	2	2	1
19	3	3	4	3	2	1	1	1	1	1	1
20	4	2	3	3	2	1	2	2	1	1	1
21	4	3	4	3	2	2	2	1	1	1	1
22	3	2	3	2	3	3	3	1	2	1	2
23	3	3	2	2	3	2	2	2	2	2	2
24	3	3	3	2	4	4	3	2	2	2	2
25	3	2	3	3	3	3	3	2	3	2	2
26	4	2	1	1	3	4	3	1	1	1	1
27	3	3	3	2	4	3	3	3	3	3	2
28	3	3	3	4	3	3	2	3	2	2	2

COMPLETION 9

P[nt]	C1	C2	C3	C4	T1	T2	T3	L1	L2	L3	L4
1	4	3	3	3	2	2	2	1	1	1	1
2	2	2	2	2	3	2	2	3	2	2	2
3	3	2	2	2	2	2	3	3	2	2	2
4	3	2	2	2	3	3	3	2	3	3	3
5	3	3	3	3	1	1	1	1	1	1	1
6	3	3	3	3	3	3	2	2	2	2	2
7	4	2	2	3	3	3	3	1	1	1	1
8	4	3	4	3	2	2	2	1	1	1	1
9	4	4	4	4	1	1	1	1	1	1	1
10	3	2	3	3	2	2	2	2	2	2	2
11	3	2	2	2	3	3	3	2	3	2	2
12	3	2	2	3	2	2	2	3	2	1	1
13	4	3	3	3	2	3	2	1	1	1	1
14	2	2	2	2	3	2	4	3	3	3	2
15	3	3	3	3	2	1	2	1	1	1	1
16	3	4	2	3	2	2	1	2	1	2	1
17	4	4	4	4	2	1	1	1	1	1	1
18	2	2	2	2	4	3	1	2	3	2	2
19	3	3	3	3	2	2	2	1	2	1	1
20	3	2	3	3	2	2	2	2	2	1	2
21	4	1	3	2	2	3	2	1	1	3	2
22	3	2	3	2	2	3	3	2	2	2	2
23	3	3	2	2.5	2	2	2	2	2	2	2
24	2	2	3	1	4	3	4	3	3	2	3
25	3	2	3	3	3	3	3	2	3	2	2
26	4	1	1	1	3	4	4	2	1	1	2
27	3	3	2	2	3	3	3	3	3	3	3
28	4	3	3	3	3	3	2	3	1	3	2

RAW DATA RELATING TO HYPOTHESIS TESTING IN THE MAIN REPLICATION STUDY

CSA SCORES ACROSS THE NINE COMPLETIONS

Scores for Challenge

P^nt	1	2	3	4	5	6	7	8	9
1	3.50	3.25	3.25	3.25	3.25	3.25	3.75	3.25	3.25
2	3.00	3.00	2.75	2.75	2.25	2.25	2.50	2.75	2.00
3	2.50	3.00	2.75	2.50	2.50	2.75	2.75	3.00	2.25
4	2.75	2.25	2.25	2.00	2.00	2.00	2.38	2.25	2.25
5	3.25	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
6	2.75	2.25	2.75	2.75	2.75	2.75	3.25	3.25	3.00
7	3.50	2.50	3.00	2.75	2.75	2.50	2.75	2.75	2.75
8	3.25	2.50	3.25	3.25	3.00	3.50	3.50	3.25	3.50
9	3.25	3.25	3.75	3.75	3.50	3.50	3.75	3.50	4.00
10	3.00	2.75	2.75	2.75	2.50	2.25	2.25	3.00	2.75
11	2.25	1.75	2.00	1.00	1.50	1.50	2.50	2.50	2.25
12	3.00	2.75	2.75	2.75	2.75	2.75	2.75	2.50	2.50
13	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
14	3.00	3.00	2.75	2.75	2.00	2.25	2.50	2.25	2.00
15	3.25	3.25	3.25	3.25	3.50	3.25	3.00	3.00	3.00
16	3.00	2.75	3.00	2.25	2.50	2.25	3.00	3.00	3.00
17	3.75	2.75	3.25	3.00	3.00	3.00	4.00	4.00	4.00
18	3.25	2.50	3.50	3.00	2.75	2.00	3.00	2.25	2.00
19	3.25	3.00	3.00	3.00	3.00	3.25	3.00	3.25	3.00
20	2.75	2.75	2.25	2.50	1.75	3.00	3.25	3.00	2.75
21	3.50	2.75	3.00	3.00	1.75	3.25	3.25	3.25	2.50
22	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
23	2.25	2.25	2.38	2.63	2.75	2.50	2.75	2.50	2.63
24	2.75	2.00	1.25	1.25	1.00	2.50	2.75	2.75	2.00
25	2.75	3.00	3.00	2.75	2.75	3.00	3.00	2.75	2.75
26	2.75	2.00	1.75	2.00	2.25	1.75	2.25	2.00	1.75
27	3.00	2.25	2.25	2.00	2.00	2.00	3.25	2.75	2.50
28	3.50	3.00	2.75	3.25	3.25	3.25	3.00	3.25	3.25

Scores for Threat

P^{nt}	1	2	3	4	5	6	7	8	9
1	1.67	2.00	2.00	2.67	2.67	2.67	2.00	2.00	2.00
2	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.33
3	3.00	2.33	2.00	2.67	2.67	2.00	2.67	2.00	2.33
4	3.33	3.00	3.00	3.00	3.00	3.33	2.00	2.67	3.00
5	2.67	2.00	1.33	1.67	1.33	1.33	1.00	1.00	1.00
6	3.00	3.00	3.00	3.33	3.00	3.00	2.00	3.00	2.67
7	2.33	2.00	1.33	2.33	2.67	3.00	2.67	2.00	3.00
8	1.33	2.00	2.00	2.00	2.00	1.67	2.00	2.00	2.00
9	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	2.33	2.33	2.33	3.00	3.00	2.67	3.00	2.67	2.00
11	3.00	3.00	3.00	3.67	3.00	3.33	2.67	2.67	3.00
12	2.33	2.33	2.00	2.00	2.00	2.00	2.00	2.00	2.00
13	1.33	2.00	2.00	2.00	2.33	1.67	1.33	2.33	2.33
14	2.67	2.67	2.67	2.67	3.00	2.67	2.67	2.33	3.00
15	1.67	1.67	1.67	1.00	1.00	1.33	1.33	1.33	1.67
16	2.00	2.00	1.67	1.67	2.00	1.67	2.00	2.00	1.67
17	3.00	3.33	3.00	3.00	3.00	3.00	1.33	1.33	1.33
18	3.00	3.00	1.67	2.33	3.00	2.67	2.00	3.00	2.67
19	2.00	3.00	2.67	3.00	3.00	3.00	1.33	1.33	2.00
20	2.67	2.00	3.00	2.00	3.00	2.00	2.00	1.67	2.00
21	3.00	4.00	4.00	3.67	4.00	3.33	1.33	2.00	2.33
22	2.67	2.67	2.67	2.00	2.33	2.00	3.00	3.00	2.67
23	2.00	3.00	2.67	2.67	2.67	2.67	2.00	2.33	2.00
24	3.67	4.00	4.00	4.00	4.00	3.67	3.00	3.67	3.67
25	3.00	2.33	3.33	3.33	3.00	3.00	3.00	3.00	3.00
26	3.00	3.00	3.00	3.67	3.67	3.33	3.67	3.33	3.67
27	3.67	3.67	3.67	3.67	3.67	4.00	3.00	3.33	3.00
28	2.33	2.33	2.67	2.00	3.33	3.33	2.67	2.67	2.67

Scores for Loss

P^{nt}	1	2	3	4	5	6	7	8	9
1	1.00	1.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.75	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.25
3	2.00	1.75	2.00	1.75	2.25	2.00	2.00	1.50	2.25
4	1.50	2.00	2.25	2.25	3.00	2.75	2.00	2.00	2.75
5	1.00	1.00	1.00	1.00	1.25	1.00	1.00	1.00	1.00
6	1.50	1.50	1.75	2.25	2.25	2.25	1.25	1.75	2.00
7	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.50	1.00
9	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.75	2.00	2.00	2.00	2.00	2.00	2.25	2.25	2.00
11	2.00	2.75	2.75	3.00	3.00	2.75	2.25	2.00	2.25
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.75
13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.50	1.50	1.75	2.00	2.00	2.00	2.00	1.50	2.75
15	1.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.25	1.50	1.75	1.50	1.75	1.50	1.50	1.50	1.50
17	1.25	2.00	1.50	1.00	1.00	1.00	1.00	1.00	1.00
18	1.25	1.25	1.00	1.00	1.50	1.75	1.00	1.75	2.25
19	1.25	2.25	2.00	2.00	2.75	2.25	1.50	1.00	1.75
20	2.00	2.00	2.50	2.00	3.00	2.00	1.50	1.25	1.75
21	1.00	1.75	2.00	2.25	3.75	2.00	1.00	1.00	1.75
22	1.50	2.00	1.50	1.75	1.50	1.50	1.50	1.50	2.00
23	1.00	1.75	2.00	2.00	2.00	2.00	2.00	2.00	2.00
24	2.50	2.25	2.75	3.50	3.75	2.50	2.00	2.00	2.75
25	2.50	2.25	2.25	2.25	2.25	2.25	2.00	2.25	2.25
26	1.25	1.00	1.00	1.00	1.00	1.00	1.25	1.00	1.50
27	2.75	3.00	3.25	3.50	3.75	3.75	2.25	2.75	3.00
28	2.00	2.13	2.25	2.00	2.38	2.38	2.25	2.25	2.25

Scores for Anagram Sets

Part[nt]	1	2	3	4	5	6	Mean
1	6	3	4	2	5	4	4.0000
2	6	6	7	7	7	9	7.0000
3	2	4	5	2	1	3	2.8333
4	5	4	5	4	3	5	4.3333
5	1	2	1	3	3	4	2.3333
6	5	4	2	3	4	4	3.6667
7	4	6	5	6	4	4	4.8333
8	5	4	6	3	4	6	4.6667
9	4	4	5	5	1	5	4.0000
10	8	6	8	8	7	7	7.3333
11	4	2	5	2	5	4	3.6667
12	6	3	4	5	1	4	3.8333
13	6	5	8	8	4	7	6.3333
14	5	3	5	3	2	5	3.8333
15	7	9	6	8	9	7	7.6667
16	7	9	9	7	5	6	7.1667
17	3	3	4	4	3	4	3.5000
18	5	5	6	5	3	7	5.1667
19	7	3	6	6	2	8	5.3333
20	4	5	3	5	4	4	4.1667
21	2	3	2	3	2	4	2.6667
22	4	3	6	8	3	5	4.8333
23	6	4	4	5	8	4	5.1667
24	5	5	6	2	5	6	4.8333
25	4	6	3	4	3	4	4.0000
26	5	3	5	2	2	4	3.5000
27	3	4	2	3	2	4	3.0000
28	3	3	3	5	1	4	3.1670

Scores for AH6 Sets

Participant	1	2	3	Mean
1	6	3	4	4.3333
2	4	8	4	5.3333
3	5	8	4	5.6667
4	2	3	3	2.6667
5	5	6	3	4.6667
6	5	2	3	3.3333
7	3	5	4	4.0000
8	3	3	5	3.6667
9	2	9	4	5.0000
10	2	7	4	4.3333
11	4	6	3	4.3333
12	6	4	4	4.6667
13	2	0	5	2.3333
14	3	6	3	4.0000
15	7	6	6	6.3333
16	3	6	7	5.3333
17	3	8	6	5.6667
18	5	4	5	4.6667
19	4	7	6	5.6667
20	8	10	7	8.3333
21	2	4	5	3.6667
22	3	5	3	3.6667
23	5	5	6	5.3333
24	5	5	3	4.3333
25	5	5	2	4.0000
26	2	4	4	3.3333
27	6	6	6	6.0000
28	2	4	0	2.0000

MAUCHLY'S TEST[b] OF SPHERICITY FOR CSAQ SUBSCALES

Within Subjects Effect	Mauchly's W	Approx Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
CHALL	.030	84.856	35	.000	.535	.648	.125
THREAT	.042	76.530	35	.000	.456	.536	.125
LOSS	.005	128.248	35	.000	.363	.411	.125

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b Design: Intercept Within Subjects Design: CSA

ANOVAs TO TEST MAIN HYPOTHESES OF REPLICATION STUDY

CHALLENGE SUBSCALE

```
BMDP Instruction File    : C:\WINDOWS\BMDPRUN&.TMP
BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01   (IBM PC/MS-DOS)                Date: 03/29/02  at 07:50:49
Site: S1500522CK
      City University - Computer Unit


/INPUT
       FILE = 'C:\bmdp\MSChal.dat'.
       FORMAT = FREE.
       VARIABLES = 10.
/VARIABLE
       NAMES ARE GSE, Chal1, Chal2, Chal3, Chal4, Chal5, Chal6,
Chal7, Chal8, Chal9.
/GROUP
       VARIABLE = GSE.
       CODES (GSE) = 1, 2.
       NAMES (GSE) = High, Low.
/DESIGN
       LEVEL = 9.
       NAME = C.
       DEPENDENT = Chal1, Chal2, Chal3, Chal4, Chal5, Chal6,
Chal7, Chal8, Chal9.
/END
 CASE      1         2         3         4         5         6         7         8
  NO.  GSE       Chal1     Chal2     Chal3     Chal4     Chal5     Chal6     Chal7
-----  --------  --------  --------  --------  --------  --------  --------  --------
    1  High          3.50      3.25      3.25      3.25      3.25      3.25      3.75
    2  Low           3.00      3.00      2.75      2.75      2.25      2.25      2.50
    3  Low           2.50      3.00      2.75      2.50      2.50      2.75      2.75
    4  Low           2.75      2.25      2.25      2.00      2.00      2.00      2.37
    5  Low           3.25      3.00      3.00      3.00      3.00      3.00      3.00
    6  Low           2.75      2.25      2.75      2.75      2.75      2.75      3.25
    7  High          3.50      2.50      3.00      2.75      2.75      2.50      2.75
    8  High          3.25      2.50      3.25      3.25      3.00      3.50      3.50
    9  High          3.25      3.25      3.75      3.75      3.50      3.50      3.75
   10  High          3.00      2.75      2.75      2.75      2.50      2.25      2.25
 CASE      9        10
  NO.  Chal8     Chal9
-----  --------  --------
    1      3.25      3.25
    2      2.75      2.00
    3      3.00      2.25
    4      2.25      2.25
    5      3.00      3.00
    6      3.25      3.00
    7      2.75      2.75
    8      3.25      3.50
    9      3.50      4.00
   10      3.00      2.75

NUMBER OF CASES READ. . . . . .      28
```

GROUPING VARIABLE. . . GSE

CATEGORY	FREQUENCY
High	14
Low	14

DESCRIPTIVE STATISTICS OF DATA

VARIABLE NO.	NAME	TOTAL FREQ.	MEAN	STANDARD DEV.	ST.ERR OF MEAN	COEFF OF VAR	SMALLEST VALUE	LARGEST VALUE	RANGE
2	Chal1	28	3.0179	.38447	.07266	.12740	2.2500	3.7500	1.5000
3	Chal2	28	2.6875	.41736	.07887	.15530	1.7500	3.2500	1.5000
4	Chal3	28	2.7634	.54256	.10253	.19634	1.2500	3.7500	2.5000
5	Chal4	28	2.6741	.60413	.11417	.22592	1.0000	3.7500	2.7500
6	Chal5	28	2.5625	.61473	.11617	.23989	1.0000	3.5000	2.5000
7	Chal6	28	2.6786	.55217	.10435	.20614	1.5000	3.5000	2.0000
8	Chal7	28	2.9598	.45012	.08506	.15208	2.2500	4.0000	1.7500
9	Chal8	28	2.8839	.44348	.08381	.15378	2.0000	4.0000	2.0000
10	Chal9	28	2.7277	.57740	.10912	.21168	1.7500	4.0000	2.2500

METHOD OF ESTIMATING PREDICTED AND RESIDUALS. .	MEAN
PRINT PREDICTED AND RESIDUALS VALUES.	NO
PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL .	NO
PRINT SPHERICITY TEST	YES
PRINT CELL MEANS AND STANDARD DEVIATIONS. . . .	YES
PRINT UNWEIGHTED MARGINAL MEANS	NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . .	NO
PRINT CONFIDENCE INTERVALS.	NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . .	NO
BOX-COX DIAGNOSTIC PLOT	NO
MINIPLOTS	NO
TOLERANCE FOR PIVOTING.	1.0E-02

DESIGN SPECIFICATIONS

GROUP = 1
DEPEND = 2 3 4 5 6 7 8 9 10
LEVEL = 9

GROUP STRUCTURE

GSE	COUNT
High	14
Low	14

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

5.47048	1.000					
3.15179	-0.341	1.000				
3.31258	-0.305	0.636	1.000			
1.64541	-0.009	-0.427	-0.415	1.000		
1.06714	0.246	0.180	-0.164	-0.049	1.000	
1.92544	-0.168	0.292	0.312	-0.365	0.270	1.000

0.61632	-0.210	0.034	-0.060	-0.029	-0.110	-0.152	1.000
2.72131	0.029	0.010	-0.335	0.296	0.406	0.047	-0.224
2.72131	1.000						

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY 0.0000

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

				MARGINAL
GSE =		High	Low	
	C			
Chal1	1	3.21429	2.82143	3.01786
Chal2	2	2.75000	2.62500	2.68750
Chal3	3	2.97321	2.55357	2.76339
Chal4	4	2.97321	2.37500	2.67411
Chal5	5	2.83929	2.28571	2.56250
Chal6	6	2.85714	2.50000	2.67857
Chal7	7	3.08929	2.83036	2.95982
Chal8	8	3.00000	2.76786	2.88393
Chal9	9	2.93750	2.51786	2.72768
MARGINAL		2.95933	2.58631	2.77282
COUNT		14	14	28

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

GSE =		High	Low
	C		
Chal1	1	0.37796	0.28468
Chal2	2	0.37978	0.45731
Chal3	3	0.49560	0.52053
Chal4	4	0.40483	0.63359
Chal5	5	0.45581	0.64194
Chal6	6	0.56936	0.49029
Chal7	7	0.53356	0.31625
Chal8	8	0.53709	0.30167
Chal9	9	0.66280	0.39788

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
Chal1 Chal2 Chal3 Chal4 Chal5 Chal6 Chal7 Chal8
Chal9

	SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.
	MEAN	1937.50620	1	1937.50620	1449.26	0.0000
	GSE	8.76587	1	8.76587	6.56	0.0166
1	ERROR	34.75918	26	1.33689		
	C	5.02951	8	0.62869	6.57	0.0000
	CG	1.27877	8	0.15985	1.67	0.1074

2	ERROR	19.91047	208	0.09572

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
MEAN		
GSE		
C	0.0001	0.0000
CG	0.1599	0.1427

EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

ERROR TERM	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.5201	0.6553

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 1522

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 03/29/02 at 07:51:45
Site: S1500522CK
City University - Computer Unit

THREAT SUBSCALE

```
BMDP Instruction File    : C:\WINDOWS\BMDPRUN&.TMP
BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01    (IBM PC/MS-DOS)                    Date: 03/29/02  at 08:13:51
Site: S1500522CK
      City University - Computer Unit


/INPUT
       FILE = 'C:\bmdp\MSThreat.dat'.
       FORMAT = FREE.
       VARIABLES = 10.
/VARIABLE
       NAMES ARE GSE, Threat1, Threat2, Threat3, Threat4, Threat5, Threat6,
Threat7, Threat8, Threat9.
/GROUP
       VARIABLE = GSE.
       CODES (GSE) = 1, 2.
       NAMES (GSE) = High, Low.
/DESIGN
       LEVEL = 9.
       NAME = T.
       DEPENDENT = Threat1, Threat2, Threat3, Threat4, Threat5, Threat6,
Threat7, Threat8, Threat9.
/END
 CASE    1        2        3        4        5        6        7        8
  NO. GSE      Threat1  Threat2  Threat3  Threat4  Threat5  Threat6  Threat7
----- -------- -------- -------- -------- -------- -------- -------- --------
    1 High         1.67     2.00     2.00     2.67     2.67     2.67     2.00
    2 Low          2.00     2.00     2.00     2.00     2.00     2.00     2.00
    3 Low          3.00     2.33     2.00     2.67     2.67     2.00     2.67
    4 Low          3.33     3.00     3.00     3.00     3.00     3.33     2.00
    5 Low          2.67     2.00     1.33     1.67     1.33     1.33     1.00
    6 Low          3.00     3.00     3.00     3.33     3.00     3.00     2.00
    7 High         2.33     2.00     1.33     2.33     2.67     3.00     2.67
    8 High         1.33     2.00     2.00     2.00     2.00     1.67     2.00
    9 High         1.33     1.00     1.00     1.00     1.00     1.00     1.00
   10 High         2.33     2.33     2.33     3.00     3.00     2.67     3.00
 CASE    9        10
  NO. Threat8  Threat9
----- -------- --------
    1     2.00     2.00
    2     2.00     2.33
    3     2.00     2.33
    4     2.67     3.00
    5     1.00     1.00
    6     3.00     2.67
    7     2.00     3.00
    8     2.00     2.00
    9     1.00     1.00
   10     2.67     2.00

NUMBER OF CASES READ. . . . . .      28
```

GROUPING VARIABLE. . . GSE

CATEGORY	FREQUENCY
High	14
Low	14

DESCRIPTIVE STATISTICS OF DATA

VARIABLE NO.	NAME	TOTAL FREQ.	MEAN	STANDARD DEV.	ST.ERR OF MEAN	COEFF OF VAR	SMALLEST VALUE	LARGEST VALUE	RANGE
2	Threat1	28	2.5000	.66975	.12657	.26790	1.3333	3.6667	2.3334
3	Threat2	28	2.5595	.70304	.13286	.27468	1.0000	4.0000	3.0000
4	Threat3	28	2.4762	.78792	.14890	.31820	1.0000	4.0000	3.0000
5	Threat4	28	2.5714	.81072	.15321	.31528	1.0000	4.0000	3.0000
6	Threat5	28	2.6905	.78005	.14742	.28993	1.0000	4.0000	3.0000
7	Threat6	28	2.5476	.78679	.14869	.30883	1.0000	4.0000	3.0000
8	Threat7	28	2.1667	.70566	.13336	.32569	1.0000	3.6667	2.6667
9	Threat8	28	2.2738	.71466	.13506	.31430	1.0000	3.6667	2.6667
10	Threat9	28	2.3571	.69050	.13049	.29294	1.0000	3.6667	2.6667

METHOD OF ESTIMATING PREDICTED AND RESIDUALS. .	MEAN
PRINT PREDICTED AND RESIDUALS VALUES.	NO
PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL .	NO
PRINT SPHERICITY TEST	YES
PRINT CELL MEANS AND STANDARD DEVIATIONS. . . .	YES
PRINT UNWEIGHTED MARGINAL MEANS	NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . .	NO
PRINT CONFIDENCE INTERVALS.	NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . .	NO
BOX-COX DIAGNOSTIC PLOT	NO
MINIPLOTS	NO
TOLERANCE FOR PIVOTING.	1.0E-02

DESIGN SPECIFICATIONS

```
GROUP  =  1
DEPEND =  2   3   4   5   6   7   8   9  10
LEVEL  =  9
```

GROUP STRUCTURE

GSE	COUNT
High	14
Low	14

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

```
12.21794     1.000
 4.48210    -0.374   1.000
 4.81307    -0.477   0.513   1.000
 3.11121     0.263  -0.339  -0.105   1.000
 1.64392    -0.230   0.017   0.029  -0.357   1.000
 2.60086    -0.401   0.048   0.336  -0.149   0.119   1.000
```

3.16709	0.465	-0.357	-0.545	0.124	-0.230	-0.370	1.000
2.66828	-0.307	0.215	0.213	-0.313	0.164	0.378	-0.089
2.66828	1.000						

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY 0.0000

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

GSE =		High	Low	MARGINAL
	T			
Threat1	1	2.21427	2.78573	2.50000
Threat2	2	2.52380	2.59524	2.55952
Threat3	3	2.30955	2.64286	2.47621
Threat4	4	2.52384	2.61906	2.57145
Threat5	5	2.73812	2.64286	2.69049
Threat6	6	2.57146	2.52381	2.54763
Threat7	7	2.02381	2.30953	2.16667
Threat8	8	2.14285	2.40476	2.27381
Threat9	9	2.21429	2.50001	2.35715
MARGINAL		2.36244	2.55821	2.46032
COUNT		14	14	28

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

GSE =		High	Low
	T		
Threat1	1	0.63526	0.59351
Threat2	2	0.74781	0.68161
Threat3	3	0.76757	0.80026
Threat4	4	0.72460	0.91387
Threat5	5	0.75310	0.83169
Threat6	6	0.72120	0.87427
Threat7	7	0.75635	0.64669
Threat8	8	0.64998	0.77547
Threat9	9	0.66162	0.71313

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
Threat1 Threat2 Threat3 Threat4 Threat5 Threat6 Threat7 Threat8
Threat9

	SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.
	MEAN	1525.40518	1	1525.40518	423.51	0.0000
	GSE	2.41439	1	2.41439	0.67	0.4204
1	ERROR	93.64629	26	3.60178		
	T	6.05589	8	0.75699	4.54	0.0000
	TG	2.45097	8	0.30637	1.84	0.0720

2	ERROR	34.70447	208	0.16685

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
MEAN GSE		
T	0.0037	0.0018
TG	0.1389	0.1248

ERROR TERM — EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.4265	0.5176

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 1542

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 03/29/02 at 08:14:18
Site: S1500522CK
City University - Computer Unit

LOSS SUBSCALE

```
BMDP Instruction File    : C:\WINDOWS\BMDPRUN&.TMP

BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT


BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.


Release: 7.01    (IBM PC/MS-DOS)                    Date: 03/29/02  at 08:13:51
Site: S1500522CK
      City University - Computer Unit

/INPUT
       FILE = 'C:\bmdp\MSThreat.dat'.
       FORMAT = FREE.
       VARIABLES = 10.
/VARIABLE
       NAMES ARE GSE, Threat1, Threat2, Threat3, Threat4, Threat5, Threat6,
Threat7, Threat8, Threat9.
/GROUP
       VARIABLE = GSE.
       CODES (GSE) = 1, 2.
       NAMES (GSE) = High, Low.
/DESIGN
       LEVEL = 9.
       NAME = T.
       DEPENDENT = Threat1, Threat2, Threat3, Threat4, Threat5, Threat6,
Threat7, Threat8, Threat9.
/END
 CASE    1         2         3         4         5         6         7         8
  NO. GSE       Threat1   Threat2   Threat3   Threat4   Threat5   Threat6   Threat7
----- -------- -------- -------- -------- -------- -------- -------- --------
    1 High          1.67      2.00      2.00      2.67      2.67      2.67      2.00
    2 Low           2.00      2.00      2.00      2.00      2.00      2.00      2.00
    3 Low           3.00      2.33      2.00      2.67      2.67      2.00      2.67
    4 Low           3.33      3.00      3.00      3.00      3.00      3.33      2.00
    5 Low           2.67      2.00      1.33      1.67      1.33      1.33      1.00
    6 Low           3.00      3.00      3.00      3.33      3.00      3.00      2.00
    7 High          2.33      2.00      1.33      2.33      2.67      3.00      2.67
    8 High          1.33      2.00      2.00      2.00      2.00      1.67      2.00
    9 High          1.33      1.00      1.00      1.00      1.00      1.00      1.00
   10 High          2.33      2.33      2.33      3.00      3.00      2.67      3.00
 CASE    9        10
  NO. Threat8  Threat9
----- -------- --------
    1     2.00     2.00
    2     2.00     2.33
    3     2.00     2.33
    4     2.67     3.00
    5     1.00     1.00
    6     3.00     2.67
    7     2.00     3.00
    8     2.00     2.00
    9     1.00     1.00
   10     2.67     2.00

NUMBER OF CASES READ. . . . . .     28
```

GROUPING VARIABLE. . . GSE

CATEGORY	FREQUENCY
High	14
Low	14

DESCRIPTIVE STATISTICS OF DATA

VARIABLE NO.	NAME	TOTAL FREQ.	MEAN	STANDARD DEV.	ST.ERR OF MEAN	COEFF OF VAR	SMALLEST VALUE	LARGEST VALUE	RANGE
2	Loss1	28	1.4911	.52034	.09833	.34897	1.0000	2.7500	1.7500
3	Loss2	28	1.6830	.56773	.10729	.33732	1.0000	3.0000	2.0000
4	Loss3	28	1.7232	.65736	.12423	.38147	1.0000	3.2500	2.2500
5	Loss4	28	1.7500	.75462	.14261	.43121	1.0000	3.5000	2.5000
6	Loss5	28	1.9688	.92648	.17509	.47059	1.0000	3.7500	2.7500
7	Loss6	28	1.7723	.71690	.13548	.40450	1.0000	3.7500	2.7500
8	Loss7	28	1.5179	.50428	.09530	.33223	1.0000	2.2500	1.2500
9	Loss8	28	1.5268	.52414	.09905	.34329	1.0000	2.7500	1.7500
10	Loss9	28	1.8125	.63328	.11968	.34940	1.0000	3.0000	2.0000

METHOD OF ESTIMATING PREDICTED AND RESIDUALS. .	MEAN
PRINT PREDICTED AND RESIDUALS VALUES.	NO
PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL .	NO
PRINT SPHERICITY TEST	YES
PRINT CELL MEANS AND STANDARD DEVIATIONS. . . .	YES
PRINT UNWEIGHTED MARGINAL MEANS	NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . .	NO
PRINT CONFIDENCE INTERVALS.	NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . .	NO
BOX-COX DIAGNOSTIC PLOT	NO
MINIPLOTS	NO
TOLERANCE FOR PIVOTING.	1.0E-02

DESIGN SPECIFICATIONS

```
GROUP  =  1
DEPEND =  2   3   4   5   6   7   8   9  10
LEVEL  =  9
```

GROUP STRUCTURE

GSE	COUNT
High	14
Low	14

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

```
 3.63690     1.000
 5.63759    -0.307   1.000
 2.09598    -0.179   0.749   1.000
 4.09272     0.020  -0.602  -0.698   1.000
 1.24253    -0.043   0.174   0.384  -0.102   1.000
 1.60184    -0.259   0.663   0.636  -0.599   0.102   1.000
```

0.90293	-0.037	-0.291	-0.115	0.309	-0.136	-0.531	1.000
1.47725	0.341	-0.504	-0.430	0.494	-0.206	-0.266	0.064
1.47725	1.000						

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY 0.0000

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

GSE =	High	Low	MARGINAL
L			
Loss1 1	1.19643	1.78571	1.49107
Loss2 2	1.47321	1.89286	1.68304
Loss3 3	1.41071	2.03571	1.72321
Loss4 4	1.37500	2.12500	1.75000
Loss5 5	1.59821	2.33929	1.96875
Loss6 6	1.45536	2.08929	1.77232
Loss7 7	1.30357	1.73214	1.51786
Loss8 8	1.33929	1.71429	1.52679
Loss9 9	1.51786	2.10714	1.81250
MARGINAL	1.40774	1.98016	1.69395
COUNT	14	14	28

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

GSE =	High	Low
L		
Loss1 1	0.31284	0.52676
Loss2 2	0.49073	0.57775
Loss3 3	0.51522	0.64939
Loss4 4	0.52578	0.77677
Loss5 5	0.86627	0.85826
Loss6 6	0.56246	0.73122
Loss7 7	0.49204	0.43262
Loss8 8	0.50580	0.48889
Loss9 9	0.50444	0.62569

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
Loss1 Loss2 Loss3 Loss4 Loss5 Loss6 Loss7 Loss8
Loss9

	SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.
	MEAN	723.10423	1	723.10423	299.19	0.0000
	GSE	20.64292	1	20.64292	8.54	0.0071
1	ERROR	62.83792	26	2.41684		
	L	5.59834	8	0.69979	7.04	0.0000
	LG	1.05072	8	0.13134	1.32	0.2347

2 ERROR 20.68775 208 0.09946

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
MEAN		
GSE		
L	0.0003	0.0001
LG	0.2741	0.2710

ERROR TERM — EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.3663	0.4337

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 1522

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 03/29/02 at 08:31:45
Site: S1500522CK
City University - Computer Unit

ANOVAs Relating to Main Hypotheses of Replication Study With GSEscore as Covariate

Challenge Subscale

```
BMDP Instruction File    : C:\WINDOWS\BMDPRUN&.TMP
BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01    (IBM PC/MS-DOS)                Date: 04/30/02  at 09:44:05
Site: S1500522CK
      City University - Computer Unit



/INPUT
       FILE = 'C:\bmdp\MSChal.dat'.
       FORMAT = FREE.
       VARIABLES = 11.
/VARIABLE
       NAMES ARE GSE, GSEscore, Chal1, Chal2, Chal3, Chal4, Chal5, Chal6,
Chal7, Chal8, Chal9.
/GROUP
       VARIABLE = GSE.
       CODES (GSE) = 1, 2.
       NAMES (GSE) = High, Low.
/DESIGN
       LEVEL = 9.
       NAME = C.
       DEPENDENT = Chal1, Chal2, Chal3, Chal4, Chal5, Chal6,
Chal7, Chal8, Chal9.
       COVARIATE = GSEscore, GSEscore, GSEscore, GSEscore, GSEscore,
GSEscore, GSEscore, GSEscore, GSEscore.
/END
```

CASE NO.	1 GSE	2 GSEscore	3 Chal1	4 Chal2	5 Chal3	6 Chal4	7 Chal5	8 Chal6
1	High	36.00	3.50	3.25	3.25	3.25	3.25	3.25
2	Low	25.00	3.00	3.00	2.75	2.75	2.25	2.25
3	Low	23.00	2.50	3.00	2.75	2.50	2.50	2.75
4	Low	25.00	2.75	2.25	2.25	2.00	2.00	2.00
5	Low	29.00	3.25	3.00	3.00	3.00	3.00	3.00
6	Low	27.00	2.75	2.25	2.75	2.75	2.75	2.75
7	High	35.00	3.50	2.50	3.00	2.75	2.75	2.50
8	High	36.00	3.25	2.50	3.25	3.25	3.00	3.50
9	High	38.00	3.25	3.25	3.75	3.75	3.50	3.50
10	High	35.00	3.00	2.75	2.75	2.75	2.50	2.25

CASE NO.	9 Chal7	10 Chal8	11 Chal9
1	3.75	3.25	3.25
2	2.50	2.75	2.00
3	2.75	3.00	2.25
4	2.37	2.25	2.25
5	3.00	3.00	3.00
6	3.25	3.25	3.00
7	2.75	2.75	2.75
8	3.50	3.25	3.50
9	3.75	3.50	4.00
10	2.25	3.00	2.75

NUMBER OF CASES READ. 28

GROUPING VARIABLE. . . GSE

CATEGORY	FREQUENCY
High	14
Low	14

DESCRIPTIVE STATISTICS OF DATA

VARIABLE NO.	NAME	TOTAL FREQ.	MEAN	STANDARD DEV.	ST.ERR OF MEAN	COEFF OF VAR	SMALLEST VALUE	LARGEST VALUE	RANGE
2	GSEscore	28	31.286	5.5100	1.0413	.17612	23.000	38.000	15.000
3	Chal1	28	3.0179	.38447	.07266	.12740	2.2500	3.7500	1.5000
4	Chal2	28	2.6875	.41736	.07887	.15530	1.7500	3.2500	1.5000
5	Chal3	28	2.7634	.54256	.10253	.19634	1.2500	3.7500	2.5000
6	Chal4	28	2.6741	.60413	.11417	.22592	1.0000	3.7500	2.7500
7	Chal5	28	2.5625	.61473	.11617	.23989	1.0000	3.5000	2.5000
8	Chal6	28	2.6786	.55217	.10435	.20614	1.5000	3.5000	2.0000
9	Chal7	28	2.9598	.45012	.08506	.15208	2.2500	4.0000	1.7500
10	Chal8	28	2.8839	.44348	.08381	.15378	2.0000	4.0000	2.0000
11	Chal9	28	2.7277	.57740	.10912	.21168	1.7500	4.0000	2.2500

METHOD OF ESTIMATING PREDICTED AND RESIDUALS. .	MEAN
PRINT PREDICTED AND RESIDUALS VALUES.	NO
PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL .	NO
PRINT SPHERICITY TEST	YES
PRINT CELL MEANS AND STANDARD DEVIATIONS. . . .	YES
PRINT UNWEIGHTED MARGINAL MEANS	NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . .	NO
PRINT CONFIDENCE INTERVALS.	NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . .	NO
BOX-COX DIAGNOSTIC PLOT	NO
MINIPLOTS	NO
TOLERANCE FOR PIVOTING.	1.0E-02

DESIGN SPECIFICATIONS

GROUP =	1								
DEPEND =	3	4	5	6	7	8	9	10	11
COVAR =	2	2	2	2	2	2	2	2	2
LEVEL =	9								

GROUP STRUCTURE

GSE	COUNT
High	14
Low	14

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

5.47048	1.000	
3.15179	-0.341	1.000

3.31258	-0.305	0.636	1.000				
1.64541	-0.009	-0.427	-0.415	1.000			
1.06714	0.246	0.180	-0.164	-0.049	1.000		
1.92544	-0.168	0.292	0.312	-0.365	0.270	1.000	
0.61632	-0.210	0.034	-0.060	-0.029	-0.110	-0.152	1.000
2.72131	0.029	0.010	-0.335	0.296	0.406	0.047	-0.224
2.72131	1.000						

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY 0.0000

CELL MEANS FOR 1-ST COVARIATE

GSE =	C	High	Low	MARGINAL
GSEscore	1	36.50000	26.07143	31.28571
GSEscore	2	36.50000	26.07143	31.28571
GSEscore	3	36.50000	26.07143	31.28571
GSEscore	4	36.50000	26.07143	31.28571
GSEscore	5	36.50000	26.07143	31.28571
GSEscore	6	36.50000	26.07143	31.28571
GSEscore	7	36.50000	26.07143	31.28571
GSEscore	8	36.50000	26.07143	31.28571
GSEscore	9	36.50000	26.07143	31.28571
MARGINAL		36.50000	26.07143	31.28571
COUNT		14	14	28

STANDARD DEVIATIONS FOR 1-ST COVARIATE

GSE =	C	High	Low
GSEscore	1	1.01905	1.85904
GSEscore	2	1.01905	1.85904
GSEscore	3	1.01905	1.85904
GSEscore	4	1.01905	1.85904
GSEscore	5	1.01905	1.85904
GSEscore	6	1.01905	1.85904
GSEscore	7	1.01905	1.85904
GSEscore	8	1.01905	1.85904
GSEscore	9	1.01905	1.85904

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

GSE =	C	High	Low	MARGINAL
Chal1	1	3.21429	2.82143	3.01786
Chal2	2	2.75000	2.62500	2.68750

Chal3	3	2.97321	2.55357	2.76339
Chal4	4	2.97321	2.37500	2.67411
Chal5	5	2.83929	2.28571	2.56250
Chal6	6	2.85714	2.50000	2.67857
Chal7	7	3.08929	2.83036	2.95982
Chal8	8	3.00000	2.76786	2.88393
Chal9	9	2.93750	2.51786	2.72768
MARGINAL		2.95933	2.58631	2.77282
COUNT		14	14	28

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

GSE = High Low

	C		
Chal1	1	0.37796	0.28468
Chal2	2	0.37978	0.45731
Chal3	3	0.49560	0.52053
Chal4	4	0.40483	0.63359
Chal5	5	0.45581	0.64194
Chal6	6	0.56936	0.49029
Chal7	7	0.53356	0.31625
Chal8	8	0.53709	0.30167
Chal9	9	0.66280	0.39788

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
Chal1 Chal2 Chal3 Chal4 Chal5 Chal6 Chal7 Chal8 Chal9

	SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.
	GSE	0.17304	1	0.17304	0.13	0.7266
	1-ST COVAR	0.15099	1	0.15099	0.11	0.7440
	ERROR	34.60818	25	1.38433		
	C	5.02951	8	0.62869	6.57	0.0000
	CG	1.27877	8	0.15985	1.67	0.1074
2	ERROR	19.91047	208	0.09572		

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
GSE		
1-ST COVAR		
C	0.0001	0.0000
CG	0.1599	0.1427

ERROR TERM — EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.5201	0.6553

REG. COEFF.	ESTIMATE	STD. ERROR	T-VALUE	P-VALUE
1-ST COVAR	0.01695	0.05131	0.33	0.7440

ADJUSTED CELL MEANS FOR 1-ST DEPENDENT VARIABLE

GSE =	C	High	Low	MARGINAL
Chal1	1	3.12593	2.90979	3.01786
Chal2	2	2.66164	2.71336	2.68750
Chal3	3	2.88486	2.64193	2.76339
Chal4	4	2.88486	2.46336	2.67411
Chal5	5	2.75093	2.37407	2.56250
Chal6	6	2.76879	2.58836	2.67857
Chal7	7	3.00093	2.91871	2.95982
Chal8	8	2.91164	2.85621	2.88393
Chal9	9	2.84914	2.60621	2.72768
MARGINAL		2.87097	2.67467	2.77282
COUNT		14	14	28

STANDARD ERRORS OF ADJUSTED CELL MEANS FOR 1-ST DEPENDENT VARIABLE

GSE =	C	High	Low
Chal1	1	0.41286	0.41286
Chal2	2	0.41286	0.41286
Chal3	3	0.41286	0.41286
Chal4	4	0.41286	0.41286
Chal5	5	0.41286	0.41286
Chal6	6	0.41286	0.41286
Chal7	7	0.41286	0.41286
Chal8	8	0.41286	0.41286
Chal9	9	0.41286	0.41286

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 2238

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 04/30/02 at 09:45:10
Site: S1500522CK
City University - Computer Unit

THREAT SUBSCALE

```
BMDP Instruction File    : C:\WINDOWS\BMDPRUN&.TMP

BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT


BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.


Release: 7.01    (IBM PC/MS-DOS)                  Date: 04/30/02  at 10:06:05
Site: S1500522CK
      City University - Computer Unit

/INPUT
       FILE = 'C:\bmdp\MSThreat.dat'.
       FORMAT = FREE.
        VARIABLES = 11.
/VARIABLE
       NAMES ARE GSE, GSEscore, Threat1, Threat2, Threat3, Threat4, Threat5,
Threat6, Threat7, Threat8, Threat9.
/GROUP
       VARIABLE = GSE.
       CODES (GSE) = 1, 2.
       NAMES (GSE) = High, Low.
/DESIGN
       LEVEL = 9.
       NAME = T.
       DEPENDENT = Threat1, Threat2, Threat3, Threat4, Threat5, Threat6,
Threat7, Threat8, Threat9.
       COVARIATE = GSEscore, GSEscore, GSEscore, GSEscore, GSEscore,
GSEscore, GSEscore, GSEscore, GSEscore.
/END
```

CASE NO.	1 GSE	2 GSEscore	3 Threat1	4 Threat2	5 Threat3	6 Threat4	7 Threat5	8 Threat6
1	High	36.00	1.67	2.00	2.00	2.67	2.67	2.67
2	Low	25.00	2.00	2.00	2.00	2.00	2.00	2.00
3	Low	23.00	3.00	2.33	2.00	2.67	2.67	2.00
4	Low	25.00	3.33	3.00	3.00	3.00	3.00	3.33
5	Low	29.00	2.67	2.00	1.33	1.67	1.33	1.33
6	Low	27.00	3.00	3.00	3.00	3.33	3.00	3.00
7	High	35.00	2.33	2.00	1.33	2.33	2.67	3.00
8	High	36.00	1.33	2.00	2.00	2.00	2.00	1.67
9	High	38.00	1.33	1.00	1.00	1.00	1.00	1.00
10	High	35.00	2.33	2.33	2.33	3.00	3.00	2.67

CASE NO.	9 Threat7	10 Threat8	11 Threat9
1	2.00	2.00	2.00
2	2.00	2.00	2.33
3	2.67	2.00	2.33
4	2.00	2.67	3.00
5	1.00	1.00	1.00
6	2.00	3.00	2.67
7	2.67	2.00	3.00
8	2.00	2.00	2.00
9	1.00	1.00	1.00
10	3.00	2.67	2.00

NUMBER OF CASES READ. 28

GROUPING VARIABLE. . . GSE

CATEGORY	FREQUENCY
High	14
Low	14

DESCRIPTIVE STATISTICS OF DATA

VARIABLE NO.	NAME	TOTAL FREQ.	MEAN	STANDARD DEV.	ST.ERR OF MEAN	COEFF OF VAR	SMALLEST VALUE	LARGEST VALUE	RANGE
2	GSEscore	28	31.286	5.5100	1.0413	.17612	23.000	38.000	15.000
3	Threat1	28	2.5000	.66975	.12657	.26790	1.3333	3.6667	2.3334
4	Threat2	28	2.5595	.70304	.13286	.27468	1.0000	4.0000	3.0000
5	Threat3	28	2.4762	.78792	.14890	.31820	1.0000	4.0000	3.0000
6	Threat4	28	2.5714	.81072	.15321	.31528	1.0000	4.0000	3.0000
7	Threat5	28	2.6905	.78005	.14742	.28993	1.0000	4.0000	3.0000
8	Threat6	28	2.5476	.78679	.14869	.30883	1.0000	4.0000	3.0000
9	Threat7	28	2.1667	.70566	.13336	.32569	1.0000	3.6667	2.6667
10	Threat8	28	2.2738	.71466	.13506	.31430	1.0000	3.6667	2.6667
11	Threat9	28	2.3571	.69050	.13049	.29294	1.0000	3.6667	2.6667

METHOD OF ESTIMATING PREDICTED AND RESIDUALS. .	MEAN
PRINT PREDICTED AND RESIDUALS VALUES.	NO
PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL .	NO
PRINT SPHERICITY TEST	YES
PRINT CELL MEANS AND STANDARD DEVIATIONS. . . .	YES
PRINT UNWEIGHTED MARGINAL MEANS	NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . .	NO
PRINT CONFIDENCE INTERVALS.	NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . .	NO
BOX-COX DIAGNOSTIC PLOT	NO
MINIPLOTS	NO
TOLERANCE FOR PIVOTING.	1.0E-02

DESIGN SPECIFICATIONS

GROUP =	1								
DEPEND =	3	4	5	6	7	8	9	10	11
COVAR =	2	2	2	2	2	2	2	2	2
LEVEL =	9								

GROUP STRUCTURE

GSE	COUNT
High	14
Low	14

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

12.21794	1.000	
4.48210	-0.374	1.000

4.81307	-0.477	0.513	1.000				
3.11121	0.263	-0.339	-0.105	1.000			
1.64392	-0.230	0.017	0.029	-0.357	1.000		
2.60086	-0.401	0.048	0.336	-0.149	0.119	1.000	
3.16709	0.465	-0.357	-0.545	0.124	-0.230	-0.370	1.000
2.66828	-0.307	0.215	0.213	-0.313	0.164	0.378	-0.089
2.66828	1.000						

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY 0.0000

CELL MEANS FOR 1-ST COVARIATE

GSE =		High	Low	MARGINAL
T				
GSEscore	1	36.50000	26.07143	31.28571
GSEscore	2	36.50000	26.07143	31.28571
GSEscore	3	36.50000	26.07143	31.28571
GSEscore	4	36.50000	26.07143	31.28571
GSEscore	5	36.50000	26.07143	31.28571
GSEscore	6	36.50000	26.07143	31.28571
GSEscore	7	36.50000	26.07143	31.28571
GSEscore	8	36.50000	26.07143	31.28571
GSEscore	9	36.50000	26.07143	31.28571
MARGINAL		36.50000	26.07143	31.28571
COUNT		14	14	28

STANDARD DEVIATIONS FOR 1-ST COVARIATE

GSE =		High	Low
T			
GSEscore	1	1.01905	1.85904
GSEscore	2	1.01905	1.85904
GSEscore	3	1.01905	1.85904
GSEscore	4	1.01905	1.85904
GSEscore	5	1.01905	1.85904
GSEscore	6	1.01905	1.85904
GSEscore	7	1.01905	1.85904
GSEscore	8	1.01905	1.85904
GSEscore	9	1.01905	1.85904

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

GSE =		High	Low	MARGINAL
T				
Threat1	1	2.21427	2.78573	2.50000
Threat2	2	2.52380	2.59524	2.55952

Threat3	3	2.30955	2.64286	2.47621
Threat4	4	2.52384	2.61906	2.57145
Threat5	5	2.73812	2.64286	2.69049
Threat6	6	2.57146	2.52381	2.54763
Threat7	7	2.02381	2.30953	2.16667
Threat8	8	2.14285	2.40476	2.27381
Threat9	9	2.21429	2.50001	2.35715
MARGINAL		2.36244	2.55821	2.46032
COUNT		14	14	28

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

GSE = High Low

	T		
Threat1	1	0.63526	0.59351
Threat2	2	0.74781	0.68161
Threat3	3	0.76757	0.80026
Threat4	4	0.72460	0.91387
Threat5	5	0.75310	0.83169
Threat6	6	0.72120	0.87427
Threat7	7	0.75635	0.64669
Threat8	8	0.64998	0.77547
Threat9	9	0.66162	0.71313

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
Threat1 Threat2 Threat3 Threat4 Threat5 Threat6 Threat7 Threat8
Threat9

SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.
GSE	0.00951	1	0.00951	0.00	0.9602
1-ST COVAR	0.28266	1	0.28266	0.08	0.7855
ERROR	93.36364	25	3.73455		
T	6.05589	8	0.75699	4.54	0.0000
TG	2.45097	8	0.30637	1.84	0.0720
2 ERROR	34.70447	208	0.16685		

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
GSE		
1-ST COVAR		
T	0.0037	0.0018
TG	0.1389	0.1248

ERROR TERM — EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.4265	0.5176

REG. COEFF.	ESTIMATE	STD. ERROR	T-VALUE	P-VALUE
1-ST COVAR	-0.02318	0.08427	-0.28	0.7855

ADJUSTED CELL MEANS FOR 1-ST DEPENDENT VARIABLE

GSE =	T	High	Low	MARGINAL
Threat1	1	2.33516	2.66484	2.50000
Threat2	2	2.64469	2.47435	2.55952
Threat3	3	2.43044	2.52197	2.47621
Threat4	4	2.64473	2.49817	2.57145
Threat5	5	2.85901	2.52197	2.69049
Threat6	6	2.69235	2.40292	2.54763
Threat7	7	2.14470	2.18864	2.16667
Threat8	8	2.26374	2.28387	2.27381
Threat9	9	2.33518	2.37912	2.35715
MARGINAL		2.48333	2.43732	2.46032
COUNT		14	14	28

STANDARD ERRORS OF ADJUSTED CELL MEANS FOR 1-ST DEPENDENT VARIABLE

GSE =	T	High	Low
Threat1	1	0.67812	0.67812
Threat2	2	0.67812	0.67812
Threat3	3	0.67812	0.67812
Threat4	4	0.67812	0.67812
Threat5	5	0.67812	0.67812
Threat6	6	0.67812	0.67812
Threat7	7	0.67812	0.67812
Threat8	8	0.67812	0.67812
Threat9	9	0.67812	0.67812

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 2258

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 04/30/02 at 10:06:25
Site: S1500522CK
City University - Computer Unit

LOSS SUBSCALE

```
BMDP Instruction File    : C:\WINDOWS\BMDPRUN&.TMP

BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT


BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.


Release: 7.01    (IBM PC/MS-DOS)                    Date: 04/30/02  at 10:14:12
Site: S1500522CK
      City University - Computer Unit
```

```
/INPUT
       FILE = 'C:\bmdp\MSLoss.dat'.
       FORMAT = FREE.
       VARIABLES = 11.
/VARIABLE
       NAMES ARE GSE, GSEscore, Loss1, Loss2, Loss3, Loss4, Loss5, Loss6,
Loss7, Loss8, Loss9.
/GROUP
       VARIABLE = GSE.
       CODES (GSE) = 1, 2.
       NAMES (GSE) = High, Low.
/DESIGN
       LEVEL = 9.
       NAME = L.
       DEPENDENT = Loss1, Loss2, Loss3, Loss4, Loss5, Loss6,
Loss7, Loss8, Loss9.
       COVARIATE = GSEscore, GSEscore, GSEscore, GSEscore, GSEscore, GSEscore,
GSEscore, GSEscore, GSEscore.
/END
```

CASE NO.	1 GSE	2 GSEscore	3 Loss1	4 Loss2	5 Loss3	6 Loss4	7 Loss5	8 Loss6
1	High	36.00	1.00	1.50	1.00	1.00	1.00	1.00
2	Low	25.00	1.75	2.00	2.00	2.00	2.00	2.00
3	Low	23.00	2.00	1.75	2.00	1.75	2.25	2.00
4	Low	25.00	1.50	2.00	2.25	2.25	3.00	2.75
5	Low	29.00	1.00	1.00	1.00	1.00	1.25	1.00
6	Low	27.00	1.50	1.50	1.75	2.25	2.25	2.25
7	High	35.00	1.00	1.00	1.00	1.00	1.00	1.00
8	High	36.00	1.00	1.00	1.00	1.00	1.00	1.00
9	High	38.00	1.00	1.00	1.00	1.00	1.00	1.00
10	High	35.00	1.75	2.00	2.00	2.00	2.00	2.00

CASE NO.	9 Loss7	10 Loss8	11 Loss9
1	1.00	1.00	1.00
2	2.00	2.00	2.25
3	2.00	1.50	2.25
4	2.00	2.00	2.75
5	1.00	1.00	1.00
6	1.25	1.75	2.00
7	1.00	1.00	1.00
8	1.00	1.50	1.00
9	1.00	1.00	1.00
10	2.25	2.25	2.00

NUMBER OF CASES READ. 28

GROUPING VARIABLE. . . GSE

CATEGORY	FREQUENCY
High	14
Low	14

DESCRIPTIVE STATISTICS OF DATA

VARIABLE NO.	NAME	TOTAL FREQ.	MEAN	STANDARD DEV.	ST.ERR OF MEAN	COEFF OF VAR	SMALLEST VALUE	LARGEST VALUE	RANGE
2	GSEscore	28	31.286	5.5100	1.0413	.17612	23.000	38.000	15.000
3	Loss1	28	1.4911	.52034	.09833	.34897	1.0000	2.7500	1.7500
4	Loss2	28	1.6830	.56773	.10729	.33732	1.0000	3.0000	2.0000
5	Loss3	28	1.7232	.65736	.12423	.38147	1.0000	3.2500	2.2500
6	Loss4	28	1.7500	.75462	.14261	.43121	1.0000	3.5000	2.5000
7	Loss5	28	1.9688	.92648	.17509	.47059	1.0000	3.7500	2.7500
8	Loss6	28	1.7723	.71690	.13548	.40450	1.0000	3.7500	2.7500
9	Loss7	28	1.5179	.50428	.09530	.33223	1.0000	2.2500	1.2500
10	Loss8	28	1.5268	.52414	.09905	.34329	1.0000	2.7500	1.7500
11	Loss9	28	1.8125	.63328	.11968	.34940	1.0000	3.0000	2.0000

METHOD OF ESTIMATING PREDICTED AND RESIDUALS. .	MEAN
PRINT PREDICTED AND RESIDUALS VALUES.	NO
PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL .	NO
PRINT SPHERICITY TEST	YES
PRINT CELL MEANS AND STANDARD DEVIATIONS. . . .	YES
PRINT UNWEIGHTED MARGINAL MEANS	NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . .	NO
PRINT CONFIDENCE INTERVALS.	NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . .	NO
BOX-COX DIAGNOSTIC PLOT	NO
MINIPLOTS	NO
TOLERANCE FOR PIVOTING.	1.0E-02

DESIGN SPECIFICATIONS

GROUP	=	1								
DEPEND	=	3	4	5	6	7	8	9	10	11
COVAR	=	2	2	2	2	2	2	2	2	2
LEVEL	=	9								

GROUP STRUCTURE

GSE	COUNT
High	14
Low	14

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

3.63690	1.000	
5.63759	-0.307	1.000

2.09598	-0.179	0.749	1.000				
4.09272	0.020	-0.602	-0.698	1.000			
1.24253	-0.043	0.174	0.384	-0.102	1.000		
1.60184	-0.259	0.663	0.636	-0.599	0.102	1.000	
0.90293	-0.037	-0.291	-0.115	0.309	-0.136	-0.531	1.000
1.47725	0.341	-0.504	-0.430	0.494	-0.206	-0.266	0.064
1.47725	1.000						

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY 0.0000

CELL MEANS FOR 1-ST COVARIATE

GSE =	L	High	Low	MARGINAL
GSEscore	1	36.50000	26.07143	31.28571
GSEscore	2	36.50000	26.07143	31.28571
GSEscore	3	36.50000	26.07143	31.28571
GSEscore	4	36.50000	26.07143	31.28571
GSEscore	5	36.50000	26.07143	31.28571
GSEscore	6	36.50000	26.07143	31.28571
GSEscore	7	36.50000	26.07143	31.28571
GSEscore	8	36.50000	26.07143	31.28571
GSEscore	9	36.50000	26.07143	31.28571
MARGINAL		36.50000	26.07143	31.28571
COUNT		14	14	28

STANDARD DEVIATIONS FOR 1-ST COVARIATE

GSE =	L	High	Low
GSEscore	1	1.01905	1.85904
GSEscore	2	1.01905	1.85904
GSEscore	3	1.01905	1.85904
GSEscore	4	1.01905	1.85904
GSEscore	5	1.01905	1.85904
GSEscore	6	1.01905	1.85904
GSEscore	7	1.01905	1.85904
GSEscore	8	1.01905	1.85904
GSEscore	9	1.01905	1.85904

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

GSE =	L	High	Low	MARGINAL
Loss1	1	1.19643	1.78571	1.49107
Loss2	2	1.47321	1.89286	1.68304

Loss3	3	1.41071	2.03571	1.72321
Loss4	4	1.37500	2.12500	1.75000
Loss5	5	1.59821	2.33929	1.96875
Loss6	6	1.45536	2.08929	1.77232
Loss7	7	1.30357	1.73214	1.51786
Loss8	8	1.33929	1.71429	1.52679
Loss9	9	1.51786	2.10714	1.81250
MARGINAL		1.40774	1.98016	1.69395
COUNT		14	14	28

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

GSE = High Low

	L		
Loss1	1	0.31284	0.52676
Loss2	2	0.49073	0.57775
Loss3	3	0.51522	0.64939
Loss4	4	0.52578	0.77677
Loss5	5	0.86627	0.85826
Loss6	6	0.56246	0.73122
Loss7	7	0.49204	0.43262
Loss8	8	0.50580	0.48889
Loss9	9	0.50444	0.62569

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
Loss1 Loss2 Loss3 Loss4 Loss5 Loss6 Loss7 Loss8
Loss9

SOURCE		SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.
GSE		0.41642	1	0.41642	0.17	0.6866
1-ST COVAR		0.34704	1	0.34704	0.14	0.7126
ERROR		62.49089	25	2.49964		
L		5.59834	8	0.69979	7.04	0.0000
LG		1.05072	8	0.13134	1.32	0.2347
2 ERROR		20.68775	208	0.09946		

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
GSE		
1-ST COVAR		
L	0.0003	0.0001
LG	0.2741	0.2710

EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

ERROR TERM	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.3663	0.4337

REG. COEFF.	ESTIMATE	STD. ERROR	T-VALUE	P-VALUE
1-ST COVAR	-0.02569	0.06895	-0.37	0.7126

ADJUSTED CELL MEANS FOR 1-ST DEPENDENT VARIABLE

GSE =	L	High	Low	MARGINAL
Loss1	1	1.33038	1.65176	1.49107
Loss2	2	1.60717	1.75891	1.68304
Loss3	3	1.54467	1.90176	1.72321
Loss4	4	1.50895	1.99105	1.75000
Loss5	5	1.73217	2.20533	1.96875
Loss6	6	1.58931	1.95533	1.77232
Loss7	7	1.43752	1.59819	1.51786
Loss8	8	1.47324	1.58033	1.52679
Loss9	9	1.65181	1.97319	1.81250
MARGINAL		1.54169	1.84621	1.69395
COUNT		14	14	28

STANDARD ERRORS OF ADJUSTED CELL MEANS FOR 1-ST DEPENDENT VARIABLE

GSE =	L	High	Low
Loss1	1	0.55478	0.55478
Loss2	2	0.55478	0.55478
Loss3	3	0.55478	0.55478
Loss4	4	0.55478	0.55478
Loss5	5	0.55478	0.55478
Loss6	6	0.55478	0.55478
Loss7	7	0.55478	0.55478
Loss8	8	0.55478	0.55478
Loss9	9	0.55478	0.55478

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 2238

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 04/30/02 at 10:15:15
Site: S1500522CK
City University - Computer Unit

TESTS OF WITHIN-SUBJECTS CONTRASTS FOR CSAS IN REPLICATION STUDY: ACROSS ALL 9 TASKS

CSA		Type III Sum of Squares	df	Mean Square	F	Sig.	Eta[2]	NP[a]	OP[b]
C	LINEAR	1.415E-02	1	1.415E-02	.07	.794	.003	.070	.06
	Quad.	1.417	1	1.417	11.62	.002	.301	11.616	.91
	Cubic	1.824	1	1.824	14.41	.001	.348	14.405	.96
	Order 4	.381	1	.381	4.23	.049	.136	4.234	.51
	Order 5	.373	1	.373	7.78	.010	.224	7.782	.77
	Order 6	.970	1	.970	13.50	.001	.333	13.501	.94
	Order 7	4.847E-02	1	4.847E-02	2.12	.157	.073	2.116	.29
	Order 8	2.395E-03	1	2.395E-03	.02	.879	.001	.024	.05
T	Linear	2.002	1	2.002	4.40	.045	.140	4.398	.53
	Quad.	.670	1	.670	3.14	.088	.104	3.141	.40
	Cubic	.508	1	.508	2.80	.106	.094	2.802	.36
	Order 4	1.379	1	1.379	11.84	.002	.305	11.838	.91
	Order 5	7.491E-02	1	7.491E-02	1.02	.321	.037	1.023	.16
	Order 6	1.219	1	1.219	10.19	.004	.274	10.194	.87
	Order 7	.192	1	.192	1.64	.211	.057	1.641	.24
	Order 8	9.993E-03	1	9.993E-03	.10	.754	.004	.100	.06
L	Linear	8.571E-02	1	8.571E-02	.63	.435	.023	.628	.12
	Quad.	1.054	1	1.054	4.90	.036	.154	4.899	.57
	Cubic	1.838	1	1.838	22.52	.000	.455	22.521	.10
	Order 4	1.493	1	1.493	8.43	.007	.238	8.431	.80
	Order 5	.340	1	.340	7.23	.012	.211	7.232	.74
	Order 6	.493	1	.493	8.29	.008	.235	8.286	.79
	Order 7	.121	1	.121	3.61	.068	.118	3.606	.45
	Order 8	.174	1	.174	3.17	.086	.105	3.174	.41
Error:									
C	Linear	5.473	27	.203					
	Quad.	3.294	27	.122					
	Cubic	3.419	27	.127					
	Order 4	2.429	27	8.997E-02					
	Order 5	1.293	27	4.788E-02					
	Order 6	1.939	27	7.183E-02					
	Order 7	.618	27	2.290E-02					
	Order 8	2.724	27	.101					
T	Linear	12.294	27	.455					
	Quad.	5.758	27	.213					
	Cubic	4.896	27	.181					
	Order 4	3.145	27	.116					
	Order 5	1.976	27	7.320E-02					
	Order 6	3.229	27	.120					
	Order 7	3.167	27	.117					
	Order 8	2.689	27	9.960E-02					

L	Linear	3.685	27	.136						
	Quad.	5.808	27	.215						
	Cubic	2.204	27	8.163E-02						
	Order 4	4.780	27	.177						
	Order 5	1.269	27	4.701E-02						
	Order 6	1.605	27	5.944E-02						
	Order 7	.909	27	3.366E-02						
	Order 8	1.478	27	5.475E-02						

a Noncent. Parameter

b Observed Power; computed using alpha = .05

TESTS OF WITHIN-SUBJECTS CONTRASTS FOR CSAS IN REPLICATION STUDY: ACROSS THE FIRST 5 TASKS

CSA		Type III Sum of Squares	df	Mean Square	F	Sig.	Eta^2	NP[a]	OP[b]
C	LINEAR	2.391	1	2.391	14.827	.001	.354	14.827	.960
	Quad.	.148	1	.148	2.254	.145	.077	2.254	.305
	Cubic	.514	1	.514	9.672	.004	.264	9.672	.850
	Order 4	.204	1	.204	3.719	.064	.121	3.719	.460
T	Linear	.432	1	.432	2.408	.132	.082	2.408	.322
	Quad.	.177	1	.177	1.489	.233	.052	1.489	.218
	Cubic	.078	1	.078	.931	.343	.033	.931	.154
	Order 4	.091	1	.091	.896	.352	.032	.896	.150
L	Linear	2.926	1	2.926	10.917	.003	.288	10.917	.890
	Quad.	.003	1	.003	.072	.791	.003	.072	.058
	Cubic	.331	1	.331	6.126	.020	.185	6.126	.665
	Order 4	.002	1	.002	.076	.785	.003	.076	.058
Error:									
C	Linear	4.354	27	.161					
	Quad.	1.777	27	.066					
	Cubic	1.436	27	.053					
	Order 4	1.482	27	.055					
T	Linear	4.846	27	.179					
	Quad.	3.212	27	.119					
	Cubic	2.255	27	.084					
	Order 4	2.732	27	.101					
L	Linear	7.238	27	.268					
	Quad.	1.212	27	.045					
	Cubic	1.458	27	.054					
	Order 4	.636	27	.024					

a Noncent. Parameter

b Observed Power; computed using alpha = .05

APPENDIX D

Material Relating to the Study Reported in Chapter 5

ANOVAs of Changes in CSAs Across the First 3 Failures of the Replication Study

Challenge Subscale

```
BMDP Instruction File    : C:\WINDOWS\BMDPRUN&.TMP
BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01   (IBM PC/MS-DOS)                Date: 04/22/02  at 07:37:58
Site: S1500522CK
      City University - Computer Unit


/INPUT
       FILE = 'C:\bmdp\MSChal3.dat'.
       FORMAT = FREE.
       VARIABLES =4.
/VARIABLE
       NAMES ARE GSE, Chal1, Chal2, Chal3.
/GROUP
       VARIABLE = GSE.
       CODES (GSE) = 1, 2.
       NAMES (GSE) = High, Low.
/DESIGN
       LEVEL = 3.
       NAME = C.
       DEPENDENT = Chal1, Chal2, Chal3.
/END
```

CASE NO.	1 GSE	2 Chal1	3 Chal2	4 Chal3
1	High	3.50	3.25	3.25
2	Low	3.00	3.00	2.75
3	Low	2.50	3.00	2.75
4	Low	2.75	2.25	2.25
5	Low	3.25	3.00	3.00
6	Low	2.75	2.25	2.75
7	High	3.50	2.50	3.00
8	High	3.25	2.50	3.25
9	High	3.25	3.25	3.75
10	High	3.00	2.75	2.75

```
NUMBER OF CASES READ. . . . . .      28

GROUPING VARIABLE. . . GSE
```

CATEGORY	FREQUENCY
High	14
Low	14

```
DESCRIPTIVE STATISTICS OF DATA
```

VARIABLE NO.	NAME	TOTAL FREQ.	MEAN	STANDARD DEV.	ST.ERR OF MEAN	COEFF OF VAR	SMALLEST VALUE	LARGEST VALUE	RANGE
2	Chal1	28	3.0179	.38447	.07266	.12740	2.2500	3.7500	1.5000

3 Chal2	28	2.6875	.41736	.07887	.15530	1.7500	3.2500	1.5000
4 Chal3	28	2.7634	.54256	.10253	.19634	1.2500	3.7500	2.5000

METHOD OF ESTIMATING PREDICTED AND RESIDUALS. . MEAN
PRINT PREDICTED AND RESIDUALS VALUES. . . . . NO
PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL . NO
PRINT SPHERICITY TEST . . . . . YES
PRINT CELL MEANS AND STANDARD DEVIATIONS. . . YES
PRINT UNWEIGHTED MARGINAL MEANS . . . . . NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . . NO
PRINT CONFIDENCE INTERVALS. . . . . NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . . NO
BOX-COX DIAGNOSTIC PLOT . . . . . NO
MINIPLOTS . . . . . NO
TOLERANCE FOR PIVOTING. 1.0E-02

DESIGN SPECIFICATIONS

GROUP = 1
DEPEND = 2 3 4
LEVEL = 3

GROUP STRUCTURE

GSE	COUNT
High	14
Low	14

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

2.38002 1.000
1.41536 0.060 1.000

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY 0.4147

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

GSE =	C	High	Low	MARGINAL
Chal1	1	3.21429	2.82143	3.01786
Chal2	2	2.75000	2.62500	2.68750
Chal3	3	2.97321	2.55357	2.76339
MARGINAL		2.97917	2.66667	2.82292
COUNT		14	14	28

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

GSE =	C	High	Low

Chal1	1	0.37796	0.28468
Chal2	2	0.37978	0.45731
Chal3	3	0.49560	0.52053

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
Chal1 Chal2 Chal3

	SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.
	MEAN	669.38411	1	669.38411	1669.53	0.0000
	GSE	2.05078	1	2.05078	5.11	0.0323
1	ERROR	10.42448	26	0.40094		
	C	1.67671	2	0.83836	11.49	0.0001
	CG	0.37165	2	0.18583	2.55	0.0881
2	ERROR	3.79539	52	0.07299		

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
MEAN		
GSE		
C	0.0001	0.0001
CG	0.0921	0.0881

ERROR TERM — EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.9363	1.0000

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 948

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 04/22/02 at 07:38:34
Site: S1500522CK
City University - Computer Unit

THREAT SUBSCALE

```
BMDP Instruction File    : C:\WINDOWS\BMDPRUN&.TMP

BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT


BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.


Release: 7.01    (IBM PC/MS-DOS)                    Date: 04/22/02  at 08:03:04
Site: S1500522CK
      City University - Computer Unit



/INPUT
       FILE = 'C:\bmdp\MSThr3.dat'.
       FORMAT = FREE.
       VARIABLES =4.
/VARIABLE
       NAMES ARE GSE, Threat1, Threat2, Threat3.
/GROUP
       VARIABLE = GSE.
       CODES (GSE) = 1, 2.
       NAMES (GSE) = High, Low.
/DESIGN
       LEVEL = 3.
       NAME = T.
       DEPENDENT = Threat1, Threat2, Threat3.
/END
 CASE     1          2          3          4
  NO. GSE       Threat1    Threat2    Threat3
----- -------- -------- -------- --------
    1 High         1.67       2.00       2.00
    2 Low          2.00       2.00       2.00
    3 Low          3.00       2.33       2.00
    4 Low          3.33       3.00       3.00
    5 Low          2.67       2.00       1.33
    6 Low          3.00       3.00       3.00
    7 High         2.33       2.00       1.33
    8 High         1.33       2.00       2.00
    9 High         1.33       1.00       1.00
   10 High         2.33       2.33       2.33

NUMBER OF CASES READ. . . . . .      28

GROUPING VARIABLE. . . GSE
                              CATEGORY    FREQUENCY
                              --------    ---------
                              High             14
                              Low              14


DESCRIPTIVE STATISTICS OF DATA
----------- ---------- -- ----

 VARIABLE     TOTAL                STANDARD  ST.ERR    COEFF SMALLEST LARGEST
 NO. NAME      FREQ.    MEAN        DEV.    OF MEAN  OF VAR  VALUE   VALUE    RANGE

   2 Threat1      28  2.5000      .66975    .12657   .26790  1.3333  3.6667   2.3334
```

3 Threat2	28	2.5595	.70304	.13286	.27468	1.0000	4.0000	3.0000
4 Threat3	28	2.4762	.78792	.14890	.31820	1.0000	4.0000	3.0000

METHOD OF ESTIMATING PREDICTED AND RESIDUALS. .	MEAN
PRINT PREDICTED AND RESIDUALS VALUES.	NO
PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL .	NO
PRINT SPHERICITY TEST	YES
PRINT CELL MEANS AND STANDARD DEVIATIONS. . . .	YES
PRINT UNWEIGHTED MARGINAL MEANS	NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . .	NO
PRINT CONFIDENCE INTERVALS.	NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . .	NO
BOX-COX DIAGNOSTIC PLOT	NO
MINIPLOTS	NO
TOLERANCE FOR PIVOTING.	1.0E-02

DESIGN SPECIFICATIONS

GROUP = 1
DEPEND = 2 3 4
LEVEL = 3

GROUP STRUCTURE

GSE	COUNT
High	14
Low	14

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

4.46052	1.000	
1.59781	-0.031	1.000

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY 0.0420

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

GSE =		High	Low	MARGINAL
T				
Threat1	1	2.21427	2.78573	2.50000
Threat2	2	2.52380	2.59524	2.55952
Threat3	3	2.30955	2.64286	2.47621
MARGINAL		2.34921	2.67461	2.51191
COUNT		14	14	28

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

GSE =		High	Low
T			

Threat1	1	0.63526	0.59351
Threat2	2	0.74781	0.68161
Threat3	3	0.76757	0.80026

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
Threat1 Threat2 Threat3

	SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.
	MEAN	530.01391	1	530.01391	416.81	0.0000
	GSE	2.22365	1	2.22365	1.75	0.1976
1	ERROR	33.06114	26	1.27158		
	T	0.10313	2	0.05157	0.44	0.6448
	TG	0.87571	2	0.43785	3.76	0.0299
2	ERROR	6.05832	52	0.11651		

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
MEAN		
GSE		
T	0.6056	0.6238
TG	0.0394	0.0349

ERROR TERM — EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.8170	0.8978

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 956

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 04/22/02 at 08:03:16
Site: S1500522CK
City University - Computer Unit

LOSS SUBSCALE

```
BMDP Instruction File    : C:\WINDOWS\BMDPRUN&.TMP

BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT


BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.


Release: 7.01    (IBM PC/MS-DOS)                    Date: 04/22/02  at 08:10:09
Site: S1500522CK
      City University - Computer Unit


/INPUT
       FILE = 'C:\bmdp\MSLoss3.dat'.
       FORMAT = FREE.
       VARIABLES =4.
/VARIABLE
       NAMES ARE GSE, Loss1, Loss2, Loss3.
/GROUP
       VARIABLE = GSE.
       CODES (GSE) = 1, 2.
       NAMES (GSE) = High, Low.
/DESIGN
       LEVEL = 3.
       NAME = L.
       DEPENDENT = Loss1, Loss2, Loss3.
/END
 CASE     1          2          3          4
  NO. GSE       Loss1      Loss2      Loss3
----- -------- -------- -------- --------
    1 High         1.00       1.50       1.00
    2 Low          1.75       2.00       2.00
    3 Low          2.00       1.75       2.00
    4 Low          1.50       2.00       2.25
    5 Low          1.00       1.00       1.00
    6 Low          1.50       1.50       1.75
    7 High         1.00       1.00       1.00
    8 High         1.00       1.00       1.00
    9 High         1.00       1.00       1.00
   10 High         1.75       2.00       2.00

NUMBER OF CASES READ. . . . . .      28

GROUPING VARIABLE. . . GSE
                                CATEGORY    FREQUENCY
                                --------    ---------
                                High             14
                                Low              14


DESCRIPTIVE STATISTICS OF DATA
----------- ---------- -- ----

 VARIABLE     TOTAL          STANDARD  ST.ERR    COEFF SMALLEST LARGEST
 NO. NAME      FREQ.   MEAN     DEV.   OF MEAN  OF VAR  VALUE   VALUE    RANGE

   2 Loss1        28  1.4911   .52034   .09833  .34897  1.0000  2.7500   1.7500
```

3 Loss2	28	1.6830	.56773	.10729	.33732	1.0000	3.0000	2.0000
4 Loss3	28	1.7232	.65736	.12423	.38147	1.0000	3.2500	2.2500

METHOD OF ESTIMATING PREDICTED AND RESIDUALS. .	MEAN
PRINT PREDICTED AND RESIDUALS VALUES.	NO
PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL .	NO
PRINT SPHERICITY TEST	YES
PRINT CELL MEANS AND STANDARD DEVIATIONS. . . .	YES
PRINT UNWEIGHTED MARGINAL MEANS	NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . .	NO
PRINT CONFIDENCE INTERVALS.	NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . .	NO
BOX-COX DIAGNOSTIC PLOT	NO
MINIPLOTS	NO
TOLERANCE FOR PIVOTING.	1.0E-02

DESIGN SPECIFICATIONS

GROUP = 1
DEPEND = 2 3 4
LEVEL = 3

GROUP STRUCTURE

GSE	COUNT
High	14
Low	14

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

1.80357	1.000	
1.03051	0.380	1.000

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY 0.0541

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

GSE =		High	Low	MARGINAL
	L			
Loss1	1	1.19643	1.78571	1.49107
Loss2	2	1.47321	1.89286	1.68304
Loss3	3	1.41071	2.03571	1.72321
MARGINAL		1.36012	1.90476	1.63244
COUNT		14	14	28

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

GSE =		High	Low
	L		

Loss1	1	0.31284	0.52676
Loss2	2	0.49073	0.57775
Loss3	3	0.51522	0.64939

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
Loss1 Loss2 Loss3

	SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.
	MEAN	223.84840	1	223.84840	315.48	0.0000
	GSE	6.22935	1	6.22935	8.78	0.0064
1	ERROR	18.44829	26	0.70955		
	L	0.86198	2	0.43099	7.91	0.0010
	LG	0.16853	2	0.08426	1.55	0.2227
2	ERROR	2.83408	52	0.05450		

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
MEAN		
GSE		
L	0.0021	0.0015
LG	0.2259	0.2245

ERROR TERM — EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.8278	0.9110

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 948

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 04/22/02 at 08:10:44
Site: S1500522CK
City University - Computer Unit

CITY UNIVERSITY

Department of Psychology

Cognitive Appraisals and Generalised Self-Efficacy

Information Sheet (Extended Study)

Previous research has shown that cognitive appraisals vary according to performance on a series of cognitive tasks and can be influenced by the degree of confidence in one's ability to deal with the demands of daily life (known as Generalised Self-Efficacy). This study is designed to discover whether such reactions persist for a period of time after feedback on performance has been received.

Participation in the study will take 10 minutes on each of three consecutive weeks at the start of next term and involves, on the first of these occasions, attempting to solve 15 computer-based anagrams and complete a short questionnaire. On the second and third occasions, the questionnaire will be completed twice - once before the anagrams and once after their completion. You would need to come to my office (W302) on each occasion.

Payment for participation is 3 course credits or £15
(whichever you prefer)
but ONLY if you take part on all THREE occasions.

If you are interested in taking part in the study, you will need to give your written consent, together with details of how you may be contacted (e.g. an email address or telephone number). **Your contact details will not be used for any other purpose:** should you take part in the study, a code number would be attached to your anagram scores and questionnaires, so that I would know which go together, but no-one other than myself would be able to connect this number to you. You will also need to complete a short questionnaire assessing GSE.

If you return completed the forms, I will contact you at the start of next term to arrange times for your participation. Only a small number of people are required, so I will make contact with volunteers in the order in which I receive their completed forms. If you agree to take part in the study, you will be free to withdraw at any time without giving a reason.

Frances Stanton

CITY UNIVERSITY

Department of Psychology

Cognitive Appraisals and Generalised Self-Efficacy

Informed Consent Signature Sheet (Extended Study)

I acknowledge that I have read and understood the description of the investigation and give my consent to take part in the study. I understand that my name and contact details will be held separately from my responses to the study and that only the researcher will be able to connect me personally with my test results and questionnaire responses. I am aware that I may withdraw from the study at any time without giving a reason.

Name (please print) _____

Signature _____

Date _____

Contact Details: Tel _____

email _____

CITY UNIVERSITY

Department of Psychology

Cognitive Appraisals and Generalised Self-Efficacy

Debriefing Sheet (Extended Study)

Previous research has shown that the Cognitive Stress Appraisals (CSAs) of Challenge, Threat and Loss change over time in the face of repeated failure experiences. Challenge appraisals tend to start high and decrease, while those of Threat and Loss start at lower levels and increase. In addition, people low in Generalised Self-Efficacy (confidence in one's ability to deal with the demands of daily life - GSE) have been found to have generally lower levels of Challenge and higher levels of Loss in the face of failure and are therefore more susceptible to becoming demoralised by performing poorly on difficult tasks than those with greater levels of confidence.

So far, studies in this area (Jerusalem and Schwarzer, 1992; Stanton, 2002) have only explored to changes in CSAs immediately after the receipt of failure feedback, so this study is designed to see if the changes persist over time and if there is any relationship between GSE and levels of CSAs a week after failure feedback. If changes do persist, then these phenomena will be further explored in the area of health behaviours such as dieting, exercising and smoking, to see if they can help to explain why past performance of such behaviours is related to their future performance.

<u>References</u>:

Jerusalem, M. & Schwarzer, R. (1992). Self-efficacy as a Resource Factor in Stress Appraisal Processes. In R. Schwarzer (Ed.). *Self-efficacy: thought control of action.* Washington, D.C.; Hemisphere (pp 195-213).

Stanton, F. (2002). The Influence of Repeated Failure on Cognitive Stress Appraisals. Unpublished work.

Thank you very much for your help.
Frances Stanton

RAW DATA FROM EXTENDED IPM STUDY

DEMOGRAPHIC DATA

Participant	Age	Education[b]	Gender[c]	GSE score
1	37	5	2	30
2	19	2	1	27
3	23	4	2	32
4	19	2	2	27
5	18	2	1	27
6	20	2	2	29
7	21	2	2	32
8	22	6	2	33
9	22	2	2	27
10	20	2	2	32
11	18	2	2	25
12	19	2	2	32
13	28	4	1	35
14	28	3	1	28
15	49	3	1	37
16	20	2	2	32
17	21	2	2	34
18	19	2	2	32
19	19	2	2	26
20	19	2	2	33

a 1 = High GSE, 2 = Low GSE

b 0 = none; 1 = GSEs; 2 = A Levels; 3 = Bachelor's Degree; 4 = Master's Degree; 5 = MPhil/PhD; 6 = Professional qualifications

c 1 = Male; 2 = Female

MEAN CHALLENGE SCORES ACROSS THE FIVE COMPLETIONS & WEEKLY DIFFERENCE SCORES

Participant	C1	C2	Cdiff1	C3	C4	Cdiff2	C5
1	2.50	2.75	.25	2.50	2.75	.25	2.50
2	2.25	2.00	-.25	2.00	2.00	.00	2.25
3	3.50	3.50	.00	2.75	2.75	.00	3.00
4	3.50	2.75	-.75	3.00	2.00	-1.00	2.00
5	2.75	3.25	.50	2.25	3.00	.75	1.50
6	3.00	3.75	.75	2.50	3.50	1.00	2.75
7	2.75	3.25	.50	2.50	2.50	.00	3.00
8	3.00	3.00	.00	2.75	3.00	.25	2.00
9	3.00	3.00	.00	2.75	2.75	.00	3.25
10	2.50	2.50	.00	2.00	2.25	.25	2.25
11	2.50	3.00	.50	2.50	2.75	.25	2.75
12	3.75	3.00	-.75	3.25	3.25	.00	3.25
13	2.75	2.50	-.25	1.75	2.25	.50	2.00
14	3.00	3.00	.00	3.25	3.00	-.25	3.00
15	2.75	3.00	.25	2.75	2.75	.00	2.25
16	3.25	3.00	-.25	2.75	2.75	.00	3.00
17	2.50	3.00	.50	3.00	3.00	.00	3.00
18	3.25	3.25	.00	3.50	4.00	.50	4.00
19	2.75	3.00	.25	2.75	3.00	.25	3.00
20	3.75	3.75	.00	3.50	4.00	.50	4.00

MEAN THREAT SCORES ACROSS THE FIVE COMPLETIONS & WEEKLY DIFFERENCE SCORES

Participant	T1	T2	Tdiff1	T3	T4	Tdiff2	T5
1	2.33	2.33	.00	2.00	2.33	.33	2.00
2	3.00	3.00	.00	3.67	3.33	-.33	2.67
3	3.33	2.00	-1.33	3.00	2.67	-.33	3.00
4	2.67	2.33	-.33	2.00	1.67	-.33	2.67
5	2.00	2.00	.00	2.67	2.00	-.67	3.00
6	1.67	2.33	.67	3.00	1.67	-1.33	2.00
7	3.33	2.67	-.67	2.67	2.67	.00	2.67
8	1.33	1.33	.00	1.33	1.33	.00	1.33
9	1.67	2.00	.33	2.00	1.67	-.33	1.67
10	2.67	2.67	.00	2.33	2.33	.00	2.00
11	3.00	3.00	.00	3.00	2.67	-.33	3.33
12	1.67	1.67	.00	2.00	2.00	.00	1.67
13	2.00	2.33	.33	2.33	2.33	.00	2.33
14	1.67	2.00	.33	1.67	1.67	.00	1.67
15	2.33	2.00	-.33	2.67	2.67	.00	2.67
16	2.00	2.00	.00	2.00	2.00	.00	2.33
17	2.33	2.67	.33	2.33	3.00	.67	2.67
18	2.33	2.67	.33	2.00	2.33	.33	1.67
19	2.33	3.00	.67	3.00	3.00	.00	2.33
20	1.33	2.00	.67	2.00	2.00	.00	2.00

Mean Loss Scores Across the Five Completions & Weekly Difference Scores

Participant	L1	L2	Ldiff1	L3	L4	Ldiff2	L5
1	2.00	2.00	.00	2.00	2.00	.00	2.00
2	3.00	3.00	.00	3.25	3.00	-.25	2.50
3	2.25	1.00	-1.25	1.00	1.25	.25	1.00
4	1.50	1.25	-.25	1.25	1.50	.25	1.50
5	1.50	1.25	-.25	2.00	1.25	-.75	2.75
6	1.00	1.25	.25	1.50	1.50	.00	1.25
7	2.00	1.25	-.75	1.75	1.25	-.50	1.50
8	1.00	1.00	.00	1.00	1.00	.00	1.00
9	1.75	2.00	.25	2.00	1.75	-.25	1.50
10	1.25	2.00	.75	2.00	2.00	.00	2.00
11	2.25	2.00	-.25	2.25	2.00	-.25	2.00
12	1.25	1.00	-.25	1.00	1.00	.00	1.00
13	2.00	2.00	.00	2.00	2.25	.25	3.00
14	1.25	1.00	-.25	1.00	1.00	.00	1.00
15	2.50	1.00	-1.50	1.25	1.25	.00	2.00
16	1.75	1.50	-.25	1.50	1.75	.25	2.00
17	1.50	1.00	-.50	1.25	1.00	-.25	1.00
18	2.00	1.00	-1.00	1.00	1.00	.00	1.00
19	2.00	2.00	.00	2.25	2.00	-.25	2.00
20	1.25	1.25	.00	1.25	2.00	.75	2.00

Scores for Anagram Sets

Participant	1	2	3	Mean
1	10	9	10	9.6667
2	4	2	4	3.3333
3	6	4	5	5.0000
4	5	4	3	4.0000
5	5	4	2	3.6667
6	6	3	6	5.0000
7	4	3	5	4.0000
8	8	6	7	7.0000
9	5	3	5	4.3333
10	4	3	4	3.6667
11	2	1	2	1.6667
12	3	1	3	2.6667
13	3	2	1	2.0000
14	6	5	8	6.3333
15	3	2	2	2.3333
16	5	4	4	4.3333
17	5	4	4	4.3333
18	5	4	5	4.6667
19	3	2	3	2.6667
20	5	5	6	5.3333

DESCRIPTIVE STATISTICS IN RELATION TO THE EXTENDED IPM STUDY

	Age	GSE score	Mean number correct anagrams across sets
Valid	20	20	20
Missing	0	0	0
Mean	23.05	30.50	4.300000
Median	20.00	32.00	4.166650
Std. Deviation	7.63	3.32	1.860326
Variance	58.16	11.00	3.460813
Minimum	18	25	1.6667
Maximum	49	37	9.6667

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**18**	2	10.0	10.0	10.0
	19	6	30.0	30.0	40.0
	20	3	15.0	15.0	55.0
	21	2	10.0	10.0	65.0
	22	2	10.0	10.0	75.0
	23	1	5.0	5.0	80.0
	28	2	10.0	10.0	90.0
	37	1	5.0	5.0	95.0
	49	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

Highest Educational Achievement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**A levels**	14	70.0	70.0	70.0
	Bachelor degree	2	10.0	10.0	80.0
	Masters degree	2	10.0	10.0	90.0
	Mphil/ PhD	1	5.0	5.0	95.0
	Prof. Quals	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

GSE Scores

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25	1	5.0	5.0	5.0
	26	1	5.0	5.0	10.0
	27	4	20.0	20.0	30.0
	28	1	5.0	5.0	35.0
	29	1	5.0	5.0	40.0
	30	1	5.0	5.0	45.0
	32	6	30.0	30.0	75.0
	33	2	10.0	10.0	85.0
	34	1	5.0	5.0	90.0
	35	1	5.0	5.0	95.0
	37	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

		GSE score
N		20
Normal Parameters(a,b)	Mean	30.50
	Std. Deviation	3.32
Most Extreme Differences	Absolute	.224
	Positive	.154
	Negative	-.224
Kolmogorov-Smirnov Z		1.004
Asymp. Sig. (2-tailed)		.266

a Test distribution is Normal.
b Calculated from data.

Mean Number of Correct Anagrams Across Sets

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.6667	1	5.0	5.0	5.0
	2.0000	1	5.0	5.0	10.0
	2.3333	1	5.0	5.0	15.0
	2.6667	2	10.0	10.0	25.0
	3.3333	1	5.0	5.0	30.0
	3.6667	2	10.0	10.0	40.0
	4.0000	2	10.0	10.0	50.0
	4.3333	3	15.0	15.0	65.0
	4.6667	1	5.0	5.0	70.0
	5.0000	2	10.0	10.0	80.0
	5.3333	1	5.0	5.0	85.0
	6.3333	1	5.0	5.0	90.0
	7.0000	1	5.0	5.0	95.0
	9.6667	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

Mean CSA Scores for Each Completion

	N	Mean
Challenge score after first set of anagrams	20	2.9500
Challenge score before second set of anagrams	20	3.0125
Challenge score after second set of anagrams	20	2.7000
Challenge score before third set of anagrams	20	2.8625
Challenge score after third set of anagrams	20	2.7375
Threat score after first set of anagrams	20	2.2500
Threat score before second set of anagrams	20	2.3000
Threat score after second set of anagrams	20	2.3833
Threat score before third set of anagrams	20	2.2667
Threat score after third set of anagrams	20	2.2833
Loss score after first set of anagrams	20	1.7500
Loss score before second set of anagrams	20	1.4875
Loss score after second set of anagrams	20	1.6250
Loss score before third set of anagrams	20	1.5875
Loss score after third set of anagrams	20	1.7000
Valid N (listwise)	20	

Mean CSA Scores from Replication Study, Sets 1-3

	N	Mean
Challenge score after Set 1	28	3.0179
Challenge score after Set 2	28	2.6875
Challenge score after Set 3	28	2.7634
Threat score after Set 1	28	2.500
Threat score after Set 2	28	2.5595
Threat score after Set 3	28	2.4762
Loss Score after Set 1	28	1.4911
Loss Score after Set 2	28	1.6830
Loss Score after Set 3	28	1.7232
Valid N (listwise)	28	

COMPARISON OF GSE SCORES BETWEEN REPLICATION AND EXTENDED STUDIES

	Study	N	Mean	Std. Deviation	Std. Error Mean
GSE scores	**Replication**	50	31.46	4.53	.64
	Extended	20	30.50	3.32	.74

Independent t-test

		Levene's Test[a]		t-test for Equality of Means						
		F	Sig.[b]	t	df	Sig.	Mean Diff.	Std. Error Diff.	95% Conf. Int. of the Diff.	
									Lower	Upper
GSE Score	**Equal vars assed**	2.86	.096	.86	68	.39	.96	1.12	-1.27	3.19
	Equal vars not assed			.98	47.67	.33	.96	.98	-1.01	2.93

a for Equality of Variances
b two-tailed

PEARSON CORRELATIONS OF IMMEDIATE AND DELAYED CSA SCORES

Challenge

		Challenge score before second set of anagrams
Challenge score after first set of anagrams	Correlation	.559(**)
	Sig. (1-tailed)	.005
	N	20

** Correlation is significant at the 0.01 level (1-tailed).

		Challenge score before third set of anagrams
Challenge score after second set of anagrams	Correlation	.691(**)
	Sig. (1-tailed)	.000
	N	20

** Correlation is significant at the 0.01 level (1-tailed).

Threat

		Threat score before second set of anagrams
Threat score after first set of anagrams	Correlation	.638(**)
	Sig. (1-tailed)	.001
	N	20

** Correlation is significant at the 0.01 level (1-tailed).

		Threat score before third set of anagrams
Threat score after second set of anagrams	Correlation	.726(**)
	Sig. (1-tailed)	.000
	N	20

** Correlation is significant at the 0.01 level (1-tailed).

Loss

		Loss score before second set of anagrams
Loss score after first set of anagrams	Correlation	.521(**)
	Sig. (1-tailed)	.009
	N	20

** Correlation is significant at the 0.01 level (1-tailed).

		Loss score before third set of anagrams
Loss score after second set of anagrams	Correlation	.848(**)
	Sig. (1-tailed)	.000
	N	20

** Correlation is significant at the 0.01 level (1-tailed).

ANOVAs to Test for Changes in CSAs over All 5 Measurement Points

Challenge Subscale

```
BMDP Instruction File    : C:\WINDOWS\BMDPRUN&.TMP
BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01    (IBM PC/MS-DOS)                Date: 08/21/02  at
11:28:23
Site: S1500522CK
      City University - Computer Unit

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/DESIGN
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     NAME = C.
     DEPENDENT = CHAL1, CHAL2, CHAL3, CHAL4, CHAL5.
/END.
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  NO. CHAL1     CHAL2     CHAL3     CHAL4     CHAL5
----- -------- -------- -------- -------- --------
    1     2.50     2.75     2.50     2.75     2.50
    2     2.25     2.00     2.00     2.00     2.25
    3     3.50     3.50     2.75     2.75     3.00
    4     3.50     2.75     3.00     2.00     2.00
    5     2.75     3.25     2.25     3.00     1.50
    6     3.00     3.75     2.50     3.50     2.75
    7     2.75     3.25     2.50     2.50     3.00
    8     3.00     3.00     2.75     3.00     2.00
    9     3.00     3.00     2.75     2.75     3.25
   10     2.50     2.50     2.00     2.25     2.25

NUMBER OF CASES READ. . . . . .      20

DESCRIPTIVE STATISTICS OF DATA
----------- --------- -- ----

 VARIABLE     TOTAL          STANDARD  ST.ERR   COEFF SMALLEST LARGEST
  NO. NAME     FREQ.  MEAN     DEV.   OF MEAN  OF VAR  VALUE   VALUE
RANGE

   1 CHAL1        20  2.9500  .43377  .09699  .14704  2.2500  3.7500
1.5000
   2 CHAL2        20  3.0125  .40939  .09154  .13590  2.0000  3.7500
1.7500
   3 CHAL3        20  2.7000  .47711  .10668  .17671  1.7500  3.5000
1.7500
   4 CHAL4        20  2.8625  .54697  .12231  .19108  2.0000  4.0000
2.0000
   5 CHAL5        20  2.7375  .65129  .14563  .23791  1.5000  4.0000
2.5000

  METHOD OF ESTIMATING PREDICTED AND RESIDUALS. .     MEAN
  PRINT PREDICTED AND RESIDUALS VALUES. . . . . .       NO
  PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL .       NO
  PRINT SPHERICITY TEST . . . . . .                    YES
```

PRINT CELL MEANS AND STANDARD DEVIATIONS. . . . YES
PRINT UNWEIGHTED MARGINAL MEANS . . . . . NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . . NO
PRINT CONFIDENCE INTERVALS. . . . . NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . . NO
BOX-COX DIAGNOSTIC PLOT . . . . . NO
MINIPLOTS . . . . . NO
TOLERANCE FOR PIVOTING. 1.0E-02

DESIGN SPECIFICATIONS

DEPEND = 1 2 3 4 5
LEVEL = 5

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

3.60125	1.000			
1.53036	-0.176	1.000		
0.87844	0.148	-0.306	1.000	
2.15621	-0.047	0.408	0.007	1.000

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY
0.0951

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

	C		MARGINAL
CHAL1	1	2.95000	2.95000
CHAL2	2	3.01250	3.01250
CHAL3	3	2.70000	2.70000
CHAL4	4	2.86250	2.86250
CHAL5	5	2.73750	2.73750
MARGINAL		2.85250	2.85250
COUNT		20	20

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

	C	
CHAL1	1	0.43377
CHAL2	2	0.40939
CHAL3	3	0.47711
CHAL4	4	0.54697
CHAL5	5	0.65129

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
CHAL1 CHAL2 CHAL3 CHAL4 CHAL5

SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.

MEAN	813.67562	1	813.67562	927.86
0.0000				
1 ERROR	16.66188	19	0.87694	
C	1.43375	4	0.35844	3.34
0.0143				
2 ERROR	8.16625	76	0.10745	

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
MEAN		
C	0.0263	0.0185

ERROR TERM EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.7377	0.8881

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 958

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 08/21/02 at 11:29:13
Site: S1500522CK
City University - Computer Unit

THREAT SUBSCALE

```
BMDP Instruction File   : C:\WINDOWS\BMDPRUN&.TMP

BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT


BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.


Release: 7.01   (IBM PC/MS-DOS)                 Date: 09/23/02  at
14:00:26
Site: S1500522CK
      City University - Computer Unit



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/DESIGN
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/END.
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  NO. THREAT1   THREAT2   THREAT3   THREAT4   THREAT5
----- -------- -------- -------- -------- --------
    1     2.33     2.33     2.00     2.33     2.00
    2     3.00     3.00     3.67     3.33     2.67
    3     3.33     2.00     3.00     2.67     3.00
    4     2.67     2.33     2.00     1.67     2.67
    5     2.00     2.00     2.67     2.00     3.00
    6     1.67     2.33     3.00     1.67     2.00
    7     3.33     2.67     2.67     2.67     2.67
    8     1.33     1.33     1.33     1.33     1.33
    9     1.67     2.00     2.00     1.67     1.67
   10     2.67     2.67     2.33     2.33     2.00

NUMBER OF CASES READ. . . . . .      20


DESCRIPTIVE STATISTICS OF DATA
---------- --------- -- ----

 VARIABLE     TOTAL          STANDARD  ST.ERR    COEFF SMALLEST LARGEST
  NO. NAME     FREQ.  MEAN     DEV.    OF MEAN   OF VAR  VALUE   VALUE
RANGE

   1 THREAT1      20  2.2500  .61057  .13653  .27137  1.3333  3.3333
2.0000
   2 THREAT2      20  2.3000  .45756  .10231  .19894  1.3333  3.0000
1.6667
   3 THREAT3      20  2.3833  .56481  .12630  .23698  1.3333  3.6667
2.3334
   4 THREAT4      20  2.2667  .53639  .11994  .23664  1.3333  3.3333
2.0000
   5 THREAT5      20  2.2833  .54370  .12158  .23812  1.3333  3.3333
2.0000

  METHOD OF ESTIMATING PREDICTED AND RESIDUALS. .     MEAN
  PRINT PREDICTED AND RESIDUALS VALUES. . . . . .      NO
  PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL .      NO
  PRINT SPHERICITY TEST . . . . . .                   YES
```

PRINT CELL MEANS AND STANDARD DEVIATIONS. . . . YES
PRINT UNWEIGHTED MARGINAL MEANS . . . . . NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . . NO
PRINT CONFIDENCE INTERVALS. . . . . NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . . NO
BOX-COX DIAGNOSTIC PLOT . . . . . NO
MINIPLOTS . . . . . NO
TOLERANCE FOR PIVOTING. 1.0E-02

DESIGN SPECIFICATIONS

DEPEND = 1 2 3 4 5
LEVEL = 5

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

1.82002	1.000			
2.75551	0.027	1.000		
1.37983	0.115	0.068	1.000	
2.00672	-0.338	0.175	-0.065	1.000

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY
0.8106

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

	T		MARGINAL
THREAT1	1	2.25000	2.25000
THREAT2	2	2.30000	2.30000
THREAT3	3	2.38333	2.38333
THREAT4	4	2.26667	2.26667
THREAT5	5	2.28334	2.28334
MARGINAL		2.29667	2.29667
COUNT		20	20

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

	T	
THREAT1	1	0.61057
THREAT2	2	0.45756
THREAT3	3	0.56481
THREAT4	4	0.53639
THREAT5	5	0.54370

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
THREAT1 THREAT2 THREAT3 THREAT4 THREAT5

SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.

MEAN	527.46839	1	527.46839	495.07
0.0000				
1 ERROR	20.24348	19	1.06545	
T	0.21556	4	0.05389	0.51
0.7253				
2 ERROR	7.96207	76	0.10476	

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
MEAN		
T	0.7012	0.7253

ERROR TERM — EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.8736	1.0000

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 966

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 09/23/02 at 14:00:43
Site: S1500522CK
City University - Computer Unit

LOSS SUBSCALE

```
BMDP Instruction File   : C:\WINDOWS\BMDPRUN&.TMP

BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT


BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.


Release: 7.01   (IBM PC/MS-DOS)                 Date: 09/23/02  at
13:27:21
Site: S1500522CK
      City University - Computer Unit


/INPUT
     FILE = 'C:\BMDP\ESLOSS5.DAT'.
     FORMAT = FREE.
     VARIABLES = 5.
/VARIABLE
      NAMES ARE LOSS1, LOSS2, LOSS3, LOSS4, LOSS5.
/DESIGN
     LEVEL = 5.
     NAME = L.
     DEPENDENT = LOSS1, LOSS2, LOSS3, LOSS4, LOSS5.
/END.
 CASE     1         2         3         4         5
  NO. LOSS1     LOSS2     LOSS3     LOSS4     LOSS5
----- -------- -------- -------- -------- --------
    1     2.00      2.00      2.00      2.00      2.00
    2     3.00      3.00      3.25      3.00      2.50
    3     2.25      1.00      1.00      1.25      1.00
    4     1.50      1.25      1.25      1.50      1.50
    5     1.50      1.25      2.00      1.25      2.75
    6     1.00      1.25      1.50      1.50      1.25
    7     2.00      1.25      1.75      1.25      1.50
    8     1.00      1.00      1.00      1.00      1.00
    9     1.75      2.00      2.00      1.75      1.50
   10     1.25      2.00      2.00      2.00      2.00

NUMBER OF CASES READ. . . . . .      20

DESCRIPTIVE STATISTICS OF DATA
----------- ---------- -- ----

 VARIABLE     TOTAL          STANDARD  ST.ERR   COEFF SMALLEST LARGEST
  NO. NAME     FREQ.  MEAN     DEV.   OF MEAN  OF VAR  VALUE   VALUE
RANGE

   1 LOSS1        20  1.7500  .52566  .11754  .30038  1.0000  3.0000
2.0000
   2 LOSS2        20  1.4875  .55295  .12364  .37173  1.0000  3.0000
2.0000
   3 LOSS3        20  1.6250  .59327  .13266  .36509  1.0000  3.2500
2.2500
   4 LOSS4        20  1.5875  .53971  .12068  .33997  1.0000  3.0000
2.0000
   5 LOSS5        20  1.7000  .62091  .13884  .36524  1.0000  3.0000
2.0000

  METHOD OF ESTIMATING PREDICTED AND RESIDUALS. .     MEAN
  PRINT PREDICTED AND RESIDUALS VALUES. . . . .       NO
  PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL .     NO
  PRINT SPHERICITY TEST . . . . . .                   YES
```

PRINT CELL MEANS AND STANDARD DEVIATIONS. . . .	YES
PRINT UNWEIGHTED MARGINAL MEANS	NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . .	NO
PRINT CONFIDENCE INTERVALS.	NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . .	NO
BOX-COX DIAGNOSTIC PLOT	NO
MINIPLOTS	NO
TOLERANCE FOR PIVOTING.	1.0E-02

DESIGN SPECIFICATIONS

DEPEND = 1 2 3 4 5
LEVEL = 5

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

3.37500	1.000			
2.84911	0.089	1.000		
0.81250	0.698	0.365	1.000	
0.93464	0.081	0.364	-0.228	1.000

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY
0.0000

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

	L		MARGINAL
LOSS1	1	1.75000	1.75000
LOSS2	2	1.48750	1.48750
LOSS3	3	1.62500	1.62500
LOSS4	4	1.58750	1.58750
LOSS5	5	1.70000	1.70000
MARGINAL		1.63000	1.63000
COUNT		20	20

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

	L	
LOSS1	1	0.52566
LOSS2	2	0.55295
LOSS3	3	0.59327
LOSS4	4	0.53971
LOSS5	5	0.62091

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
LOSS1 LOSS2 LOSS3 LOSS4 LOSS5

SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.

MEAN	265.69000	1	265.69000	223.02
0.0000				
1 ERROR	22.63500	19	1.19132	
L	0.82875	4	0.20719	1.98
0.1068				
2 ERROR	7.97125	76	0.10488	

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
MEAN		
L	0.1396	0.1297

ERROR TERM — EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.6277	0.7310

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 958

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 09/23/02 at 13:27:26
Site: S1500522CK
City University - Computer Unit

ANOVAs to Compare Changes in CSAs Immediately After Each of the 3 Failures in the Extension Study with Those Observed After the First 3 Failures of the Replication

Challenge Subscale

```
BMDP Instruction File    : C:\WINDOWS\BMDPRUN&.TMP
BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01   (IBM PC/MS-DOS)                Date: 05/24/02  at 12:11:48
Site: S1500522CK
      City University - Computer Unit


/INPUT
       FILE = 'C:\bmdp\EMSChal.dat'.
       FORMAT = FREE.
       VARIABLES = 4.
/VARIABLE
       NAMES ARE Study, Chal1, Chal3, Chal5.
/GROUP
       VARIABLE = STUDY.
       CODES (STUDY) = 1, 2.
       NAMES (STUDY) = MS, ES.
/DESIGN
       LEVEL = 3.
       NAME = C.
       DEPENDENT = Chal1, Chal3, Chal5.
/END
 CASE     1         2         3         4
  NO. Study     Chal1     Chal3     Chal5
----- -------- --------- --------- ---------
    1 MS            3.50      3.25      3.25
    2 MS            3.00      2.75      2.25
    3 MS            2.50      2.75      2.50
    4 MS            2.75      2.25      2.00
    5 MS            3.25      3.00      3.00
    6 MS            2.75      2.75      2.75
    7 MS            3.50      3.00      2.75
    8 MS            3.25      3.25      3.00
    9 MS            3.25      3.75      3.50
   10 MS            3.00      2.75      2.50

NUMBER OF CASES READ. . . . . .      48

GROUPING VARIABLE. . . Study
                                 CATEGORY    FREQUENCY
                                 --------    ---------
                                 MS               28
                                 ES               20

DESCRIPTIVE STATISTICS OF DATA
----------- ---------- -- ----

 VARIABLE     TOTAL          STANDARD  ST.ERR   COEFF SMALLEST LARGEST
 NO. NAME      FREQ.   MEAN     DEV.   OF MEAN OF VAR  VALUE   VALUE   RANGE

   2 Chal1        48 2.9896   .40265   .05812  .13468 2.2500  3.7500  1.5000
```

3 Chal3	48	2.7370	.51198	.07390	.18706	1.2500	3.7500	2.5000
4 Chal5	48	2.6354	.62942	.09085	.23883	1.0000	4.0000	3.0000

METHOD OF ESTIMATING PREDICTED AND RESIDUALS. . MEAN
PRINT PREDICTED AND RESIDUALS VALUES. . . . . NO
PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL . NO
PRINT SPHERICITY TEST . . . . . YES
PRINT CELL MEANS AND STANDARD DEVIATIONS. . . YES
PRINT UNWEIGHTED MARGINAL MEANS . . . . . NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . . NO
PRINT CONFIDENCE INTERVALS. . . . . NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . . NO
BOX-COX DIAGNOSTIC PLOT . . . . . NO
MINIPLOTS . . . . . NO
TOLERANCE FOR PIVOTING. 1.0E-02

DESIGN SPECIFICATIONS

GROUP = 1
DEPEND = 2 3 4
LEVEL = 3

GROUP STRUCTURE

Study	COUNT
MS	28
ES	20

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

7.20804 1.000
2.61734 -0.035 1.000

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY 0.0038

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

Study = MS ES MARGINAL

	C			
Chal1	1	3.01786	2.95000	2.98958
Chal3	2	2.76339	2.70000	2.73698
Chal5	3	2.56250	2.73750	2.63542
MARGINAL		2.78125	2.79583	2.78733
COUNT		28	20	48

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

Study = MS ES

C

Chal1	1	0.38447	0.43377
Chal3	2	0.54256	0.47711
Chal5	3	0.61473	0.65129

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
Chal1 Chal3 Chal5

	SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.
	MEAN	1088.63505	1	1088.63505	1771.00	0.0000
	Study	0.00744	1	0.00744	0.01	0.9129
1	ERROR	28.27630	46	0.61470		
	C	2.82806	2	1.41403	13.24	0.0000
	CS	0.45045	2	0.22523	2.11	0.1272
2	ERROR	9.82537	92	0.10680		

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
MEAN		
Study		
C	0.0000	0.0000
CS	0.1372	0.1347

EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

ERROR TERM	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.8202	0.8649

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 952

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 05/24/02 at 12:13:44
Site: S1500522CK
City University - Computer Unit

THREAT SUBSCALE

```
BMDP Instruction File    : C:\WINDOWS\BMDPRUN&.TMP

BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT


BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.


Release: 7.01    (IBM PC/MS-DOS)                    Date: 05/24/02  at 12:36:04
Site: S1500522CK
      City University - Computer Unit

/INPUT
       FILE = 'C:\bmdp\EMSThre.dat'.
       FORMAT = FREE.
       VARIABLES = 4.
/VARIABLE
       NAMES ARE Study, Threat1, Threat3, Threat5.
/GROUP
       VARIABLE = STUDY.
       CODES (STUDY) = 1, 2.
       NAMES (STUDY) = MS, ES.
/DESIGN
       LEVEL = 3.
       NAME = T.
       DEPENDENT = Threat1, Threat3, Threat5.
/END
 CASE     1         2         3         4
  NO. Study     Threat1   Threat3   Threat5
----- -------- -------- -------- --------
    1 MS           1.67     2.00      2.67
    2 MS           2.00     2.00      2.00
    3 MS           3.00     2.00      2.67
    4 MS           3.33     3.00      3.00
    5 MS           2.67     1.33      1.33
    6 MS           3.00     3.00      3.00
    7 MS           2.33     1.33      2.67
    8 MS           1.33     2.00      2.00
    9 MS           1.33     1.00      1.00
   10 MS           2.33     2.33      3.00

NUMBER OF CASES READ. . . . . .      48

GROUPING VARIABLE. . . Study
                              CATEGORY    FREQUENCY
                              --------    ---------
                              MS               28
                              ES               20


DESCRIPTIVE STATISTICS OF DATA
----------- ---------- -- ----

 VARIABLE     TOTAL          STANDARD  ST.ERR    COEFF SMALLEST LARGEST
 NO. NAME      FREQ.  MEAN     DEV.    OF MEAN  OF VAR  VALUE   VALUE    RANGE

   2 Threat1     48  2.3958   .65108   .09398   .27176  1.3333  3.6667   2.3334
```

3 Threat3	48	2.4375	.69839	.10080	.28652	1.0000	4.0000	3.0000
4 Threat5	48	2.5208	.71428	.10310	.28335	1.0000	4.0000	3.0000

METHOD OF ESTIMATING PREDICTED AND RESIDUALS. .	MEAN
PRINT PREDICTED AND RESIDUALS VALUES.	NO
PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL .	NO
PRINT SPHERICITY TEST	YES
PRINT CELL MEANS AND STANDARD DEVIATIONS. . . .	YES
PRINT UNWEIGHTED MARGINAL MEANS	NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . .	NO
PRINT CONFIDENCE INTERVALS.	NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . .	NO
BOX-COX DIAGNOSTIC PLOT	NO
MINIPLOTS	NO
TOLERANCE FOR PIVOTING.	1.0E-02

DESIGN SPECIFICATIONS

GROUP = 1
DEPEND = 2 3 4
LEVEL = 3

GROUP STRUCTURE

Study	COUNT
MS	28
ES	20

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

6.37005	1.000	
5.70228	0.245	1.000

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY 0.2319

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

Study =		MS	ES	MARGINAL
T				
Threat1	1	2.50000	2.25000	2.39583
Threat3	2	2.47621	2.38333	2.43751
Threat5	3	2.69049	2.28334	2.52084
MARGINAL		2.55557	2.30556	2.45140
COUNT		28	20	48

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

Study =	MS	ES
T		

Threat1	1	0.66975	0.61057
Threat3	2	0.78792	0.56481
Threat5	3	0.78005	0.54370

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
Threat1 Threat3 Threat5

	SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.
	MEAN	827.06780	1	827.06780	731.76	0.0000
	Study	2.18765	1	2.18765	1.94	0.1708
1	ERROR	51.99105	46	1.13024		
	T	0.29230	2	0.14615	1.11	0.3327
	TS	0.57616	2	0.28808	2.20	0.1171
2	ERROR	12.07234	92	0.13122		

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
MEAN		
Study		
T	0.3302	0.3327
TS	0.1205	0.1171

ERROR TERM — EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.9408	1.0000

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 960

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 05/24/02 at 12:37:57
Site: S1500522CK
City University - Computer Unit

LOSS SUBSCALE

```
BMDP Instruction File    : C:\WINDOWS\BMDPRUN&.TMP

BMDP Program Output File: C:\WINDOWS\BMDPOUT&.OUT


BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.


Release: 7.01   (IBM PC/MS-DOS)                  Date: 05/24/02  at 12:56:36
Site: S1500522CK
      City University - Computer Unit

/INPUT
       FILE = 'C:\bmdp\EMSLoss.dat'.
       FORMAT = FREE.

       VARIABLES = 4.
/VARIABLE
       NAMES ARE Study, Loss1, Loss3, Loss5.
/GROUP
       VARIABLE = STUDY.
       CODES (STUDY) = 1, 2.
       NAMES (STUDY) = MS, ES.
/DESIGN
       LEVEL = 3.
       NAME = L.
       DEPENDENT = Loss1, Loss3, Loss5.
/END
 CASE     1         2         3         4
  NO. Study     Loss1     Loss3     Loss5
----- -------- -------- -------- --------
    1 MS           1.00      1.00      1.00
    2 MS           1.75      2.00      2.00
    3 MS           2.00      2.00      2.25
    4 MS           1.50      2.25      3.00
    5 MS           1.00      1.00      1.25
    6 MS           1.50      1.75      2.25
    7 MS           1.00      1.00      1.00
    8 MS           1.00      1.00      1.00
    9 MS           1.00      1.00      1.00
   10 MS           1.75      2.00      2.00

NUMBER OF CASES READ. . . . . .      48

GROUPING VARIABLE. . . Study
                                CATEGORY    FREQUENCY
                                --------    ---------
                                MS                28
                                ES                20


DESCRIPTIVE STATISTICS OF DATA
----------- ---------- -- ----

 VARIABLE     TOTAL          STANDARD  ST.ERR    COEFF SMALLEST LARGEST
 NO. NAME      FREQ.  MEAN     DEV.    OF MEAN  OF VAR  VALUE   VALUE    RANGE
```

2 Loss1	48	1.5990	.53281	.07690	.33322	1.0000	3.0000	2.0000
3 Loss3	48	1.6823	.62684	.09048	.37261	1.0000	3.2500	2.2500
4 Loss5	48	1.8568	.81663	.11787	.43981	1.0000	3.7500	2.7500

METHOD OF ESTIMATING PREDICTED AND RESIDUALS. . MEAN
PRINT PREDICTED AND RESIDUALS VALUES. . . . . NO
PRINT ANOVA TABLE FOR EACH ORTHOG. POLYNOMIAL . NO
PRINT SPHERICITY TEST . . . . . YES
PRINT CELL MEANS AND STANDARD DEVIATIONS. . . . YES
PRINT UNWEIGHTED MARGINAL MEANS . . . . . NO
PRINT BONFERRONI TEST FOR TRIAL COMPARISONS . . NO
PRINT CONFIDENCE INTERVALS. . . . . NO
SAVE PREDICTED AND RESIDUALS ON BMDP FILE . . . NO
BOX-COX DIAGNOSTIC PLOT . . . . . NO
MINIPLOTS . . . . . NO
TOLERANCE FOR PIVOTING. 1.0E-02

DESIGN SPECIFICATIONS

GROUP = 1
DEPEND = 2 3 4
LEVEL = 3

GROUP STRUCTURE

Study	COUNT
MS	28
ES	20

SUMS OF SQUARES AND CORRELATION MATRIX OF THE
ORTHOGONAL COMPONENTS POOLED FOR ERROR 2 IN ANOVA TABLE BELOW.

10.28834 1.000
2.59760 0.001 1.000

SPHERICITY TEST APPLIED TO ORTHOGONAL COMPONENTS - TAIL PROBABILITY 0.0000

CELL MEANS FOR 1-ST DEPENDENT VARIABLE

Study =	L	MS	ES	MARGINAL
Loss1	1	1.49107	1.75000	1.59896
Loss3	2	1.72321	1.62500	1.68229
Loss5	3	1.96875	1.70000	1.85677
MARGINAL		1.72768	1.69167	1.71267
COUNT		28	20	48

STANDARD DEVIATIONS FOR 1-ST DEPENDENT VARIABLE

Study = MS ES

	L		
Loss1	1	0.52034	0.52566
Loss3	2	0.65736	0.59327
Loss5	3	0.92648	0.62091

A N A L Y S I S O F V A R I A N C E FOR THE 1-ST DEPENDENT VARIABLE

THE TRIALS ARE REPRESENTED BY THE VARIABLES:
Loss1 Loss3 Loss5

	SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	TAIL PROB.
	MEAN	409.21727	1	409.21727	387.88	0.0000
	Study	0.04539	1	0.04539	0.04	0.8366
1	ERROR	48.53002	46	1.05500		
	L	1.15551	2	0.57776	4.12	0.0192
	LS	1.69197	2	0.84599	6.04	0.0034
2	ERROR	12.88594	92	0.14006		

SOURCE	GREENHOUSE GEISSER PROB.	HUYNH FELDT PROB.
MEAN		
Study		
L	0.0312	0.0292
LS	0.0081	0.0072

ERROR TERM — EPSILON FACTORS FOR DEGREES OF FREEDOM ADJUSTMENT

	GREENHOUSE-GEISSER	HUYNH-FELDT
2	0.7373	0.7724

NUMBER OF INTEGER WORDS USED IN PRECEDING PROBLEM 952

BMDP2V - ANALYSIS OF VARIANCE AND COVARIANCE WITH REPEATED MEASURES.

Release: 7.01 (IBM PC/MS-DOS) Date: 05/24/02 at 12:59:45
Site: S1500522CK
City University - Computer Unit

PEARSON CORRELATIONS OF GSE WITH CSA DIFFERENCE SCORES

		Chall2 minus Chall1
GSE score	Correlation	-.075
	Sig. (1-tailed)	.377
	N	20

		Chall4 minus Chall3
GSE score	Correlation	.102
	Sig. (1-tailed)	.334
	N	20

		Threat2 minus Threat1
GSE score	Correlation	-.173
	Sig. (1-tailed)	.233
	N	20

		Threat4 minus Threat3
GSE score	Correlation	.460(*)
	Sig. (1-tailed)	.021
	N	20

* Correlation is significant at the 0.05 level (1-tailed).

		Loss2 minus Loss1
GSE score	Correlation	-.394(*)
	Sig. (1-tailed)	.043
	N	20

* Correlation is significant at the 0.05 level (1-tailed).

		Loss4 minus Loss3
GSE score	Correlation	.407(*)
	Sig. (1-tailed)	.038
	N	20

* Correlation is significant at the 0.05 level (1-tailed).

CORRELATION OF GSE AND CSA SCORES AT EACH MEASUREMENT POINT

CSA & Completion No.		GSE
Challenge 1st	Correlation	.174
	Sig.[a]	.464
Challenge 2nd	Correlation	.111
	Sig.[a]	.640
Challenge 3rd	Correlation	.091
	Sig.[a]	.701
Challenge 4th	Correlation	.156
	Sig.[a]	.511
Challenge 5th	Correlation	.094
	Sig.[a]	.692
Threat 1st	Correlation	-.143
	Sig.[a]	.548
Threat 2nd	Correlation	-.370
	Sig.[a]	.108
Threat 3rd	Correlation	-.295
	Sig.[a]	.207
Threat 4th	Correlation	.039
	Sig.[a]	.869
Threat 5th	Correlation	-.190
	Sig.[a]	.423
Loss 1st	Correlation	-.068
	Sig.[a]	.776
Loss 2nd	Correlation	-.441
	Sig.[a]	.051
Loss 3rd	Correlation	-.495
	Sig.[a]	.027
Loss 4th	Correlation	-.305
	Sig.[a]	.191
Loss 5th	Correlation	-.102
	Sig.[a]	.668

a Two-tailed

N = 20 throughout

APPENDIX E

Material Relating to the Work Reported in Chapter 6

EXERCISERS' APPRAISAL QUESTIONNAIRE
Version 1

The questions below concern how you feel about continuing your efforts to exercise regularly . Please circle the <u>most appropriate</u> response to each using the following key:-

SA = Strongly Agree
A = Agree
D = Disagree
SD = Strongly Disagree

1. I'm curious to see how much I manage to exercise this week.	SA	A	D	SD
2. I suspect that it will be too hard for me to take enough exercise this week.	SA	A	D	SD
3. I can't cope with much more of this.	SA	A	D	SD
4. I'll be more able to take enough exercise this week if I make a real effort.	SA	A	D	SD
5. I feel discouraged and depressed now.	SA	A	D	SD
6. I doubt my ability to develop the habit of exercising regularly.	SA	A	D	SD
7. I feel more fully challenged as exercising gets more difficult.	SA	A	D	SD
8. I'm very nearly at the point of giving up.	SA	A	D	SD
9. I'm worried that I won't be able to take enough exercise this week.	SA	A	D	SD
10. There's no point in trying any more.	SA	A	D	SD
11. I'm really motivated to do better this week.	SA	A	D	SD

<u>Thank You</u>

QUITTERS' APPRAISAL QUESTIONNAIRE
Version 1

The questions below concern how you feel about continuing your efforts to stop smoking. Please circle the <u>most appropriate</u> response to each using the following key:-

SA = Strongly Agree
A = Agree
D = Disagree
SD = Strongly Disagree

12. I'm curious to see how well I manage to keep off the cigarettes this week.	SA	A	D	SD
13. I suspect that it will be too hard for me to go without smoking this week.	SA	A	D	SD
14. I can't cope with much more of this.	SA	A	D	SD
15. I'll be more able to keep off the cigarettes this week if I make a real effort.	SA	A	D	SD
16. I feel discouraged and depressed now.	SA	A	D	SD
17. I doubt my ability to stop smoking for good.	SA	A	D	SD
18. I feel more fully challenged as the cravings get stronger.	SA	A	D	SD
19. I'm very nearly at the point of caving in.	SA	A	D	SD
20. I'm worried that I won't be able to do without cigarettes this week.	SA	A	D	SD
21. There's no point in trying any more.	SA	A	D	SD
22. I'm really motivated to do better this week.	SA	A	D	SD

<u>Thank You</u>

Challenge Subscale

Participant	C1 (q1)	C2 (q4)	C3 (q7)	C4 (q11)
1	3	3	4	4
2	3	2	3	3
3	3	3	3	4
4	3	3	3	3
5	3	3	2	3
6	3	3	3	3
7	2	2	2	2
8	4	2	3	3
9	3	4	4	4
10	4	2	3	3
11	3	4	3	4
12	3	3	4	3
13	3	2	3	2
14	3	3	4	3
15	3	3	3	3
16	3	3	3	2
17	3	3	3	4
18	4	1	4	3
19	3	3	3	3
20	2	2	4	4
21	3	3	2	2
22	4	3	3	3
23	3	3	2	3
24	3	3	2	2
25	3	3	2	2
26	3	3	2	2

Threat Subscale

Participant	T1 (q2)	T2 (q6)	T3 (q9)
1	3	2	3
2	2	2	2
3	2	1	2
4	3	2	3
5	4	2	2
6	2	2	3
7	4	2	2
8	2	1	1
9	1	1	1
10	1	1	2
11	3	1	1
12	1	1	1
13	2	1	1
14	1	2	3
15	2	3	3
16	3	3	3
17	2	2	2
18	4	1	3
19	1	3	2
20	2	2	1
21	3	3	2
22	2	2	3
23	2	2	2
24	2	2	2
25	2	2	3
26	2	2	3

Loss Subscale

Participant	L1 (q3)	L2 (q5)	L3 (q8)	L4 (q10)
1	1	1	2	1
2	2	2	2	2
3	1	2	1	2
4	2	3	2	1
5	2	2	2	2
6	1	2	2	2
7	2	2	2	2
8	2	1	1	1
9	1	1	1	1
10	1	1	1	1
11	2	1	1	1
12	1	1	1	1
13	1	1	1	1
14	1	1	1	1
15	2	2	2	1
16	2	2	2	1
17	2	2	1	1
18	1	1	1	1
19	1	1	1	1
20	2	2	1	1
21	2	2	2	2
22	3	1	2	2
23	2	1	2	2
24	1	2	2	2
25	3	3	2	2
26	1	1	1	1

Challenge Subscale

Participant	C1 (q1)	C2 (q4)	C3 (q7)	C4 (q11)
1	3	4	4	4
2	3	3	2	3
3	4	4	4	2
4	3	3	3	3
5	4	4	3	4
6	2	3	3	3
7	4	3	1	4
8	3	4	3	2
9	3	3	3	3
10	4	1	4	4

Threat Subscale

Participant	T1 (q2)	T2 (q6)	T3 (q9)
1	1	1	1
2	2	2	3
3	3	2	4
4	2	2	2
5	2	2	2
6	2	2	2
7	1	1	1
8	1	2	3
9	2	2	3
10	2	4	2

Loss Subscale

Participant	L1 (q3)	L2 (q5)	L3 (q8)	L4 (q10)
1	1	1	1	1
2	1	1	2	1
3	2	2	3	1
4	2	2	2	2
5	1	1	2	1
6	2	2	2	2
7	1	1	1	1
8	1	1	1	1
9	2	2	2	2
10	2	3	3	2

CHALLENGE SUBSCALE

		Mean	Std Dev	Cases
1.	Q1	3.0769	.4836	26.0
2.	Q4	2.7692	.6516	26.0
3.	Q7	2.9615	.7200	26.0
4.	Q11	2.9615	.7200	26.0

Statistics for	Mean	Variance	Std Dev	No. of Variables
SCALE	11.7692	2.4246	1.5571	4

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q1	8.6923	2.2215	-.0213	.5132
Q4	9.0000	2.0000	.0000	.5469
Q7	8.8077	1.2815	.3831	.1224
Q11	8.8077	1.0415	.5883	-.1950

Reliability Coefficients

N of Cases = 26.0 N of Items = 4
Alpha = .4010

THREAT SUBSCALE

		Mean	Std Dev	Cases
1.	Q2	2.2308	.9081	26.0
2.	Q6	1.8462	.6748	26.0
3.	Q9	2.1538	.7845	26.0

Statistics for	Mean	Variance	Std Dev	No. of Variables
SCALE	6.2308	2.9046	1.7043	3

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q2	4.0000	1.6000	.2089	.6615
Q6	4.3846	1.7662	.3808	.3693
Q9	4.0769	1.4338	.4553	.2146

Reliability Coefficients

N of Cases = 26.0 N of Items = 3
Alpha = .5212

LOSS SUBSCALE

		Mean	Std Dev	Cases
1.	Q3	1.6154	.6373	26.0
2.	Q5	1.5769	.6433	26.0
3.	Q8	1.5000	.5099	26.0
4.	Q10	1.3846	.4961	26.0

Statistics for	Mean	Variance	Std Dev	No. of Variables
SCALE	6.0769	3.1938	1.7871	4

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q3	4.4615	1.8585	.5348	.7575
Q5	4.5000	1.7800	.5826	.7312
Q8	4.5769	1.9338	.7051	.6730
Q10	4.6923	2.1415	.5552	.7435

Reliability Coefficients

N of Cases = 26.0 N of Items = 4
Alpha = .7797

INTER-ITEM PEARSON CORRELATIONS FOR THE FIRST QUITTERS' CSAQ

		C1	T1	L1	C2	T2	L2	C3	T3	L3	C4	L4
C1	**r**	1	.156	-.156	-.107	.202	.047	.000	.017	.290	.292.	-.383
	p[a]	---	.667	.667	.768	.576	.897	1.00	.962	.416	413	.275
T1	**r**		1	.667	-.115	.430	.553	.373	.667	.905	-.356	.272
	p[a]		---	.035	.752	.214	.097	.289	.035	.000	.312	.447
L1	**r**			1.	-.459	.516	.905	.447	.333	.714	-.267	.816
	p[a]			---	.182	.126	.000	.195	.347	.020	.455	.004
C2	**r**				1	-.740	-.726	.000	.178	-.459	-.368	-.656
	p[a]				---	.014	.017	1.00	.622	.182	.296	.040
T2	**r**					1	.778	.433	.287	.738	.000	.527
	p[a]					---	.008	.211	.422	.015	1.00	.117
L2	**r**						1	.506	.201	.775	-.040	.800
	p[a]						---	.136	.578	.008	.912	.005
C3	**r**							1	.248	.479	-.149	.228
	p[a]							---	.489	.161	.680	.526
T3	**r**								1	.524	-.831	-.045
	p[a]								---	.120	.003	.901
L3	**r**									1	-.153	.408
	p[a]									---	.674	.242
C4	**r**										1	.055
	p[a]										---	.881
L4	**r**											1
	p[a]											---

N = 10 throughout

a two-tailed

EXERCISERS' APPRAISAL QUESTIONNAIRE
Version 2

The questions below concern how you feel about continuing your efforts to exercise regularly . Please circle the most appropriate response to each using the following key:-

SA = Strongly Agree
A = Agree
D = Disagree
SD = Strongly Disagree

1. I'm really motivated to do well this week.	SA	A	D	SD
2. I suspect I'm not up to meeting my exercise targets this week.	SA	A	D	SD
3. I can't cope with much more of this.	SA	A	D	SD
4. The benefits of regular exercise make all the effort worthwhile.	SA	A	D	SD
5. I feel discouraged and depressed now.	SA	A	D	SD
6. I doubt I'll manage to develop the habit of exercising regularly.	SA	A	D	SD
7. The harder it gets to exercise, the more fully challenged I feel.	SA	A	D	SD
8. I'm very nearly at the point of giving up.	SA	A	D	SD
9. I'm worried how I'll feel if I don't meet my exercise targets.	SA	A	D	SD
10. There's no point in trying any more.	SA	A	D	SD
11. I'm sure I'll be able to meet my exercise targets this week.	SA	A	D	SD

Thank You

QUITTERS' APPRAISAL QUESTIONNAIRE
Version 2

The questions below concern how you feel about continuing your efforts to give up smoking. Please circle the <u>most appropriate</u> response to each using the following key:-

SA = Strongly Agree
A = Agree
D = Disagree
SD = Strongly Disagree

1. I'm really motivated to do well this week.	SA	A	D	SD
2. I suspect I'm not up to doing without cigarettes this week.	SA	A	D	SD
3. I can't cope with much more of this.	SA	A	D	SD
4. The benefits of giving up smoking make all the effort worthwhile.	SA	A	D	SD
5. I feel discouraged and depressed now.	SA	A	D	SD
6. I doubt I'll manage to stop smoking for good.	SA	A	D	SD
7. The greater the temptation to smoke, the more fully challenged I feel.	SA	A	D	SD
8. I'm very nearly at the point of caving in.	SA	A	D	SD
9. I'm worried how I'll feel if I don't manage to stay off the cigarettes.	SA	A	D	SD
10. There's no point in trying any more.	SA	A	D	SD
11. I'm sure I'll be able to keep off the cigarettes this week.	SA	A	D	SD

<u>Thank You</u>

Challenge Subscale

Participant	C1 (q1)	C2 (q4)	C3 (q7)	C4 (q11)
1	4	4	2	2
2	3	4	3	4
3	2	4	1	2
4	3	4	3	4
5	2	3	2	2
6	3	4	3	3
7	2	3	1	2
8	3	3	2	3
9	4	3	3	3
10	3	4	2	4
11	3	4	4	3
12	3	3	4	3
13	2	4	2	2
14	4	4	3	3
15	3	3	2	2
16	3	4	2	2
17	3	4	2	3
18	3	4	1	2
19	4	4	9	4
20	3	4	2	3
21	3	4	3	3
22	3	3	2	3
23	3	4	3	3
24	3	4	2	4
25	3	3	2	3
26	3	3	3	3
27	3	3	3	3
28	4	4	2	3
29	3	4	2	4
30	2	4	3	2
31	4	3	1	3
32	2	3	2	1
33	3	3	3	2
34	3	4	2	4
35	3	4	2	3

Threat Subscale

Participant	T1 (q2)	T2 (q6)	T3 (q9)
1	3	1	3
2	2	2	2
3	3	2	1
4	1	1	4
5	3	2	3
6	2	3	3
7	3	3	2
8	1	2	2
9	1	2	2
10	1	1	2
11	2	1	3
12	2	2	2
13	4	2	2
14	2	1	1
15	3	3	2
16	3	1	3
17	2	2	2
18	4	2	4
19	1	1	1
20	2	1	1
21	2	2	2
22	2	2	3
23	2	2	2
24	1	2	2
25	2	2	3
26	2	3	3
27	2	3	2
28	2	2	3
29	2	1	2
30	3	2	2
31	2	3	2
32	4	3	2
33	3	2	2
34	2	2	3
35	2	2	3

Loss Subscale

Participant	L1 (q3)	L2 (q5)	L3 (q8)	L4 (q10)
1	1	2	1	2
2	1	2	1	4
3	1	1	1	2
4	1	1	1	4
5	1	1	1	2
6	2	2	2	3
7	1	1	2	2
8	1	1	1	3
9	1	1	1	3
10	1	1	1	4
11	1	1	1	3
12	1	1	1	3
13	2	1	2	2
14	2	1	1	3
15	1	1	2	2
16	1	2	1	2
17	1	1	2	3
18	1	1	1	2
19	1	1	1	4
20	1	1	1	3
21	2	2	2	3
22	2	2	2	3
23	1	1	1	3
24	1	2	1	4
25	2	2	1	3
26	2	2	2	3
27	2	1	2	3
28	1	2	1	3
29	1	1	1	4
30	1	1	1	2
31	2	1	2	3
32	2	2	3	1
33	2	1	1	2
34	2	2	2	4
35	2	2	2	3

Challenge Subscale

Participant	C1 (q1)	C2 (q4)	C3 (q7)	C4 (q11)
1	4	4	3	3
2	2	3	4	1
3	2	4	1	2
4	4	4	3	4
5	3	4	2	3
6	4	4	4	4
7	3	2	2	2
8	3	4	2	4
9	4	3	4	4
10	3	3	3	3
11	2	4	2	1
12	3	3	3	4
13	3	3	3	3
14	3	4	2	2

Threat Subscale

Participant	T1 (q2)	T2 (q6)	T3 (q9)
1	2	1	2
2	4	3	3
3	3	2	4
4	1	2	4
5	1	2	3
6	1	3	1
7	4	2	3
8	1	1	2
9	3	2	4
10	2	3	2
11	3	3	4
12	1	1	2
13	2	2	4
14	3	3	3

Loss Subscale

Participant	L1 (q3)	L2 (q5)	L3 (q8)	L4 (q10)
1	1	1	2	1
2	2	3	3	3
3	2	1	2	1
4	1	2	1	1
5	1	1	1	1
6	1	1	1	1
7	2	2	2	1
8	1	1	1	1
9	1	1	2	1
10	3	2	1	2
11	4	4	3	2
12	1	1	1	1
13	1	1	3	2
14	2	2	2	2

RELIABILITY ANALYSIS OF SECOND EXERCISERS' CSAQ

CHALLENGE SUBSCALE

		Mean	Std Dev	Cases
1.	Q1	2.9706	.5766	34.0
2.	Q4	3.6176	.4933	34.0
3.	Q7	2.3235	.7675	34.0
4.	Q11	2.8235	.7576	34.0

Statistics for	Mean	Variance	Std Dev	No. of Variables
SCALE	11.7353	2.8066	1.6753	4

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q1	8.7647	1.9430	.3305	.4142
Q4	8.1176	2.2888	.1839	.5199
Q7	9.4118	1.7647	.2220	.5227
Q11	8.9118	1.3556	.4971	.2110

Reliability Coefficients

N of Cases = 34.0 N of Items = 4
Alpha = .5073

THREAT SUBSCALE

		Mean	Std Dev	Cases
1.	Q2	2.2286	.8432	35.0
2.	Q6	1.9429	.6835	35.0
3.	Q9	2.3143	.7581	35.0

Statistics for	Mean	Variance	Std Dev	No. of Variables
SCALE	6.4857	2.2571	1.5024	3

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q2	4.2571	1.0790	.2667	.0685
Q6	4.5429	1.4319	.2188	.2042
Q9	4.1714	1.4992	.0987	.4283

Reliability Coefficients

N of Cases = 35.0 N of Items = 3
Alpha = .3351

LOSS SUBSCALE

		Mean	Std Dev	Cases
1.	Q3	1.3714	.4902	35.0
2.	Q5	1.3714	.4902	35.0
3.	Q8	1.4000	.5531	35.0
4.	Q10	1.3429	.4816	35.0

Statistics for	Mean	Variance	Std Dev	No. of Variables
SCALE	5.4857	2.4924	1.5787	4

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q3	4.1143	1.4571	.6717	.6990
Q5	4.1143	1.6924	.4388	.8103
Q8	4.0857	1.3748	.6259	.7225
Q10	4.1429	1.4790	.6672	.7023

Reliability Coefficients

N of Cases = 35.0 N of Items = 4
Alpha = .7885

TESTING THE DIFFERENCES IN ALPHA VALUES OF THE ORIGINAL THREAT SUBSCALE AND THAT DEVELOPED FOR EXERCISERS

In the original English translation of the CSAQ, the alpha value for the Threat subscale when the pilot and main replication study samples were combined (N = 47) was .7020. That for the same subscale as adapted for Exercisers (N = 35) was .3351.

$$z = \frac{r'_1 - r'_2}{\sqrt{\frac{1}{N_1 - 3} + \frac{1}{N_2 - 3}}}$$

Using the Table of Fisher's Transformation of r to r' presented in Howell (1992:647), when $r = .70$, $r' = .867$ and when $r = .34$, $r' = .354$. Therefore:-

$$z = \frac{.867 - .354}{\sqrt{\frac{1}{47-3} + \frac{1}{35-3}}} = \frac{.513}{\sqrt{.023 + .031}}$$

$$= \frac{.513}{.233} = 2.20$$

When z = 2.20, p = .0139, therefore the difference between the two correlations is significant.

The reliability of the Exercisers' Threat subscale, as indexed by Cronbach's alpha, is significantly poorer than that of the Threat subscale of the original English translation of the CSAQ.

INTER-ITEM PEARSON CORRELATIONS FOR THE SECOND QUITTERS' CSAQ

		C1	T1	L1	C2	T2	L2	C3	T3	L3	C4	L4
C1	**r**	1	-.490	-.640	.081	-.293	-.527	.494	-.309	-.498	.780	-.559
	p[a]	---	.075	.014	.783	.309	.053	.072	.282	.070	.001	.038
T1	**r**		1	.522	-.474	.407	.522	-.086	.427	.739	-.784	.500
	p[a]		---	.055	.087	.149	.055	.771	.127	.003	.001	.068
L1	**r**			1.	-.064	.614	.822	-.311	.219	.406	-.732	.531
	p[a]			---	.829	.019	.000	.280	.451	.150	.003	.051
C2	**r**				1	.000	-.064	-.259	-.059	-.221	.108	-.183
	p[a]				---	1.00	.829	.372	.840	.447	.714	.531
T2	**r**					1	.614	.172	.114	.302	-.519	.640
	p[a]					---	.019	.557	.697	.293	.057	.014
L2	**r**						1	-.039	.303	.509	-.732	.659
	p[a]						---	.895	.293	.063	.003	.010
C3	**r**							1	-.277	0.15	.339	.223
	p[a]							---	.337	.959	.236	.443
T3	**r**								1	.557	-.361	.171
	p[a]								---	.039	.205	.560
L3	**r**									1	-.735	.636
	p[a]									---	.003	.014
C4	**r**										1	-.665
	p[a]										---	.009
L4	**r**											1
	p[a]											---

N = 10 throughout

a two-tailed

APPENDIX F

Material Relating to the Study Reported in Chapter 7

LOOKING IN ON EXPERIENCES OF TRYING TO CHANGE A HEALTH-RELATED BEHAVIOUR

A great deal of research has been aimed at increasing understanding of what affects the extent to which people succeed when they try to change health-related behaviours (such as smoking, eating, drinking alcohol or taking exercise). Although this work has provided some useful information, there are still some key questions which are not yet answered. These concern the following:-

- what particular health-related behaviours mean to people and what it means for them to succeed or fail in their efforts to change them;
- the main reasons people either carry on with or give up an attempt to change a health-related behaviour;
- the effects that past experiences of trying to change a behaviour might have on a new attempt.

In order to try to find out more about each of these points, I am planning, as part of my PhD research, to follow three people through the early stages of an attempt to change one of the behaviours mentioned above.

I will be interviewing each person who agrees to take part in the study on three separate occasions: the first shortly after they start an attempt to change a behaviour, the second about two weeks after that and the third around four weeks later.

Interviews are expected to last about an hour, on average, although the first is likely to be longer and the other two shorter. Those who take part will be paid £15 for their first interview and £10 for each of the other two, making £35 in total.

Each person will be asked to provide an alias for use on the labels of tapes and transcripts as well as in the written report of the investigation. No-one other than myself will ever know to whom the alias refers.

All interviews will be recorded and then transcribed and each person will be given copies of their transcripts unless they would rather not. Anyone will be able to withdrawal from the study at any time and, if requested, the tapes and transcripts of their interview(s) will be destroyed.

Thank you for your interest in this study.

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LOOKING IN ON EXPERIENCES OF TRYING TO CHANGE A HEALTH-RELATED BEHAVIOUR

Consent Form

I have read the information sheet concerning this piece of research and agree to the following:-

- ❖ to take part in three interviews, the first to be carried out shortly after I have started my attempt to change a health-related behaviour, the second approximately two weeks after that and the third around four weeks later;

- ❖ to provide an alias for use in labelling tapes and transcripts and in the written report of the investigation.

I understand that:-

- ❖ each interview will last for about an hour, on average, although the first is likely to be longer and the other two shorter;

- ❖ only Frances Mielewczyk will be able to connect the alias I provide to my real name;

- ❖ all interviews will be recorded;

- ❖ I will be given a copy of the transcripts of each of my interviews unless I tell Frances that I would prefer not to receive these;

- ❖ I will be able to withdrawal from the study at any time and, if I wish, the tapes and transcripts of my interview(s) will be destroyed;

- ❖ I will be paid £15 for the first interview and £10 for each of the other two, making £35 in total.

Name (please print): _____

Signature: _____

GUIDE FOR BASELINE INTERVIEWS

- Introduce self and the study, as necessary
- Check the participant has read the information sheet (give them time to do so if they haven't)
- Ask participant to read and sign consent form and provide an alias
- Ask for age and occupation
- Double check which behaviour it is that the participant is trying to change (if necessary)

Ask the following questions, as appropriate:-

1. Would you please start by telling me why you have decided to (*change this behaviour*)? Why now, in particular?

2. What does it mean to you that (*e.g. you are a smoker/someone who doesn't exercise regularly*) and what would it mean to you to become (*e.g. a non-smoker/someone who does exercise regularly*)?

3. Could you tell me a little bit about the time(s) when you tried to (*change this behaviour*) in the past? What was it like?

4. What did it mean to you when you realised you (*weren't going to achieve what you had hoped*)/how did it feel?

5. Have made any plans for how to try to increase your chances of success? If so, could you tell me a bit about these?

6. Do you think your past efforts will affect how you get on this time? Is there anything else that you think might be important?

7. How do you feel so far, this time?

8. Is there anything else that's relevant that you would like to tell me?

- Thank for doing the interview, pay and arrange the next interview (if not already set up).

REVISED GUIDE FOR BASELINE INTERVIEWS[1]

- Introduce self and the study, as necessary
- Check the participant has read the information sheet (give time to do so if they haven't)
- Ask participant to read and sign consent form and provide an alias
- Ask for age, occupation and family details

Ask the following questions, as appropriate:-

1. Could you please tell me about when you first (*started smoking, realised you needed to lose weight/take up exercise*) - why you did it/why it had happened/what it felt like.

2. Why do you think you've carried on (*smoking/being overweight/not exercising*) since then?

3. Why have you have decided to (*change this behaviour*)? Why now, in particular?

4. What does it mean to you that (*e.g. you are a smoker/someone who doesn't exercise regularly*) and what would it mean to you to become (*e.g. a non-smoker/someone who does exercise regularly*)?

5. Could you tell me a little bit about the time(s) when you tried to (*change this behaviour*) in the past? What was it like?

6. What did it mean to you when you realised you (*weren't going to achieve what you had hoped*)/how did it feel?

7. Have made any plans for how to try to increase your chances of success? If so, could you tell me a bit about these?

8. Do you think your past efforts will affect how you get on this time? Is there anything else that you think might be important?

9. How do you feel so far, this time?

10. Is there anything else that's relevant that you would like to tell me?

- Thank for doing the interview, pay and arrange the next interview (if not already set up).

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[1] Revised after the first baseline interview conducted (with Stench) and used for the remaining two.

GUIDE FOR TWO-WEEK INTERVIEWS

- Thank for taking part in another interview.
- Ask the following questions, as appropriate:-

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1. How have you been getting on since we last met?

2. What does it mean to you to have (*achieved this/had these problems*)? How do you feel about it?

3. Have there been any particularly difficult times? If so, how did you deal with these and what kept you going?

4. Have there been any particularly easy times? If so, why do you think they were easy?

5. Have you made any changes to how you're going about (*changing the behaviour*) as you've been going along? (*e.g. any changes in plans, if any were made at the outset?*)

6. What do you think is/are the main reason(s) you have managed to keep on with (*the change this behaviour*)?

7. Is there anything else that's relevant that you would like to tell me?

- Thank for doing the interview, pay and arrange the next interview (if not already set up).

GUIDE FOR FOUR-WEEK INTERVIEWS

- Thank for taking part in another interview.
- Ask the following questions, as appropriate:-

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1. How have you been getting on since we last met?

2. What does it mean to you to have (*achieved this/had these problems*)? How do you feel about it?

3. Have there been any particularly difficult times? If so, how did you deal with these and what kept you going?

4. Have you made any changes to how you're going about (*changing the behaviour*) as you've been going along? (*e.g. any changes in plans, if any were made at the outset?*)

5. How have other people reacted now you've kept it going for so long?

6. What do you think is/are the main reason(s) you have managed to keep on with (*the change this behaviour*)?

7. How confident do you feel that you will be able to sustain the change over the next weeks, months and years?

8. What (if anything) do you think might prevent you being able to keep it up?

9. What advice would you give to someone thinking of trying to (*change this behaviour*)?

10. Is there anything else that's relevant that you would like to tell me?

- Thank again for doing the interviews
- Discuss sending copies of transcripts and/or first impressions notes and possible inclusion in of write-up Appendix
- Pay final fee and ask if they would consider doing another interview in a few months' time, possibly early July
- Wish them all the best for the future

GUIDE FOR CLOSURE INTERVIEWS[2]

- Thank for taking part in this final interview
- Commiserate with them for having been unable to continue with their attempt

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1. What do you think are the reasons you couldn't carry on this time?
2. What does it mean to you to have been unable to carry on/How does it feel?
3. How have other people reacted?
4. Do you think you've learned anything from this attempt? (If so, what?)
5. Do you think you will try again to (*change this behaviour*) at any time in the future?
6. What advice would you give to someone thinking of trying to (*change this behaviour*)?
7. Is there anything else that's relevant that you would like to tell me?

- Thank again for doing the interviews and pay final fee
- Discuss sending copies of transcripts and/or first impressions notes and possible inclusion in of write-up Appendix
- Wish them the best for the future

[2] Developed in case needed but not used since all participants continued beyond their four-week interviews.

Being Motivated and Ready to Change

- being prepared to put in the necessary effort
- considering a turning point to have been reached
- considering the old behaviour to pose a threat to health, fitness and/or lifespan
- feeling mentally prepared
- pursuing vanity
- recognising the need to take action
- wanting to positively affect another/others

Progressing and Regressing

- becoming easier and/or more automatic
- causing others to notice and/or react
- considering the change to be progressing well
- experiencing loss as a result of lapsing
- feeling good
- feeling pleased
- having or experiencing 'more' as a result of the change
- provoking disappointment or disapproval in others by lapsing
- viewing progress made as a personal achievement

Experiencing Drawbacks of Changing

- craving
- having a sense of strangeness
- needing to keep busy

Lacking Direction and/or Answers

- feeling uncertain
- forgetting
- hoping
- not knowing

Using Practical and/or Psychological Strategies

- allowing treats and/or lapses
- anticipating potential difficulties
- comparing own progress favourably with that of another
- finding alternative sources of support and/or relief
- fitting changes in
- keeping a balance
- making plans and preparations
- noting beneficial results of having made the change
- noting detrimental results of having lapsed
- using positive talk to bolster confidence and/or mood
- using the power of the mind and/or will
- using thought

Meeting and Making Hindrances and Hurdles

- being unable to focus on the change
- depending on another
- feeling and/or being obstructed
- feeling justified in lapsing
- gaining support or relief by behaving in the old way
- having gained or strengthened a group identity by means of the old behaviour
- seeing the old behaviour as a potential source of support
- seeing the old behaviour as an antidote to boredom
- seeing the old behaviour as habitual or routine
- seeing the old behaviour as something insidious
- taking the easier option
- talking as if a lapse has become or is becoming a relapse
- waiting

Moving Towards a New Way of Life

- developing a change in self-identity
- experiencing changing tastes and/or perceptions
- looking forward
- making additional lifestyle changes
- moving away from the old behaviour
- seeing the process of change as having been successfully completed
- thinking about and/or preparing to make additional lifestyle changes

Occurrence of Master- & Sub-Themes Across All Interviews

Themes	Interview: Stench 1	Stench 2	Stench 3	Meatloaf 1	Meatloaf 2	Meatloaf 3	Ellie 1	Ellie 2	Ellie 3
Being Motivated and Ready to Change									
• being prepared to put in the necessary effort							✓	(✓)	(✓)
• considering a turning point to have been reached				(✓)			✓		
• considering the old behaviour to pose a threat to health, fitness and/or lifespan	✓	✓	(✓)	✓	(✓)		✓	(✓)	(✓)
• feeling mentally prepared							✓	✓	
• pursuing vanity							✓		
• recognising the need to take action							✓		
• wanting to positively affect another/others	✓	✓	(✓)	✓	✓	✓	✓		✓
Progressing and Regressing									
• becoming easier and/or more automatic				(✓)	✓	✓		✓	
• causing others to notice and/or react	✓	✓		(✓)	✓	✓			✓
• considering the change to be progressing well	(✓)	✓		(✓)	✓	(✓)	(✓)	✓	
• experiencing loss as a result of lapsing			✓						
• feeling good		✓				✓			
• feeling pleased	(✓)	✓			✓	(✓)			
• having or experiencing 'more' as a result of the change	✓	✓	(✓)	(✓)	✓	✓	(✓)	✓	(✓)
• provoking disappointment or disapproval in others by lapsing			✓						
• viewing progress made as a personal achievement	✓	✓	(✓)			(✓)		(✓)	

Themes	Interview: Stench 1	Stench 2	Stench 3	Meatloaf 1	Meatloaf 2	Meatloaf 3	Ellie 1	Ellie 2	Ellie 3
Experiencing Drawbacks of Changing									
• craving				✓	✓	✓	(✓)	✓	
• having a sense of strangeness	✓	✓	(✓)						
• needing to keep busy	✓	✓	✓						
Lacking Direction and/or Answers									
• feeling uncertain	(✓)	(✓)	✓	(✓)	✓	(✓)		✓	
• forgetting			(✓)	(✓)	✓		(✓)		
• hoping		(✓)	(✓)	(✓)		(✓)			
• not knowing	✓	(✓)	(✓)	✓	✓	✓	(✓)	✓	
Using Practical and/or Psychological Strategies									
• allowing treats and/or lapses			(✓)				✓	✓	
• anticipating potential difficulties		(✓)		✓		✓	(✓)		
• comparing own progress favourably with that of another		(✓)				✓			
• finding alternative sources of support and/or relief			(✓)	✓	✓				
• fitting changes in							✓	✓	✓
• keeping a balance		(✓)					✓	(✓)	✓
• making plans and preparations				✓	✓	✓	✓	✓	✓
• noting beneficial results of having made the change		✓	(✓)	✓	✓	✓	✓	✓	(✓)
• noting detrimental results of having lapsed			(✓)						✓
• using positive talk to bolster confidence and/or mood	✓	✓	✓	(✓)					(✓)
• using the power of the mind and/or will	✓	(✓)	(✓)		(✓)			(✓)	
• using thought	✓	(✓)		(✓)			✓	✓	
Meeting and Making Hindrances and Hurdles									
• being unable to focus on the change			✓						
• depending on another			(✓)						✓
• feeling and/or being obstructed							✓	✓	✓
• feeling justified in lapsing			✓					(✓)	✓
• gaining support or relief by behaving in the old way			✓					✓	

THEMES	INTERVIEW Stench 1	Stench 2	Stench 3	Meatloaf 1	Meatloaf 2	Meatloaf 3	Ellie 1	Ellie 2	Ellie 3
• having gained or strengthened a group identity by means of the old behaviour	(✓)			✓					
• seeing the old behaviour as a potential source of support				✓					
• seeing the old behaviour as an antidote to boredom	(✓)								
• seeing the old behaviour as habitual or routine	✓			✓			(✓)		
• seeing the old behaviour as something insidious	✓	(✓)	✓	✓		(✓)	✓		
• taking the easier option							✓	(✓)	✓
• talking as if a lapse has become or is becoming a relapse			✓						
• waiting		✓	✓						✓
Moving Towards a New Way of Life									
• developing a change in self-identity					✓	✓			
• experiencing changing tastes and/or perceptions		✓	(✓)	✓	✓	✓		✓	
• looking forward			✓		✓		✓	✓	
• making additional lifestyle changes				✓	✓	✓			
• moving away from the old behaviour		✓	(✓)	✓	✓	✓	(✓)	✓	✓
• seeing the process of change as having been successfully completed						✓			
• thinking about and/or preparing to make additional lifestyle changes		✓	✓	✓	(✓)				

Key:

Sub-themes marked ✓ are present in at least five lines of the text

Sub-themes marked (✓) are present in less than five lines of the text

First Interview

Theme	Key Words	Line(s)
Being Motivated and Ready to Change:-		
• considering the old behaviour to pose a threat to health, fitness and/or lifespan	"it kills, dunnit?"	195
• wanting to positively affect another/ others	"I'm setting a bit of an example for her as well"	304
Progressing and Regressing:-		
• causing others to notice and/or react	"she's paying a bit more attention to me as well"	98
• considering the change to be progressing well	"it's coming along"	296
• feeling pleased	"it's great"	75
• having or experiencing 'more' as a result of the change	"I can taste the food, it's nice"	75-6
• viewing progress made as a personal achievement	"I've done well"	150
Experiencing Drawbacks of Changing:-		
• having a sense of strangeness	"but it's so strange now"	34
• needing to keep busy	"you've got to find things to do"	110
Lacking Direction and/or Answers:-		
• feeling uncertain	"I think she is, I think she is, I do think she is"	92-3
• not knowing	"I don't know, I can't, I can't explain that"	31

Using Practical and/or Psychological Strategies:-		
• using positive talk to bolster confidence and/or mood	"I'm going to do it…I'm going to do it"	274-5
• using the power of the mind and/or will	"if I put my mind to it I know I can do it"	165-6
• using thought	"you think 'I could - no, no, no, hold back"	139-40
Meeting and Making Hindrances and Hurdles:-		
• having gained or strengthened a group identity by means of the old behaviour	"we're all mates, we all smoke"	327-8
• seeing the old behaviour as an antidote to boredom	"I was just bored, I suppose"	127
• seeing the old behaviour as habitual or routine	"it's a long time, forty years"	30
• seeing the old behaviour as something insidious	"it could creep in then, like"	252
Moving Towards a New Way of Life:-		
none evident		

Second Interview

Theme	Key words	Line(s)
Being Motivated and Ready to Change:-		
• considering the old behaviour to pose a threat to health, fitness and/or lifespan	"you have a smoke and coughing, coughing"	214
• wanting to positively affect another/ others	"I'll do it for him"	202

Progressing and Regressing:-		
• causing others to notice and/or react	"my little boy…he's chuffed to bits"	283-4
• considering the change to be progressing well	"things are going alright"	261
• feeling good	"it's good, it's a good little feeling like"	7
• feeling pleased	"I am pretty pleased"	30
• having or experiencing 'more' as a result of the change	"Full of energy and raring to go"	8
• viewing progress made as a personal achievement	"I really think I'm doing okay"	304-5
Experiencing Drawbacks of Changing:-		
• having a sense of strangeness	"It's, er, very strange, though"	170
• needing to keep busy	"I get the broom, sweep up, do a bit like"	13
Lacking Direction and/or Answers:-		
• feeling uncertain	"we shall see what we shall see"	251
• hoping	"I just hope it keeps on like this"	271
• not knowing	"I don't know, so I'm going to have to find out"	253
Using Practical and/or Psychological Strategies:-		
• anticipating potential difficulties	"the next month's going to be hard"	248-9
• comparing own progress favourably with that of another	"but he's drinking more as well"	168
• keeping a balance	"nothing over the top"	307
• noting beneficial results of having made the change	"it does make a huge difference"	207
• using positive talk to bolster confidence and/or mood	"we're gonna beat it…we're gonna beat it"	257-8
• using the power of the mind and/or will	"that's what you've got to set your course for"	135-6

• using thought	"that's the way I think"	65
Meeting and Making Hindrances and Hurdles:-		
• seeing the old behaviour as something insidious	"it is easy to get back into it"	67-8
• waiting	"once the better weather comes I want to..."	113-4
Moving Towards a New Way of Life:-		
• experiencing changing tastes and/or perceptions	"I can honestly say I don't like the smell"	39
• looking forward	"have a few quid, have a good time"	208-9
• moving away from the old behaviour	"I don't need a fag"	64
• thinking about and/or preparing to make additional lifestyle changes	"get in the gym, doing a bit of training"	239-40

Third Interview

Theme	Key words	Line(s)
Being Motivated and Ready to Change:-		
• considering the old behaviour to pose a threat to health, fitness and/or lifespan	"I want to be able to breathe"	276
• wanting to positively affect another/ others	"can't let him down, can I?"	279-80
Progressing and Regressing:-		
• causing others to notice and/or react	"Ooh, Dad, you shouldn't do that"	229
• having or experiencing 'more' as a result of the change	"you tend to socialise more, talk more"	266

• viewing progress made as a personal achievement	"I've done so well"	60
Experiencing Drawbacks of Changing:-		
• experiencing loss as a result of lapsing	"I'm not so chopsy am I again, now?"	238
• having a sense of strangeness	"The first few days felt strange"	307
• needing to keep busy	"you get home, you can do something"	51-2
Lacking Direction and/or Answers:-		
• feeling uncertain	"there's always that little bit of doubt"	298
• forgetting	"No I can't, I can't, I can't remember"	112
• hoping	"I'm just hoping for the end of the week"	295
• not knowing	"I can't really answer that"	272-3
Using Practical and/or Psychological Strategies:-		
• allowing treats and/or lapses	"it might happen that way"	353-4
• finding alternative sources of support and/or relief	"piece of chewing gum...does help, actually"	308-10
• noting beneficial results of having made the change	"I felt great, I really did"	285
• noting detrimental results of having lapsed	"I remember *coughing* and thinking '*God*'"	257
• using positive talk to bolster confidence and/or mood	"I think I'm on a winner again, I know I'm on a winner again"	95-6
• using the power of the mind and/or will	"me mind's back on the job again now"	42-3

Meeting and Making Hindrances and Hurdles:-		
• being unable to focus on the change	"I'm not thinking about the smoking side of it"	142-3
• depending on another	"I said to Martin, 'stop me now, stop me now'"	115
• feeling justified in lapsing	"So I cracked a little bit under pressure"	391
• gaining support or relief by behaving in the old way	"that were just...pphhww...a relief valve"	64-5
• seeing the old behaviour as something insidious	"could be on sixty a day"	394-5
• talking as if a lapse has become or is becoming a relapse	"it was good while it lasted"	368
• waiting	"they're just keeping me waiting"	100
Moving Towards a New Way of Life:-		
• experiencing changing tastes and/or perceptions	"it really did taste horrible"	256-7
• looking forward	"it will be good"	49
• moving away from the old behaviour	"I wasn't thinking of cigarettes at all"	249-50
• thinking about and/or preparing to make additional lifestyle changes	"I'm going to go up the gym"	158

"MEATLOAF"
Tables of Master Themes

First Interview

Theme	Key words	Line(s)
Being Motivated and Ready to Change:-		
• considering a turning point to have been reached	"1st of January this year, I thought 'that's it'"	11
• considering the old behaviour to pose a threat to health, fitness and/or lifespan	"the only reason is health-related really"	112-3
• wanting to positively affect another/ others	"I'm thinking mainly of the kids"	44
Progressing and Regressing:-		
• becoming easier and/or more automatic	"it's easier to deal with now"	322
• causing others to notice and/or react	"everybody was 'yes, it's a wonderful idea'"	246
• considering the change to be progressing well	"I'm succeeding"	175-6
• having or experiencing 'more' as a result of the change	"I've certainly got more capacity in my lungs"	85
Experiencing Drawbacks of Changing:-		
• craving	"I do still have strong cravings"	13-4
Lacking Direction and/or Answers:-		
• feeling uncertain	"could have probably given...a different answer"	279-80
• forgetting	"it's gone, you know, I've forgot about it"	316-7

• hoping	"I'm hoping the longer I do this now..."	322
• not knowing	"I don't know, I don't know why I..."	133-4
Using Practical and/or Psychological Strategies:-		
• anticipating potential difficulties	"there's a lot...I've still got to face"	299-300
• finding alternative sources of support and/or relief	"the patches are helping"	21
• making plans and preparations	"so I've planned it this time"	175
• noting beneficial results of having made the change	"that's certainly improving"	241
• using positive talk to bolster confidence and/or mood	"I'm quite confident...I'm very, very confident"	278
• using thought	"I was telling myself that..."	201
Meeting and Making Hindrances and Hurdles:-		
• having gained or strengthened a group identity by means of the old behaviour	"it was friends-related"	31
• seeing the old behaviour as a potential source of support	"I could easily turn to a packet of cigarettes"	14-5
• seeing the old behaviour as habitual or routine	"it's an habit you quickly pick up"	30-1
• seeing the old behaviour as something insidious	"it gradually built back up again"	194
Moving Towards a New Way of Life:-		
• experiencing changing tastes and/or perceptions	"couldn't smell it before"	338

• making additional lifestyle changes	"I am avoiding going to the pub"	129
• moving away from the old behaviour	"the only other time I had a cigarette was…"	307
• thinking about and/or preparing to make additional lifestyle changes	"I've got to get that under control next"	162

Second Interview

Theme	Key words	Line(s)
Being Motivated and Ready to Change:-		
• considering the old behaviour to pose a threat to health, fitness and/or lifespan	"and certainly my own health"	305
• wanting to positively affect another/ others	"focussing on…the kids"	303-4
Progressing and Regressing:-		
• becoming easier and/or more automatic	"better than what I thought it would"	4
• causing others to notice and/or react	" 'you're not going out for a cigarette?'"	180
• considering the change to be progressing well	"It's going very good"	2
• feeling pleased	"I'm quite pleased how it's going"	33
• having or experiencing 'more' as a result of the change	"I feel I've got more energy now"	56-7
Experiencing Drawbacks of Changing:-		
• craving	"I get probably two cravings a day now"	30
Lacking Direction and/or Answers:-		
• feeling uncertain	"I'm not sure if I'm going to bother with.."	20-1

• forgetting	"I've actually forgot my patches twice"	252-3
• not knowing	"I don't know, I don't know really"	123
Using Practical and/or Psychological Strategies:-		
• finding alternative sources of support and/or relief	"I'll turn to something else, fruit, whatever."	276-7
• making plans and preparations	"I probably will finish the course out"	317
• noting beneficial results of having made the change	"but, now, I can do it"	66
• using the power of the mind and/or will	"my will…to stop smoking is…quite strong now"	140-1
Meeting and Making Hindrances and Hurdles:-		
None in evidence		
Moving Towards a New Way of Life:-		
• developing a change in self-identity	"We're both non-smokers"	116
• experiencing changing tastes and/or perceptions	"they stink…they really smell"	109
• looking forward	"it's like something to look forward to now"	128
• making additional lifestyle changes	"I've actually started exercising"	8
• moving away from the old behaviour	"when I was smoking I used to…"	58
• thinking about and/or preparing to make additional lifestyle changes	"we're going to be moving out to the non-smoking bit soon"	112-3

Third Interview

Theme	Key words	Line(s)
Being Motivated and Ready to Change:-		
• wanting to positively affect another/ others	"I'm hoping we can steer them…not to smoke"	196-7
Progressing and Regressing:-		
• becoming easier and/or more automatic	"you think…"'Well, what was all the fuss about?""…It's easy. Yeah. Easy.	128-9
• causing others to notice and/or react	"'he doesn't smoke any more…he's done well'"	181
• considering the change to be progressing well	"I'm still not smoking"	2
• feeling good	"I do feel good"	35
• feeling pleased	"Yes, I'm quite pleased, very pleased"	20
• having or experiencing 'more' as a result of the change	"I feel like my lungs are bigger"	41
• viewing progress made as a personal achievement	"I think I've done well"	78
Experiencing Drawbacks of Changing:-		
• craving	"it's a very small craving"	99
Lacking Direction and/or Answers:-		
• feeling uncertain	"I'm not sure if I…"	120
• hoping	"I hope so"	132
• not knowing	"Could be, I don't know, I don't know"	231

Using Practical and/or Psychological Strategies:-		
• anticipating potential difficulties	"there's still things I've got to get by"	226
• comparing own progress favourably with that of another	"he gave up…now he's back smoking again"	206-7
• making plans and preparations	"if you plan it right then it does get easier"	245-6
• noting beneficial results of having made the change	"my body doesn't crave the nicotine"	227
Meeting and Making Hindrances and Hurdles:-		
• seeing the old behaviour as something insidious	"a crafty, sneaky one"	10-1
Moving Towards a New Way of Life:-		
• developing a change in self-identity	"I'm a non-smoker"	173
• experiencing changing tastes and/or perceptions	"I just couldn't stand it…I couldn't *breathe*"	51
• making additional lifestyle changes	"I've been going on the treadmill every day"	28
• moving away from the old behaviour	"No I don't want a fag"	65
• seeing the process of change as having been successfully completed	"it did work"	162

"ELLIE"
Tables of Master Themes

First Interview

Theme	Key words	Line(s)
Being Motivated and Ready to Change:-		
• being prepared to put in the necessary effort	"really trying"	134
• considering a turning point to have been reached	"it has just been a major turning point"	11-2
• considering the old behaviour to pose a threat to health, fitness and/or lifespan	"running for a bus practically kills me now"	54-5
• feeling mentally prepared	"mentally I'm more prepared to do it"	208
• pursuing vanity	"just for vanity reasons"	57
• recognising the need to take action	"it's not going to be the effortless thing it was"	291
• wanting to positively affect another/ others	"I'm hoping she will eventually see that as well"	340-1
Progressing and Regressing:-		
• considering the change to be progressing well	"It's going quite well"	169
• having or experiencing 'more' as a result of the change	"my legs feel a lot more toned"	177
Experiencing Drawbacks of Changing:-		
• craving	"I'm craving Chinese food"	230
Lacking Direction and/or Answers:-		
• forgetting	"I've pretty much forgotten..."	264-5

• not knowing	"I couldn't see any way of..."	87
Using Practical and/or Psychological Strategies:-		
• allowing treats and/or lapses	"I will allow myself the odd treat"	237
• anticipating potential difficulties	"touch wood...nothing happens that prevents me from..."	205-6
• fitting changes in	"I can still fit a bit of exercise in"	104-5
• keeping a balance	"not going mad and becoming anorexic or..."	310-1
• making plans and preparations	"it's thinking ahead for the week"	111
• noting beneficial results of having made the change	"I am seeing...and feeling the difference"	186-7
• using thought	"I think...'Is it really worth it...?'"	244-5
Meeting and Making Hindrances and Hurdles:-		
• feeling and/or being obstructed	"circumstances built up against me"	86
• seeing the old behaviour as habitual or routine	"it became a habit then"	36
• seeing the old behaviour as something insidious	"we have fallen into the trap"	26
• taking the easier option	"it's been easier to..."	24
Moving Towards a New Way of Life:-		
• looking forward	"just looking forward to little things like that"	241-2
• moving away from the old behaviour	"if I'd carried on eating what I was..."	194

Second Interview

Theme	Key words	Line(s)
Being Motivated and Ready to Change:-		
• being prepared to put the required effort	"it's the conscious effort now to cook"	40
• considering the old behaviour to pose a threat to health, fitness and/or lifespan	"health reasons"	42
• feeling mentally prepared	"I'm much more mentally prepared for it"	212
Progressing and Regressing:-		
• becoming easier and/or more automatic	"If I'd thought before it could be that easy…"	132-3
• considering the change to be progressing well	"now, I can have a little bit…and then leave it"	178
• having or experiencing 'more' as a result of the change	"feeling better about myself and my body"	223-4
• viewing progress made as a personal achievement	"I'm quite positive about it"	132
Experiencing Drawbacks of Changing:-		
• craving	"let it have its cravings"	201
Lacking Direction and/or Answers:-		
• feeling uncertain	"I think…I think I do feel…"	146
• not knowing	"I can't put my finger on what it is that has…"	215
Using Practical and/or Psychological Strategies:-		
• allowing treats and/or lapses	"I just let myself eat for the one day"	198

• fitting changes in	"I know I'm getting the exercise in"	112-3
• keeping a balance	"everything else is…balancing it out"	160
• making plans and preparations	"it's just as easy to make double"	27-8
• noting beneficial results of having made the change	"It's made a big difference"	224
• using the power of the mind and/or will	"I'm sure the willpower was there to say…"	207
• using thought	"I had to find as many reasons as I could to…"	65-6
Meeting and Making Hindrances and Hurdles:-		
• feeling and/or being obstructed	"It's the other commitments on my time"	106
• feeling justified in lapsing	"I knew why I was doing it"	199-200
• gaining support or relief by behaving in the old way	"I was comfort eating"	197
• taking the easier option	"it was so much easier…to…pamper myself"	200-2
Moving Towards a New Way of Life:-		
Experiencing changing tastes and/or perceptions	"I start to actually shudder at the thought of…"	181
Looking forward	"there's something there to eat, look forward to"	33
Moving away from the old behaviour	"so it's not how it used to be"	22

Third Interview

Theme	Key words	Line(s)
Being Motivated and Ready to Change:-		
• being prepared to put in the required effort into changing	"I'll be making an effort to go to the gym"	105-6
• considering the old behaviour to pose a threat to health, fitness and/or lifespan	"It's not really that good for you"	302
• wanting to positively affect another/others	"I want to do it for…my daughter"	321
Progressing and Regressing:-		
• causing others to notice and/or react	"she's having to give me input"	255
• having or experiencing 'more' as a result of the change	"more energy in a very short space of time"	149-50
Experiencing Drawbacks of Changing:-		
none evident	---	---
Lacking Direction and/or Answers:-		
none evident	---	---
Using Practical and/or Psychological Strategies:-		
• fitting changes in	"you can fit in a bit of exercise just…"	283-4
• keeping a balance	"maybe not give them up completely"	174
• making plans and preparations	"I'd probably just fill up on…healthier snacks"	72-3
• noting beneficial results of having made the change	"I got results"	149
• noting detrimental results of having lapsed	"my skin's not very good"	28-9

• using positive talk to bolster confidence and/or mood	"it was only…it's not the end of the world"	147-8
• using thought	"I'm thinking 'well it's not as nice as a home cooked meal'"	300-1
Meeting and Making Hindrances and Hurdles:-		
• depending on another	"It's still not going to help…if she's away"	59-60
• feeling and/or being obstructed	"I'd been told the wrong week"	91-2
• feeling justified in lapsing	"it was crisps or nothing"	134
• taking the easier option	"without having to take so much effort"	84
• waiting	"we've just got to let the knee re-heal properly"	118-9
Moving Towards a New Way of Life:-		
• experiencing changing tastes and/or perceptions	"it's not as nice as a home cooked meal"	300-1
• moving away from the old behaviour	"where maybe I would have thought…"	317

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