THE UNIVERSITY OF HULL

PSYCHOLOGICAL FACTORS IN SOCIAL RELATIONSHIPS AND HOME FUNCTIONING OF PATIENTS WITH CHRONIC FATIGUE SYNDROME

Being a Thesis submitted for the Degree of

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by

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APPROVALS

[Insert university's approval sheet here]

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"Our lives begin to end the day we become silent about things that matter" Rvd. Dr Martin Luther King

ABSTRACT

Background: Emotional expressivity has received recent research attention in studying behavioural outcomes, in non-clinical samples and clinical samples alike. However, it has not been tested with chronic fatigue syndrome patients, to see if positive expressivity predicts better social relationships. Secondly, dysfunctional attitudes concerning attainment and achievement, and poor everyday routine, have been associated with poorer functioning in different clinical conditions, such as cancer and diabetes. These have not been examined in chronic fatigue syndrome, for whether they predict worse patient functioning in their home duties. This study primarily aims to explore these relationships. The relationship between attainment/achievement attitudes and routine in this patient group was also explored. Method: This explorative, cross sectional study measured 57 patients' levels of positive expressive behaviour, attainment and achievement attitudes, routine, and levels of social relationship functioning and home functioning via self-report measures. Levels of CFS symptoms and depressive symptoms were also controlled for in each question. Results: Hierarchical regressions indicated positive expressivity did not significantly predict worse or better relationships with friends. Increased positive expressivity did predict worse relationships with family members. Attainment and achievement attitudes did not predict better home functioning, but better routine did. No relationship was found between attitudes and routine. Depressive symptoms predicted greater variance than CFS symptoms in the regressions. **Conclusions:** Depression appears to be of importance in relationship and home functioning difficulties. Positive expressivity also appears to have a special role for CFS patients, reducing quality of family relationships. Increased routine may help patients to manage their home duties better, but attainment and achievement attitudes appear to make little difference. Such attitudes do not appear to influence routine. Implications of findings for present theory and clinical treatment for patients are discussed, with further research following these findings suggested.

ACKNOWLEDGEMENTS	iii
ABSTRACT	iv
CONTENTS	V-X
LIST OF TABLES	xi
LIST OF FIGURES	xii

Chapter One: Introduction

1.1 Overview of Chapter One	1
1.2 The characteristics of Chronic Fatigue Syndrome (CFS):	1-2
1.3 Historical context	2-3
1.4 Epidemiology	4-5
1.5 Diagnosis	5-7

1.6 Aetiology	7-10
1.7 History of psychological involvement in CFS:	11-12
1.8 Current psychologically based treatments of CFS: Cognitive	13-17
Behavioural Therapy (CBT) and Graded Exercise Therapy (GET)	

1.9 Critique of CBT and GET approaches	17
2. Study question 1: Emotional expressivity and social relationships	
2.1. Relevance of social functioning	18-19
2.2 Social relationships – definition and significance in CFS	19-22
2.3 Display rules	22-23
2.4 Emotion and emotional expressivity (EExp)	23-24
2.5 Emotional expressivity – CFS, and the EExp model	24-28
2.6 Emotional expressivity – concept as a trait model, and contrast	28-29
with other emotion approaches	
2.7 Emotional expressivity effects, and research interest in CFS with	29-30
social relationships	

3. Study question 2: Dysfunctional attitudes, routine, and home functioning

3.1 Home functioning: definition, and importance in CFS	31-32
3.2 Cognitions and representations of illness	32-35
3.3 Dysfunctional attitudes – definition, and importance in CFS	36-37
3.4 Dysfunctional attitudes, and contrast of different approaches	37-39
concerning the formation of these attitudes	
3.5 Safety behaviours:	39-40
3.6 Dysfunctional attitudes concerning attainment and achievement,	40-41
and research interest in CFS with home functioning	
3.7 Definition of routine, and importance to functioning	41-42
3.8 Biological and neurophysiological regulation of routine	42
3.10 Routinization, its significance in CFS, and research interest in	42-44
CFS with home functioning	
4. Study question 3: Dysfunctional attitudes concerning goal attainment	
and achievement, and relationship with routine	
4.1 The Reich and Williams model	44-45
4.2 Significance of predictive relationship within CFS, and research	45
interest in CFS	
5. Controlling variables	
5.1 Essential controlling factors: Patient's level of chronic fatigue	46
symptoms and depressive symptoms	
5.2 Depression, its relationship with CFS	47-48

6. Rationale and Aims of the study	
6.1 Question 1: Emotional expressivity and social relationships with	48-49
friends and family	
6.2 Question 2: Dysfunctional attitudes concerning attainment and	49
achievement, routine, and home functioning.	
6.3 Question 3: Dysfunctional attitudes concerning attainment and	50
achievement, and predicting routine:	
6.4 Controlling variables: CFS symptoms and depressive symptoms	50

7. Hypotheses

50-51

Chapter 2: Design and Methodology

8.1 Overview of Chapter 2:	52
8.2 Design	52
8.3 Epistemological orientation	52
8.4 Ethical conflict of interests	52
8.5 Participants	53
8.6 Sample	53
8.7 Inclusion criteria	53
8.8 Exclusion criteria	54
8.9 Ethical considerations	54
8.10 Confidentiality	54
8.11 Informed consent	55
8.12 Impact of the research and debriefing	55
8.13 Recruitment	55-56
8.14 Response rate	56
8.15 Sampling method	56
9 Measures	

9.1 Background information	56

9.2 Level of chronic fatigue symptoms - Chalder Fatigue Questionnaire	57
9.3 Level of depressive symptoms - Beck Depression Inventory II	57
9.4 Emotional Expressivity - Berkeley Expressivity Questionnaire	57-58
9.5 Level of social functioning - The Life Functioning Questionnaire	58-59
9.6 Goal attainment and achievement - Subscales of the Dysfunctional	59
Attitude Scale. Short Version	
9.7 Routine - Social Rhythm Metric	60
10 Procedure	60-61
11 Data analysis software	62
12 Power calculations	62
12.1 Study question 1	62-63
12.2 Study question 2	63
12.3 Study question 3	64
Chapter 3: Results	
13.1 Overview of Chapter 3	65
13.2 Normality and statistical significance	65
13.3 Information on regression analyses	65

14 Significant demographic and clinical characteristics14.1 Demographic characteristics of sample6614.2 Clinical characteristics of sample6714.3 Scores on study measures68-69

15 Correlation matrices	69-72
16 Regression analyses	
16.1 Positive expressivity predicting social relationships with friends:	73
regression results	

16.2: Positive expressivity predicting social relationships with family:	73-74
regression results	
16.3 Dysfunctional attitudes and routine predicting home functioning:	74-75
regression results	
16.4 Dysfunctional attitudes predicting routine: regression results	75-76

Chapter 4: Discussion

17.1 Overview of Chapter 4	77
17.2 Main study conclusions	77
17.3 Controlling variables: depressive symptoms and chronic fatigue	78
symptoms	
17.4 Study question 1: Emotional expressivity and social relationships	78-83
17.5 Study question 2: Home functioning	83-85
17.6 Study question 3: Dysfunctional attitudes and routine	86
17.7 Critique of Research	86-89
17.8 Clinical Implications:	89-91
17.9 Future Research:	91-92

References

Appendices

Appendix A: Chalder Fatigue Questionnaire (CFQ)

Appendix B: Beck Depression Inventory, II (BDI-II)

Appendix C: Berkeley Expressivity Questionnaire (BEQ)

Appendix D: Life Functioning Questionnaire (LFQ)

Appendix E: Subscales of the Dysfunctional Attitude Scale:

93-108

Short Version (DAS-24)

Appendix F: Social Rhythm Metric (SRM)

Appendix G: Participant Information Sheet

Appendix H: Participant Consent Form

Appendix I: Letter to Participant's GP

Appendix J: Local Research Ethics Committee Approval Letter

Appendix K: Social Rhythm Metric Flow Diagram For Scoring

Appendix L: SPSS Syntax, Derived from Social Rhythm Metric Flow Diagram (Appendix K)

Appendix M: Reflective statement from the author on undertaking the research project

LIST OF TABLES

Table 1: Demographic characteristics of sample	66
Table 2: Clinical characteristics of sample	67
Table 3: Scores on the study's measures	68
Table 4: Correlation between controlling variables, and between positive expressivity and controlling variables	70
Table 5: Correlations between predictor variables and main criterion	71
variables	
Table 6: Hierarchical regression of LFQ Fri	73
Table 7: Hierarchical regression, predicting LFQ Fam	74
Table 8: Hierarchical regression, predicting LFQ Hom	75
Table 9: Hierarchical regression, predicting SRM	76

LIST OF FIGURES

Figure 1: Theoretical cognitive model of aetiology of CFS	14
Figure 2: The perpetuation of CFS	15
Figure 3 – The EExp model	25
Figure 4: Theoretical cognitive model of aetiology of CFS	80

PSYCHOLOGICAL FACTORS IN SOCIAL RELATIONSHIPS AND HOME FUNCTIONING OF PATIENTS WITH CHRONIC FATIGUE SYNDROME

CHAPTER 1: INTRODUCTION

1.1 Overview of Chapter One

The introduction starts with an overview of information regarding chronic fatigue syndrome (CFS). This includes an overview of the social and historical context of the disorder, the diagnostic criteria, epidemiology and aetiology of the syndrome, and predisposing, precipitating and perpetuating factors that may influence the course of the illness. Interventions for CFS are evaluated, especially the most popular and recommended interventions (cognitive behavioural therapy and graded exercise therapy). Relevant research concerning the topics of interest for this study is then reviewed, and considered in the light of CFS. In concluding, the rationale of the current study is presented, along with the research aims and associated hypotheses.

1.2 The characteristics of CFS

Chronic fatigue syndrome (CFS) appears to be a highly debilitating illness as described in Western medical literature. It is also one of the least explained and mysterious. While having no definite identified cause (at the time of writing) the effects can be extremely severe for a patient. Pronounced physical and mental fatigue are the major symptoms of the illness. The syndrome can have a large impact on the way a sufferer lives their life. Since sufferers frequently cannot do many activities which they previously could, their family, social, and working lives can be severely affected.

In turn, this makes CFS a prevalent public health concern. It is classified as a major cause of disability and illness in our society. Since the mean length of the illness has been reported as ranging from 18 months to 13 years (Wessely, Sharpe, & Hotopf, 1998), sufferers may be disabled and debilitated for long time periods. Resulting lost costs to the

economy (especially in unemployment), to health services, and the personal costs to sufferers are considerable (Lloyd & Pender, 1992). The illness is sufficiently severe that the Department of Health has described CFS as imposing a "substantial burden on the health of the UK population" (DoH, 2002, p1). The improvement in the health and social care of CFS patients is then seen as "an urgent challenge" (DoH, 2002, p1).

Given the scale of this social problem, it is fitting that research interests should be directed towards investigating the aetiology, treatment and management of CFS.

1.3. Historical context

Historically, CFS has had a slow genesis towards the definition we now use today. The first definition of a syndrome which may resemble the modern definition of CFS was neuroasthenia, by Beard (1869). This initial definition was soon complicated by several researchers claiming different factors as being involved in the illness. However, one core component of neuroasthenia was agreed during this period reflected in all definitions of CFS today– incapacitation via forms of physical and mental exertion.

Work on clarifying the nature of fatigue was only just beginning at this point. Beard's discovery of this "fatigue syndrome" was followed by work from an Italian physiologist, Mosso (1904). Mosso's experiments identified what were termed the constituent components of fatigue: *behaviour* (the gradual decrement of a person's performance over time): *feeling state* – the correlation of the feeling of fatigue and fatigued behaviour; a mechanism or process underlying fatigue; and finally *context* – other demands and stresses which might affect a person's fatigue level at a particular time. Even in this early research, it possible to see that fatigue has not always been classified as one, unitary concept. Rather, fatigue has been viewed as a composite of a number of measurable factors.

Since these early definitions, fatigue has had sporadic interest from the scientific community. Subsequent to Mosso's work, laboratories dedicated to studying fatigue

emerged in a number of European nations, and sporadic cases and "epidemics" of fatigue have been described (Moss-Morris & Petrie, 2001). However, as manual work lessened due to advances in technology occurring with the arrival of the Industrial Revolution, increased interest in mental fatigue began to emerge alongside physical fatigue. Interest in this type of fatigue was prominent in the First and Second World Wars: amongst radar operators, munitions workers, and pilots for example. Various attempts at defining a fatigue syndrome have occurred periodically since, including Malaise, Myalgic Encephalomyelitis, Post Viral Fatigue Syndrome, general fatigue syndrome and chronic fatigue (see Wessely, Shape & Hotopf (1998) for full review).

The contemporary term of chronic fatigue syndrome has emerged largely from a renewal of interest in chronic fatigue in the early 1980s, and a resulting seminal conference by the Center for Disease Control (CDC) in 1987 in the United States (Holmes et al., 1988). This was the first occasion on which a definition was based on specific symptoms, and by exclusion of known medical and psychiatric conditions which might contribute to fatigue symptoms. This new term was quickly adopted by the research and diagnostic community.

Revision of diagnostic guidelines has progressed, to what have become known as the Oxford criteria for CFS (Sharpe *et al.*, 1991), and the popular worldwide research criteria adopted for CFS: the Center for Disease Control (CDC) 1994 criteria (Fukuda *et al.*, 1994). These criteria are summarized in the Diagnosis section (1.3.3) below.

For the purposes of this study, the term *chronic fatigue syndrome*, in line with the Department of Health's Working Group (DOH, 2002) and current National Institute for Clinical Excellence (NICE) terminology (NICE, 2007) will be used. This term, based on the Sharpe et al. (1991) and Fukada et al. (1994) usage of the term, will be employed in all cases henceforth to describe the illness.

1.4 Epidemiology

Estimates of CFS in the general population vary. Bates *et al.* (1993) concluded estimates of 0.3% using the CDC 1987 criteria, and 0.4 % in the general population using the Oxford criteria. In primary care, incidence has been as high as 2.6% (Wessely, 1997).

The prognosis for many patients is poor. Rates of recovery vary, and estimates of the mean length of the illness have been reported from 18 months to 13 years (Wessely et al., 1998). Recent meta review of the literature (Cairns & Hotopf, 2005) found a median recovery rate of only 5%. Studies used to calculate this median rate ranged from 6 months to 10 years in their follow up from a patient's initial diagnosis.

The best improvement rate in the literature has been cited at around 66%, three to four years after first onset of the illness (Moss-Morris & Petrie, 2001). Again, recent meta-review of the literature has yielded a median rate of improvement of 39.5% (Cairns & Hotopf, 2005). Studies used for this figure again ranged from 6 months to 10 years in follow up. In the UK, an average improvement or recovery rate of 32% after one year has been noted in primary care in the British National Health service (Joyce, Hotopf, & Wessely, 1997).

While the traditional view is that CFS affects a disproportionate number of people in higher social classes, it appears in fact that risk is actually slightly higher overall for lower socio-economic groups, and for people living in deprived areas (Lawrie & Pelosi, 1995). Certain professions though do form a higher number of sufferers, including doctors (Ramsay, 1986) and teachers (Dowsett, Ramsay, McCartney, & Bell, 1990). This could be due to people in these professions having increased exposure to people carrying organic disease or infection, or high stress in these jobs contributing to a weakened immune response. An interaction effect of these two factors is also possible. Seemingly however, any person potentially can become afflicted, at any point in their lives. The incidence of CFS is also higher overall in females, by a ratio of about 4:1 (Cairns & Hotopf, 2005).

1.5 Diagnosis

Several protocols have been developed for diagnosing CFS in recent years. However, clinicians continue to have problems with diagnosis, partially because of lack of recognition or scepticism about the disorder, misdiagnosis of CFS as other conditions such as fibromyalgia, depression, or somatoform disorder, and conflict between clinician and patient opinions. The Fukuda *et al.* (1994) criteria have been adopted for many research diagnostic purposes.

These inclusion criteria are:

Clinically evaluated, unexplained, persistent, or relapsing fatigue that is:

- Of new or definite onset
- Not a result of ongoing exertion
- Not alleviated by rest
- Results in a substantial reduction in previous levels of occupational, social, or personal activity

Four or more of the following symptoms that persist or recur during 6 or more consecutive months of illness and that do not predate the fatigue:

- Self-reported impairment of short-term memory or concentration
- Sore throat
- Tender lymph nodes
- Muscle pain
- Multijoint pain without swelling or redness
- Headaches of a new type, pattern, or severity

- Unrefreshing and/or interrupted sleep
- Postexertion malaise (a feeling of general discomfort or uneasiness) lasting more than 24 hours

Exclusion criteria:

- Active, unresolved or suspected disease that is likely to cause fatigue
- Psychotic, melancholic, or bipolar depression (but not uncomplicated major depression)
- Psychotic disorders
- Dementia
- Anorexia or bulimia nervosa
- Alcohol or other substance misuse
- Severe obesity

Currently in the UK, a diagnosis of CFS most often involves the following diagnostic criteria for a patient, conforming to the Oxford Criteria for Chronic Fatigue Syndrome (Sharpe et al., 1991). The Oxford criteria have remained the most popular in the UK (as opposed to elsewhere in the world) for diagnostic and research purposes:

- (a) A minimum duration of 6 months of reported severe fatigue
- (b) Functional impairment, classified as disabling in more than one aspect of life
- (c) Other symptoms are not specified
- (d) New onset of the diagnosis is required
- (e) Medical exclusion of other known physical causes of fatigue
- (f) Psychiatric exclusions, including psychosis, bipolar disorder, eating disorder, and organic brain disease

These criteria place important emphasis over the CDC (1994) criteria on mental fatigue, in addition to physical fatigue symptoms.

The diagnostic process will also usually involve dynamic assessment of the patient by the clinician/s involved. This process should include:

- medical history of the illness
- past medical history
- psychosocial history of the patient
- identification of any current organic disease and psychiatric syndromes (especially relevant if these may reflect a dual diagnosis or differential diagnosis alongside any CFS)
- Mental state examination
- Physical examination

Individuals with CFS often also present with a number of symptoms in addition to fatigue. These include muscle pain, headaches, and great degrees of functional disability. Although a thorough medical history, medical examination, mental state examination, and exhaustive laboratory tests are recommended as part of the diagnostic process (Prins, van der Meer, & Bleijenberg, 2006), no definitive medical test exists at present for diagnosing CFS. No formal diagnostic interview schedule has also yet been agreed for CFS diagnosis, although items such as the Chalder Fatigue Questionnaire (Chalder et al., 1993) can help determine presence and severity of symptoms. Diagnosis therefore relies on the basis of the clinical judgement of the clinician/s involved, and the verified exclusion of other factors known to be involved in causing fatigue.

1.6 Aetiology

At time of writing, the precise cause of CFS is unknown. Several factors have been proposed in the CFS makeup, but it seems most likely that an interaction of both biological and environmental factors is the most likely cause.

Past research into actiology of CFS has investigated various diverse factors. These include viral infection, immune dysfunction, neuroendocrine response, central nervous system dysfunction, muscle structure, exercise capacity, sleep patterns, genetic makeup, personality and neurophysiological processes. Viral infections appear to play a prominent role in most cases of CFS. This may be through an early pathological effect, and the virus may have a reduced role or is incapable of being detected later in the illness. Alternatively, the virus may have a consistent pathological affect that cannot be detected diagnostically at present (Devanur & Kerr, 2006).

The association for any of these aetiological factors in isolation however as a primary cause of CFS has been weak (Prins *et al.*, 2006). The aetiology of CFS is then widely believed to be multi-factorial in nature. Some research has identified factors which are associated for increased risk for CFS, and for perpetuating the illness.

Predisposing factors:

Personality is one risk factor for CFS. Individuals defined as suffering from neurotic and introverted personalities are reported as having increased risk for the disorder (Hoogveld, Prins, de Long, van Aken, & Bleijenberg, 2001). Other risk factors include low levels of physical activity in childhood and having a major childhood infection (Viner & Hotopf, 2004; White, 2004). CFS, as previously cited, is also higher in females than males (Prins *et al.*, 2006). However, no sex-linked genetic markers have been reported to date which explain this difference.

Precipitating factors:

Acute physical and/or psychological stresses also appear to be important precipitating factors. Approximately 75% of adult patients with CFS report having had an infection

such as acute viral nasopharyngitis¹, influenza², infectious mononucleosis³, Q fever⁴ and Lyme disease⁵ in the past (Salit, 1997). Contrary to popular belief, no strong association between CFS immunological activity and the Epstein-Barr virus has been found to date (Swanink *et al.*, 1995). This virus is a member of the herpesvirus family, and results in no symptoms in most people. If infected during childhood, infectious mononucleosis may though sometimes occur. Symptoms of this include fever, sore throat, and swollen lymph glands (CDC, 2007). Infection of the Epstein Barr virus had been previously thought to precipitate CFS in some individuals.

Serious life events such as bereavement or unemployment are also common precipitating factors (Hatcher & House, 2003).

Perpetuating factors:

Several factors which may hinder recovery have been identified. Psychological processes may be involved (explored in further detail to follow) including beliefs about the illness. Such beliefs may include:

Physical causes of the illness

¹ Frequently also known as the "common cold". Typical symptoms include sore throat, congestion, sneezing and coughing (Eccles, 2005).

² Frequently also known as the "flu". Viral disease with symptoms similar to the common cold, but frequently may also include other symptoms including headache, feelings of weakness, muscle pains and fatigue (Eccles, 2005).

³ Also known as "kissing disease" or "Pfeiffer's disease"; this is a viral disease with typical symptoms similar to both 1 and 2 above, but signs of this infection may include fever, enlarged lymph nodes, spleen, and liver, and burst red blood cells (Longmore, Wilkinson, Turmezei, & Cheung, 2007).

⁴ Disease caused by bacterial infection: has typical symptoms similar to infectious mononucleosis, but has potentially more serious implications if not treated promptly, including atypical pneumonia and hepatitis (La Scola, 2004).

⁵ A bacterial infection commonly spread by tick bites. Symptoms are similar to infectious mononucleosis, but often accompanied by a characteristic skin rash. If not treated promptly, implications may include joint, nervous system, and heart abnormalities; chronic fatigue and sleep disturbance; and cognitive difficulties (Fallon & Nields, 1994; Seltzer, Gerber, Cartter, Freudigman, & Shapiro, 2000; Shadick et al., 1999).

(Joyce et al., 1997)

- Need for strong focus on bodily sensations
- A poor sense of personal control over symptoms

(Moss-Morris, Petrie, & Weinman, 1996)

For behavioural maintaining factors, patients tend to use more avoidance strategies towards physical activity than non patients (Afari *et al.*, 2000). Such inactivity may be caused by various perceptions and expectations about physical effort having negative consequences, rather than actual levels of physical fitness (Bazelmans, Bleijenberg, van der Meer, & Folgering, 2001).

Other perpetuating factors may include social processes, such as solicitous behaviour. This type of behaviour can include family and carers encouraging rest, and taking over tasks the patient used to do (Schmaling, Smith, & Buchwald, 2000). Lack of perceived social support is also an important factor (Prins *et al.*, 2004).

Reinforcing beliefs that contribute to perpetuating CFS can also be encouraged by family, carer and health practitioner expectations and opinions. Examples can include encouraging unnecessary medical diagnostic procedures, focusing too much attention on beliefs that the illness is psychologically caused, or denying CFS as a legitimate diagnosis (Page & Wessely, 2003; Stanley, Salmon, & Peters, 2002).

Other perpetuating factors of the illness in this category might include valuing increased care and attention from others, disengagement from difficult or unpleasant activities as a result of having CFS, and financial benefits such as disability allowance (Barsky & Borus, 1999).

1.7 History of psychological involvement in CFS

It is notable in an overwhelming amount of CFS literature to date that the aetiology and management of the illness has often been considered purely from a bio-medical model. That is, the primary factors involved in the aetiology and maintenance of CFS symptoms are often considered as purely biological. Subsequently, CFS has then been considered for treatment only by purely medical interventions.

Despite a role of psychological factors being identified in perpetuating CFS, psychology research into CFS is a recent development in CFS research history. Psychological factors, and psychological interventions that might be suggested from psychology research, until recently had been seen as having little (if any) role to play. This view appears to have been derived from political and research funding considerations about CFS. Some of these considerations may have been: patient concerns about labelling CFS as a psychiatric illness; ignorance about the role of psychological factors alongside biological factors in contributing to illness; and particular research community ethos and philosophical pressures about how the syndrome should be studied. Overwhelming emphasis on the medical research model into treating CFS appears to have been prevalent as a result of these considerations.

More recently, research focus has shifted to a bio-psycho-social perspective on CFS (Friedberg & Jason, 1998). This perspective is being seen as increasingly relevant in caring for CFS patients. This perspective takes into account both the biological causes and limitations the illness presents (muscular and mental fatigue), the psychological processes and effects of the syndrome, and the social consequences of CFS. One example of social consequences - the social cost of CFS in monetary terms - has already been outlined. However, the informal cost of stress and strain on patients, friends, relatives, work colleagues and carers of patients is more difficult to quantify.

In response to this bio-psycho-social model approach, psychological contributions to understanding and treating CFS have increased dramatically as a focus of this new research perspective. Chalder for example has described the development of the three systems model in treating the perpetuating factors of CFS (Chalder, 2005). This model links *cognitive, physiological* and *behavioural* responses to the maintenance of fatigue, rather than any purely medical explanation of continued fatigue as previously.

Treatment of CFS, from a psychologically trained therapist using and examining the effects of these three systems in tandem, then does appear to come under the remit and aims of general psychotherapy. Psychotherapy has been defined as systematic interactions between sufferers and socially designated healers, by which healers attempt to relieve the sufferer's distress by symbolic communication (Frank, 1975).

In the past, other non-psychology based treatments (some not tested by randomised controlled trials) have been reported in the literature. A number of these biologically related treatments have been attempted with CFS over a long time span. These include steroid treatment, immunoglobulin injections, and anti depressants. The outcomes recorded to date have suggested generally poor outcomes for all these treatments. Large scale trials of many non psychology based treatments have unfortunately proven either impractical, or little evidence exists to support their efficacy after the trials (Chambers, Bagnall, Hempel, & Forbes, 2006). Other more unorthodox treatments also tend to have yielded little benefit (e.g. hypnosis: Gregg & Jones, 1995).

The emergence of structured therapies such as cognitive-behavioural therapy (CBT), from psychotherapy and clinical psychology research, has inspired some therapists to trial this therapy, and other psychologically based treatments, on a large scale with CFS patients.

1.8 Current psychologically based treatments of CFS: CBT and GET, and critique of these approaches

Cognitive behavioural therapy: CBT

NICE (2007) guidelines, and recent review of the literature, suggest that Cognitive Behavioural Therapy (CBT) and graded exercise therapy (GET) are the treatments with the greatest current efficacy for improving patient condition (Chambers et al., 2006; Deale, Chalder, Marks, & Wessely, 1997; Prins et al., 2006).

CBT therapy focuses on changing beliefs patients hold about their illness, and about how to effectively manage it. A basic tenet of CBT therapy with CFS patients is that changing patients' cognitions about CFS and their illness state can positively change and affect their feelings about CFS, and the behaviours patients use for coping with the condition. This approach can lead to improved overall coping, and possible reduced severity and frequency of CFS symptoms. As patients may believe they often have little control over their illness (Neerinckx, Vingerhoets, & Van Houdenhove, 2000), this type of therapy may help empower patients to some degree.

To illustrate this approach, the Surawy, Hackmann, Hawton and Sharpe (1995) cognitive model of CFS is the best known in the field. The aetiology (Figure 1) and perpetuation (Figure 2) of CFS in this model are reproduced on the following pages.



Figure 1: Theoretical cognitive model of aetiology of CFS, (adapted from Surawy et al., 1995)

Figure 1 suggests that patients hold dysfunctional assumptions about what others expect of them, and what they must achieve. It also specifies that patients will often assume that they "should" be in control of their emotions, and not display any signs of emotional weakness to others. Patients might be seen in this model as striving for unrealistic expectations, and reluctant to admit any personal weaknesses to others. If excessive demands result in the patient failing to meet their own high level of assumptions, this can lead to symptoms forming.



Figure 2: The perpetuation of CFS (adapted from Surawy et al., 1995)

This perpetuation cycle of CFS (Figure 2) is also outlined by the same authors, and follows on from figure 1. This outlines the patients' responses to their thoughts about their CFS. The "cyclical" nature of thoughts affecting behaviour, the consequences of this behaviour, and the return to negative thoughts is clearly illustrated. Thus a patient can fall into "thinking" or "cognitive traps" in following such a cycle.

This overall model does not suggest that the causes of CFS are purely psychological, or CFS being a purely psychological illness once developed. It instead focuses on psychological factors as having a role in maintaining CFS symptoms. Maladaptive psychological thinking and processes are then cited to contribute negatively to a patient's condition, by increasing or maintaining their symptoms. Patients who fall into such "traps" then may need outside assistance and education to help break out of them. This is where the CBT therapist can assist the patient in identifying their negative assumptions.

The protocol of therapy for CBT in treating CFS then has multiple components, which follow from the Surawy *et al.* (1995) model. The protocol first proceeds with an explanation to the patient of the bio-psycho-social model, followed by assessing the patient's motivation for CBT. Challenging and changing fatigue related cognitions, achieving and maintaining basic amounts of physical activity, and planning work and other personal activities is the second part of this therapy (Whiting et al., 2001).

Improvement rates as high as 70% immediately following CBT treatment have been reported (Whiting et al., 2001). Significantly improved recovery rates for CBT compared to control groups have also been found at 2 year and 5 year patient follow ups (Van Houdenhove & Egle, 2004). It has proved a more cost effective treatment compared to either support groups for CFS, or no intervention (Severens, Prins, van der Wilt, van der Meer, & Bleijenberg, 2004). Reported continued positive changes in fatigue, physical functioning, and global improvement have also been noted from some studies as an outcome of CBT treatment (NICE, 2007).

Despite these promising results, the results for CBT treatment have not however been uniformly positive. Akagi, Klimes and Bass (2001), examining efficacy of CBT in a general hospital setting, found 32% of patients reported no significant functional improvement post-treatment. Strang (2002) found little effect on functional impairment or maladaptive thoughts, although general mood and enhanced feelings of personal mastery were noted. However, the outcomes observed for CBT have been sufficiently promising to make it the current first choice treatment for CFS, alongside graded exercise therapy.

Graded exercise therapy

Graded exercise therapy (GET) may be used in conjunction with CBT, or on its own. It is a behavioural based therapy, focusing on periods of scheduled and gradually increasing exercise. These periods of scheduled exercise are followed by periods of rest and *nonexercise*, regardless of any psychological gain or loss from the exercise done. It appears to have success rates significantly higher than control groups for CFS (Van Houdenhove & Egle, 2004). Functional outcomes appear similar compared to CBT, with CBT having a slightly higher efficacy rate (McCrone, Ridsdale, Darbishire, & Seed, 2004).

1.9 Critique of CBT and GET approaches

Despite these reported success rates, significant questions about the CBT model and the psychological perspective to treating CFS remain. The CBT perspective firstly is by no means complete. First, the CBT perspective currently includes only a limited number of researched cognitive factors to date in explaining and treating the difficulties CFS can present for patients. Secondly, the current CBT and GET approaches do not necessarily account for all the difficulties faced by sufferers while trying to live with the illness. Difficulties such as social functioning, emotional distress and pain management may be only partially accounted and solved by change in patient beliefs and scheduled activity (the "backbone" of the CBT and GET treatment methods at present). As Anderson and Ferrans (1997) advocate, much work is still to be done in understanding and taking into account the multiple losses in jobs, diminished relationships, financial instability, disruption in future plans and extracurricular interests, and the spontaneity of patients, in addition to management of their cognitions and exercise. In this study, psychological factors impacting social relationships and home duties of CFS patients will be considered.

2. Study question 1: Emotional expressivity and social relationships

2.1 Relevance of social functioning

As already noted, global difficulties in impaired functioning in CFS are not uncommon (Wessely, Chalder, Hirsch, Wallace, & Wright, 1997). One account of a sufferer gives a valuable subjective account on experiencing the illness, and the functioning difficulties the illness can produce:

"I spend 21-23 hours of my day lying down. Even then, it's an effort to use parts of my body. To lift my hand to write a [cheque] is too much. Last time I tried walking, I got to the end of the block and had to lie down for 15 minutes before I had the strength to go back home. So I don't even consider anymore. I haven't dealt with problems that I'll eventually have to deal with: like my boyfriend leaving me, my lost job and friends... these are awful things, but right now I have no stamina to think about them. All I care about is getting to a level where my illness is tolerable."

(Anderson & Ferrans, 1997, p. 363)

Within the content of this (admittedly limited) account, one might pick out several key themes. Firstly, having and managing the illness is communicated to the reader as a particularly negative experience, with the feeling that the sufferer can do very little. Secondly, the social difficulties the sufferer is facing seem pronounced: "dealing" with a spouse, losing employment, and friendships. Thirdly, belief in the improvement of the sufferer's life is concentrated in their perceived capacity to do everyday activities, and the degree of their bodily symptoms.

The negativity of the themes identified in this sufferer's account is not meant to belittle CFS sufferers, or be framed as any kind of value judgment towards them. The negativity in this account could be expected for many sufferers as a result of how severe CFS symptoms may be. It is also the account of one sufferer, and perhaps cannot be

considered generalisable to all sufferers. However, this account highlights, in the language of a sufferer, some key themes of CFS patients' lives still poorly understood in the literature.

One topic which Anderson and Ferrans (1997) make clear as a question for CFS research, and appearing openly in the quoted patient's account, is disrupted relationships. This topic, which can be termed as capacity for *social functioning*, is of particular interest in CFS.

2.2 Social relationships and social support- definition, and significance in CFS

When defining social functioning, this is the extent to which a person can perform their social roles. First, this specifically includes relationships with friends and family, and as a parent; second, in performing everyday activities which CFS patients may wish to undertake which affect other people. These can include occupational functioning, homemaking, and recreational activity (Schweitzer, Kelly, Foran, Terry, & Whiting, 1995) One particular focus in this study will firstly be on the relationships with friends and family part of social functioning. The second focus of this study is given to homemaking as part of social functioning: this is addressed later in this Introduction.

The quality of relationships between CFS sufferers and people round them, and the rate in which CFS patients do activities with others, can be severely affected. Research to date has found that relationships between family, friends, and work colleagues may become reduced, conflicted, and at a much lower frequency and quality then those of a sufferer's pre-morbid interactions (Schweitzer *et al.*, 1995).The fewer positive interactions, and many negative interactions, patients have with others compared to other clinical groups such as cancer patients, and the non-clinical population⁶ is significantly higher (Prins *et*

⁶ In the psychology context, these are normally participants who meet exclusion criteria for symptoms or conditions which might otherwise act as confounding factors in any potential study.

Any study using a "non clinical sample" often does not normally anticipate or be focused on detecting effects in participants who have such symptoms or conditions. However, screening for these in all

al., 2004). It is currently a major issue for patients, and a prominent issue on patient support groups and websites (e.g. Collinge, 2002).

Social relationships being as optimum as possible in CFS is important because the role of social support in managing CFS should not be underestimated. Obtaining this social support sufficient can be particularly difficult for CFS patients. Mayer (2000) found that during the year before illness onset, people with CFS received significantly less social support than healthy controls. Anderson and Ferrans (1997) also found significantly less perceived social support in CFS patients than in non-clinical participants.

It is worth at this point qualifying the differences between social relationships, *enacted* social support and *perceived* social support, as these are different concepts. Enacted social support (Cobb, 1976) would result from others involved with a CFS patient. This would take the form of external behaviours from another person towards the patient that help the patient cope with CFS. These behaviours might be purposefully intended to try and help the CFS patient cope, or simply help the patient cope regardless of any intentions behind them.

This enacted social support will then require a social relationship of some sort with the patient to be present: a social relationship would be needed. However, this relationship is not sufficient itself. A person could, for example, choose to not engage in supportive behaviours towards the patient in an existing relationship.

This insufficiency point also illustrates while it is possible that a patient may have a number of social relationships, but these relationships may not necessarily be pleasant or supportive ones. Conversely, a person may have only a single social relationship, but that relationship may have consistently supportive behaviours from another person within it.

participants of a study may or may not be a part of the design of studies who report using non-clinical samples. It should be considered that a non-clinical sample might often be assumed to be such simply because the group of participants in this category may be large overall, and/or when this group are being recruited from non-clinically based environments or sources.

Following from this, perceived social support has been defined as the degree to which people feel they are cared for by other people, and that others will help them if they are requested to do so (Schwarzer & Leppin, 1991). For CFS patients, this may be felt if patients feel that people they have social relationships value and care for them, and help them to cope with CFS as necessary. It should be obvious that social relationships and enacted social support will then both normally be necessary for good perceived social support in a patient.

Logically forming the base then of both enacted social support and perceived social support are the social relationships patients hold. Logically, a patient having no or very few social relationships, or consistent conflict in those that do exist, is unlikely to lead to good perceived social support in a CFS patient.

A number of causes for the impaired social relationships in CFS patients could exist. The overwhelming physical and mental fatigue patients experience may prohibit frequent and extensive physical movement. This fatigue may restrict a patient's freedom to attend social events and gatherings, and the chances of face to face contact with others on an everyday basis. It also can reduce social activities, hobbies and other pursuits. For depressed CFS patients, the perceived consequences of doing activities (as outlined in the cognitive model of chronic fatigue: (Surawy et al., 1995), and assumptions patients may have about other people having negative reactions towards their illness, may also produce difficulties in social relationships.

However, for CFS patients, it has been noted that an emotional component could be another possible factor in patients' difficulties in social situations. Some studies for example, have noted that lower levels of positive affect can be common in CFS. Higher levels of negative affect are often present instead (Dougall, Baum, & Jenkins, 1998; Smith, Behan, Bell, Millar, & Bakheit, 1993). Although reported, the consequences for restricted positive affect in CFS for social relationships are not clear in the literature. This is surprising since positive affective display (which might also be termed positive affective behaviour) the facial, vocal, or gestural behaviours serving as indicators of positive affect in a person; and negative affective displays, serving as indicators of negative affect in a person (Watson, 2000) – may adversely affect affecting social relationships. Low levels of positive affective displays, and high levels of negative affective displays, potentially (and logically) have been noted as resulting in social relationships being adversely affected (H. S. Friedman, Riggio, & Casella, 1988; Snyder, 1987). The concept of display rules clarifies why low levels of positive affective displays in patients could have such an effect.

2.3 Display rules

As Trierweiler, Eid and Lischetzke (2002) comment, while some emotions may be freely expressed to others, other ones may be repressed. Display rules dictate in many cultures which emotions should be expressed, and when (see Saarni (1999) for review of the development of individual awareness and compliance to display rules). By following appropriate display rules, a person tries to be expressive consistent with societal rules of what is appropriate to be expressed and what is not at any given time.

Negative emotions such as anger, dejection, frustration and hopelessness are not often considered desirable to be expressed in Western culture. However, since these emotions appear to be frequently expressed by CFS patients in the course of their illness, it is feasible some CFS patients could struggle with stopping expression of such emotions to others.

It is clear that although negative affective displays are generally unappreciated in Western culture, there are times when negative affective displays observed in others can result in good functional outcomes. For example, in a sample of patients with chronic fatigue (although not a full CFS diagnosis) the inability to adequately express emotional despair, and process negative emotions adequately, was a predictor of poor outcomes in treating fatigue (Godfrey, Chalder, Ridsdale, Seed, & Ogden, 2007). This is an example of negative emotions and feelings being expressed in an appropriate context. Outside of the therapy environment however, positive affective displays seem to be appreciated much more the majority of the time. There may be some limited contexts in which it is not well received (e.g. excessive optimism to others at continuing to operate a failing business for example), but these contexts appear few.

However, do patients with CFS follow display rules to the same extent as the non-clinical population? While a normal, and seemingly non pathological variety of positive and negative affective behaviour has been found in non-clinical samples (Gross & John, 1995; Trierweiler et al., 2002) the level of affective display of CFS patients has not been investigated. This is despite the fact that this type of behaviour, as cited, may have an important effect on social functioning (H. S. Friedman et al., 1988; Snyder, 1987).

It is then possible to propose that low levels of positive affective display could be a factor in the difficulties of CFS patients in their social relationships. Negative communication appears to be predominant instead in the sufferer's example above, with her expressed worries concerning her physical capacity, and inability to deal with her situation.

To examine the specific role of affective displays in this way, the theory of emotional expressivity can be used.

2.4 Emotion and emotional expressivity (EExp)

Emotional expressivity (EExp) is a relatively new concept in the research literature (see review: Trierweiler et al., (2002). It should not be confused with the concept of emotional expression (EE: Brown & Rutter, 1966). EE essentially refers to the degree of critical comments, hostility and over involvement within a family structure (Kuipers, Leff, & Lam, 2002) and has been assessed almost solely by familial, externally rated measures. While EE may effectively describe the responses of immediate others to CFS in a family environment, it does not comment on the individual emotional behaviour of a sufferer.

In observing the role of affective emotional behaviour in outcomes for illness generally, it is quite well established in the scientific literature that emotion can play a part in these. Behavioural display of emotions appears to have a role in the maintenance of symptoms, perceived severity and functioning in many chronic illnesses. These include cardiovascular disease (Brosschot & Thayer, 1998); cancer (Gross, 1989; Sanderman & Ranchor, 1997); asthma (Bray, Theodore, & Patwa, 2003) rheumatoid arthritis (Smyth, Stone, Hurewitz, & Kaell, 1999); HIV diagnosed patients (Petrie, Fontanilla, & Thomas, 2004), and fibromyalgia (Gills, 2002).

2.5 Emotional expressivity – CFS, and the EExp model

To date, the role of individual affective displays are relatively unknown in CFS. To attempt to explore such behaviour, the EExp theory may be useful to use. EExp is characterized as an individual style of expression, rather than a group focused measure of emotion, such as in EE. Gross and John (1997) describe EExp as the "behavioural changes that accompany emotion. An individual is emotionally expressive to the extent that he or she manifests emotional impulses behaviourally" (p435). The role of EExp, serving as a framework for understanding individual differences in emotionally expressive behaviour (synonymous to affective display), is outlined in the model on the following page (Figure 3).


Figure 3 – The EExp model (adapted from Gross & John, 1995, 1997)

This model is a formal way of explaining differences between emotionally expressive behaviours (7) from individuals. According to this model, emotion occurs when an external or internal 'input' (1) such as a thought or behaviour from another person, is appraised in such away that it triggers an 'emotion program' (2) e.g. anger, amusement, or sadness. Once an emotion program has been triggered, this prepares a person for further action, by generating a number of possible response tendencies (3). These tendencies can include subjective feelings, physiological changes, and environmental behaviours. The purpose of these responses (at least in theory) is to prepare a person to respond adaptively to environmental challenges or opportunities that are present at that time.

However, it is important to note: not *all* response tendencies will be expressed through externally visible, affective behaviour. However, individuals appear to be more likely to express certain response tendencies consistently into a way that becomes distinct from other people – they develop their own "range" of emotionally expressive behaviours (7). This range of developed behaviours then may be consistently adaptive to the

environmental conditions or environmental inputs a person often faces. Alternatively, it may not.

A person's response tendencies (3) are moderated by perception of these tendencies as either potentially being positive expressive behaviours (4), or negative expressive behaviours (5). They may be positive, in that these tendencies expressed as behaviours will be received well by others, or negative, in that they will not. This perceptive ability, as suggested by Gross and John (1995) is influenced by (a) an ability to perceive and obey display rules (b) a person's own personality traits (made up by factors such as those in the Big Five model of personality⁷ (e.g. Extraversion and Neuroticism) and (c) their own mood at the time, whether positive or negative.

An example, using a funeral context, can be used to clarify the model, and how the model is processed in practice:

The Input (1): Another person, close to you at a funeral, starts crying hysterically.

The Emotion Program (2): Emotions that could be generated:

- (a) Sympathy
- (b) Apathy/disregard
- (c) Contempt

Possible Response Tendencies (3) that could be generated:

- (a) Attempt to comfort them
- (b) Ignore them
- (c) Sneer at them

⁷ A model specifying individual differences in personality and behaviour can be explained through different amounts of five specific personal traits in any given individual. These traits traditionally are: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (Thurstone, 1934).

(4) Perceived positive expressivity: (a) Attempt to comfort them.

(5) Perceived negative expressivity: (b) Laugh at them (c) ignore them.

(7) Emotionally expressive behaviour becomes: (a) Attempt to comfort them.

However, another person's model, with the same Input, and the same Emotion Program, could be:

- (4) Perceived positive expressivity (a) Ignore them
- (5) Negative expressivity (b) Comfort them (c) Laugh at them

Normally, the appropriate positive tendency would be decided by most of us as "Attempt to comfort them". However, if a person, for example (i) Misunderstands the display rule that the person should be comforted in these circumstances or (ii) is incapable of giving emotional support to the person due to their own past experiences with death or (iii) is depressed, or angry with the person seeking support (or all three of these) than the most appropriate positive response tendency may not be generated, and consequently will not be expressed as a positive behaviour.

Additionally, how impulsively a person is in expressing affect through their behaviour is also included (6). In effect, this is how spontaneously certain response tendencies become expressive behaviours, without any conscious cognitive processing occurring. Taking into account impulsivity, out of the two initial response tendencies of (a) and (b), (b) may be the one expressed as behaviour, perhaps due to this particular behaviour being conditioned over time. A person may also simply become accustomed to certain response tendencies becoming behaviours, with little perception or thought towards them anymore over time. In this sense, the EExp theory is congruent with behavioural conditioning theories, such as those of B. F. Skinner (Skinner, 1938).

In Gross and John (1995) a self-report measure of positive expressivity and negative expressivity, The Berkeley Expressivity Questionnaire (BEQ: Gross & John, 1995, 1997)

was developed using a large sample of non-clinical participants (N = 1392). The items for this measure were first derived from 470 undergraduate student ratings of 22 statements relating to emotional behaviour. From these ratings, 16 final items loaded onto three distinct factors in a factor analysis: positive, negative or impulsive behaviour. With these items tested with the remainder of the sample (N = 922), results were consistent with participants. Positive expressivity (M = 5.5) items were rated much more frequently as being expressed than negative expressivity items (M = 3.7). By comparing individual responses on the items, a person's affective behaviour could also be rated as more negative, or more positive, than another person's. Similarly, level of impulsivity was found to vary between individuals in expressing affect (whether negatively or positively). Levels of positive expressivity, negative expressivity, and impulsivity could also be added together to give an overall "measure" of a person's emotionally expressivity – a person's cumulative, expected expressive behaviour responses.

2.6 Emotional expressivity – concept as a trait model, and contrast with other emotion approaches

As a characteristic of the EExp theory, a person's overall measure of expressivity is seen as a relatively stable, enduring trait. It is also a *valence specific* model of emotional expressivity (Trierweiler et al., 2002). Valence specific models of emotion, such as the EExp model, have cited that emotions are classified according to discrete categories, and the EExp model appears to support this (positive and negative emotions in this case).

The discrete emotions theory, advocating the existence of a finite number of distinct emotions, is another example. This theory has cited emotions as being biological reactions that affect a person's behaviours in their surrounding environment (e.g. Ekman, 1972; Frijda, 1986; Levenson, 1988). The EExp theory partially supports this, but argues that responses do not just arise just from a biological level, but are influenced by psychological factors as well. EExp theory also appears compatible at present with research findings that emotion is controlled by different brain hemispheres, e.g. that the right hemisphere is dominant for negative emotions, and the left hemisphere dominant for positive emotions (Hellige, 1993). Gross and John (1995) also cite EExp as compatible with dimensional emotion approaches, such as Watson & Tellegen's theory of emotions points located on dimensions such as positive affectivity and negative affectivity (Watson & Tellegen, 1985).

Other conceptual models have also been proposed to explain and measure affective responses. Unidimensional models assert that all emotions can be placed along a continuum. This means that these models differ from other models of expressivity, by citing that there are a large number of varying degrees of expressivity (e.g. H. S. Friedman, Prince, Riggio, & DiMatteo, 1980). The EExp model is not consistent with this theory.

No one theory or model to date so far appears to have taken conclusive precedence over any another in the literature in explaining individual differences in emotion. However, the Gross and John (1995, 1997) EExp model does appear to have a clear benefit which might support its use in investigating a CFS population. If a characteristic of CFS patients is that they are low in positive affective displays, and if such behaviour generally involves a finite number of emotions as has been suggested (Smith et al., 1993; Sundborn, Henningson, Holm, Soderbergh, & Evengard, 2002) this model, and the Berkeley Expressivity Questionnaire measure, have been developed specifically to identity these differences in an individual.

2.7 Emotional expressivity effects, and research interest in CFS with social relationships

In expressing emotions, the social responses an individual gets from other people may then be dictated by their type of expressivity. If CFS patients do have problems in perceiving display rules correctly, along with personality difficulties and low mood, this may lead to a reduction in positive affective displays due to these difficulties. This may lead to negative social consequences as result. If people around a sufferer feel disturbed, alienated or lacks understanding of a CFS patient being restricted in expressing positive behaviours, this is likely to lead to withdrawal of social support to that sufferer. With that withdrawal, the opportunity to engage in supportive social relationships is lost. Higher positive affective display in turn, is expected to facilitate positive, supportive behaviour from others, and this type of behaviour has been linked with positive social functioning (Wallbott & Scherer, 1989).

Empirical support for these predictions:

A non-clinical sample in a study to validate the EExp model reported expressed positive affect as higher than negative affect. Women are also slightly more expressive in general than men (Gross & John, 1995). It is then evident that both positive and negative emotions are expressed in people, but positive ones are reported as expressed more than negative, which conforms to the display rules theory. However, considering the role of social support already outlined for CFS, low levels of positive expressive behaviour could have negative social consequences for CFS patients. In essence then, those with a low overall degree of positive emotional displays may fare less well socially than those who have a higher degree of positive emotional display.

To summarize, the role of affective behaviour on social functioning in CFS remains largely unknown. However, recent research has pointed to expressing affect effectively in CFS as being a key to good functional recovery. With the positive expression of one's feelings behaviourally being held to improve social functioning in general, this appears a salient area to address for patient's in looking at their social relationships.

3. Study question 2: Dysfunctional attitudes and routine, and home functioning

3.1 Home functioning: definition, and importance in CFS

In contrast to the social relationships component of social functioning, the home tasks part of CFS patients are not as well appreciated as their social relationships counterpart. However, the home tasks based aspect of social functioning for the CFS patient is of importance. Due to most CFS patients' condition, they will have more limited participation in physical activities, and are much more restricted in completing most household tasks that previously they may have been able to (such as childcare, washing, and cooking). These tasks then make up a distinct component of social functioning as defined by Schweitzer *et al.* (1995). Reduction in doing household tasks may be a factor which reduces CFS patients "volition, sense of worth and self-esteem" (Gray & Fossey, 2003, p. 128). This makes this aspect of CFS patients' lives arguably an important area to address. Home functioning will be used from this point forward as a term to describe this area of patient's lives.

Despite it then being an important part of a patient's everyday life, home functioning appears to have been a largely neglected area in CFS patients. This is despite it being known to be impaired in disorders that may result in similar disability to CFS, such as fibromyalgia (Okifuji, 2005) and multiple sclerosis (Einarsson, Gottberg, Fredrikson, Von Koch, & Holmqvist, 2006). Little empirical research has been done on home functioning with this group to date. Patient's physical functioning (e.g. Powell, Bentall, Nye, & Edwards, 2001; Sharpe, 2001), measured by scales such as the SF-36 (J. E. Ware & Sherbourne, 1992) has been a topic of research interest with CFS patients, but this area has not specifically addressed home functioning. Physical functioning has been arguably too broad a definition to address home activities specifically, with no special focus on them to date as a subset of a patient's daily physical activities. More specific research on home duties is arguably needed in light of their stated importance (Gray & Fossey, 2003). Chalder, Power and Wessely (1996) have however included home functioning as an indicator of overall functioning difficulties in CFS patients. They examined home functioning scores using the Social Adjustment Scale (SAS: Marks, 1986), finding lower levels of home functioning in CFS patients compared to fatigued patients who attributed their fatigue either solely to psychological or social factors. Petrie, Moss-Morris and Weinman (1995), while measuring the overall level of disability suffered by CFS patients, also used the Sickness Impact Profile, which included an item for patient's home functioning. Patient's scored less on home functioning on this profile in comparison with non clinical participants.

The second question of this study is then to examine psychological factors that may affect home functioning in CFS patients. Two such factors are dysfunctional attitudes concerning attainment and achievement, and routine.

Dysfunctional attitudes:

3.2 Cognitions and representations of illness

Cognitive factors, such as dysfunctional attitudes, have been found to have a role in perpetuating disability generally in a number of chronic illnesses. Their role in contributing to symptoms has been noted in a number of illnesses as diverse as cancer (Walker, Heys, & Eremin, 1999) and diabetes (Lustman, Freedland, Griffith, & Clouse, 1998), as well as more traditionally in psychiatric illnesses such as generalized anxiety disorder (Riskind, 2004), obsessive compulsive disorder (Taylor *et al.*, 2006), and unipolar depression (A. T. Beck, 1967).

The self-regulatory and cognitive models:

In outlining the role of cognitions in maintaining disability in illness, the cognitive models of CBT, such as Surawy *et al.* (1995) are joined by the self-regulatory model of Leventhal et al. (Leventhal, Nerenz, & Steele, 1984). This model was first proposed in

explaining the coping mechanisms of cancer patients, but has extended to other illnesses, including CFS. This model pre-dates the recent cognitive model of CFS, and has contributed towards the thinking within this approach. The self-regulation model views how a patient perceives their illness as an influential factor. Such perceptions help them to cope with the knowledge that they are ill, that there is a physical threat to them, and how they experience their symptoms.

In the self-regulation model, the initial symptoms of CFS are seen to then trigger both cognitive and emotional reactions to the illness, similar to the Surawy *et al.* (1995) cognitive model. The emotional reactions likely from CFS patients (in terms of emotion, affect and emotion focused coping) are outlined in the earlier part of this Introduction. However, there are important contrasts to the pathways represented in the Surawy *et al.* model. The cognitive aspects are more diversely represented in this model. Five major cognitive components in appraising the illness are identified (Leventhal *et al.*, 1984):

- (a) Identity the label of CFS as an illness, and the symptoms as part of the disease
- (b) Cause ideas about aetiology of the illness, which may be simple single causal pathways, or complex models of causation
- (c) Timeline the expected length of the illness. Classified as acute, chronic or episodic.
- (d) Consequences the expected effects and outcome of the illness.
- (e) Cure-control how one recovers from or controls the illness.

In examining the cognitive components of the self-regulation model, most of these components have been examined with respect to CFS sufferers (e.g. Moss-Morris & Chalder, 2003; Tucker & Tatum, 2004). As CFS patients learn about the illness, and perhaps explore relevant literature and consider coping strategies, they will inevitably link these findings to their existing coping methods and personalities. Patients will then form certain ideas about aspects of their illness - the *cognitive components* of the illness, according to Leventhal et al. (1984).

However, it is striking that the cognitive components outlined appear to have a largely *external* focus to them. That is, they refer to the patients' ideas about the cause and effects of the illness: not to ideas about how a patient can affect the course of the illness themselves. Studies to date then have been mainly based on the beliefs that patients hold as to the identity and cause of their illness, and coping characteristics, not on the patients' own efficacy and personalities in how they can face their illness. For example Heijmans (1998) found illness representations of patients based around a strong illness identity (I am ill); a pessimistic view of the course of the illness, and limited possibilities of cure. These representations predicted a more avoidant, negative coping style in patients. The representations found in this study also appear consistent with the "cure-control" part of the Leventhal et al. (1984) model outlined, with patients having an external locus of control with regards any possibilities of curing or managing their illness.

These type of representations have been mirrored in much of the recent clinical literature to date (see Moss-Morris & Chalder, 2003; Moss-Morris & Petrie, 2001). In perceptions of their illness, Moss-Morris (2005) has distinguished between two types of CFS patients. The first type is CFS patients who hold excessively negative beliefs about the course of the illness. Helplessness and loss of control can define this type of patient, and passive withdrawal from activity may result as a means to try and cope with symptoms. A second group of patients have fewer pessimistic beliefs about the timeline of their illness, but tend to attribute their immediate symptoms to signs of physical disease. These patients may believe that levels of activity are dictated by momentary experience of the severity of symptoms felt at any one point in time. This type of patient also may overdo activity levels when not feeling symptoms, and will need to rest for a time to recuperate from their efforts (Moss-Morris).

In summary, the illness representations of sufferers largely seem to concern the external effects of the illness on their coping, with the self-regulation model describing the cognitive and emotional reactions patients may adapt after being diagnosed with CFS. This is in distinct contrast to how *they* may affect the illness - their own self-concept and expectations of themselves - in managing and coping with CFS.

This negative concept, and future outlook for what can be achieved – a patient maintaining that they can do much more than they are capable of doing in the course of the illness - could consequently affect recovery. This is due to the effects of a patients' own self-concept, in what they feel they can and should do, and the effect this kind of self- concept may have on how they feel they ought to be functioning. Moss- Morris and Wrapson (2003), for example, have proposed the link between self-concept - one's understanding of oneself, in terms of factors such as personality, skills, abilities, and physical attributes (Fleming & Courtney, 1984; Markus & Nurius, 1986) - and illness representation. This self-concept was stressed within this study as a possible important predictor of activity levels in a patient.

The importance of this self concept, and personal expectations, is also clear by the premorbid high expectations of many CFS patients proposed by the Surawy *et al.* (1995) cognitive model. The expectation of high achievement and attainment, as outlined in the Surawy *et al.* model, seems to be implicitly implied within the self concept. Van Damme *et al.* (2004) also conclude that acceptance of illness limitations is an important factor in psychological well being in CFS sufferers. This would suggest that a manageable level of personal expectations needs to be achieved by a patient in order for them to function. If these expectations are unrealistic and too high, it may be difficult for the patient to achieve any kind of sustainable recovery in the long term.

To summarize, the self-regulation model does not take into account fully the assumptions patients hold about what they personally feel they should be able to attain and achieve when ill. These are represented only in what patients feel they can actually achieve when the illness affects them. However, the prominence of assumptions within the later cognitive model prompts interest into the importance of dysfunctional attitudes, and how these play a role in influencing coping styles and activity levels.

3.3 Dysfunctional attitudes – definition, and importance in CFS

Dysfunctional attitudes have been defined as negatively biased views of oneself, the world and the future (A. T. Beck, 1976). They are cognitive factors, and hold similar properties to the dysfunctional assumptions and beliefs occurring in the Surawy *et al.* (1995) cognitive model previously described. Dysfunctional attitudes can be contingency statements, made up of "if- then" statements (e.g. if I do this, I will be seen as good". Alternatively, these may be negatively termed core constructs about the self and others (e.g. "people should always be good").

It is important to note most people hold some degree of dysfunctional attitudes about certain subjects. For most of us, these do not usually result in adverse pathological consequences. However, extreme dysfunctional attitudes, where people may expect very little or too much from themselves, can have negative consequences. Such excessive standards for example, have been linked to early reoccurrence of depression (Beevers, Keitner, Ryan, & Miller, 2003) and to increased negative outcomes in schizophrenia (Wykes & Reeder, 2005).

At time of writing, a literature search found few studies using the term "dysfunctional attitudes" or "dysfunctional beliefs" in CFS research. Although cited as part of the cognitive model, they are surprisingly little explored or clearly defined to date within the CFS literature. This is surprising, since protocols of most CBT trials view dysfunctional attitudes or beliefs as having a key role as maintaining and perpetuating factors in the cognitive models of CFS (Whiting *et al.*, 2001). The evidence reflecting this protocol is that CFS patients do seem to have a relatively high frequency of negative beliefs and negative assumptions (Moss-Morris, 2005). As noted, patients' assumptions are not often focused towards themselves, but towards their illness, and towards what patients feel should be "normal" functioning.

Surawy *et al.* (1995) have also proposed that high expectations can affect levels of activity. Such statements reported by patients in this study match the "if-as" sequence

described earlier in this chapter: examples including "If I don't meet all responsibilities to others all the time then I am a failure" and negative core constructs e.g. "I must never admit to difficulties" (Surawy et al., 1995, p. 537). Aside from Moss-Morris' (2005) findings and Surawy *et al*'s findings, Metzger and Denny (2002) found CFS patients consistently predicted they would perform worse on a neuropsychological task compared to normal controls (in fact, no significant differences were found). This appears to confirm that CFS patients may have unrealistic expectations of their own performance.

Capuano-Sgambati (1998) has also linked problem focused coping to increases in a patient's symptomology. This may suggest that patients may not be aware of unrealistic practical (problem based) expectations being a difficulty in terms of managing their illness. This problem focused coping style may be reflected in dysfunctional attitudes concerning achievement and attainment in a patient's practical ideas concerning what they feel they should be able to achieve.

The relevance of these expectations and beliefs are such that in the draft NICE guideline for treatment of CFS, perfectionist beliefs were proposed as an obstacle in rehabilitation and symptom management, along with fear of activity (NICE, 2006, p186). Such high expectations assumed in patients appear to have influenced the recent cognitive model and CBT treatments of CFS. These models have aimed to help empower patients to take control of the illness, through understanding their assumptions and unrealistic expectations. However the research evidence to date, although suggesting that high personal expectations in CFS patients play a key role in how patients can cope with the illness, remains sparse on the role of dysfunctional attitudes in CFS.

3.4 Dysfunctional attitudes and contrast of different approaches concerning the formation of these attitudes

It is difficult to identify what lies at the root of perfectionist and attainment beliefs. How pre-morbid dysfunctional beliefs initially may form in CFS is uncertain, but several factors may be involved. Firstly, the prevalence of type A personality has been cited as a possible factor in CFS patients. This personality type is traditionally associated with high expectations and competitive drive, time urgency and immediate gratification of goals (M. Friedman & Rosenman, 1974; Kawachi et al., 1998), Such a personality type would be consistent with expectations being exceptionally high in CFS patients. Unfortunately, the relationship between type A personality and CFS patients is inconclusive. Both negative (Weidner & Matthews, 1978) and positive associations (Nowack, 1991) with the health status of patients being found with it.

Secondly, Surawy *et al.* (1995) noted a frequent personality type characterized by high standards of work performance, responsibility and personal conduct in patients when conducting interviews with those afflicted with CFS. (N. C. Ware & Kleinman, 1992) note similar conclusions. Pacht (1984) has also suggested that having such high standards is a risk factor for psychological adjustment difficulties, since individuals with this need for achievement are frustrated by their failure to achieve.

Thirdly, the nature of CFS as a disabling illness may follow the model of other disabling illnesses by reducing attitudes concerning efficacy and control over the illness, regardless of or in conjunction with pre-morbid beliefs. This could be a means by which dysfunctional attitudes have a specific role in mediating dysfunctional behaviours in CFS.

Finally, in supporting the role of dysfunctional attitudes in activity, another theory has pointed to a cognitive "need for structure". The cognitive need for structure is described as a cognitive process that helps govern effective behaviour. It has been conceptualized as a trait variable (Neuberg & Newsom, 1993; Thompson, Naccarato, & Parker, 1992) with some people having greater "need" for structure in their lives than others. The variable incorporates several factors: an information-processing motive for simple [cognitive] structures in organising activity; a tendency to organize information in simple patterns; engaging in patterned behaviour, and changing little under conditions of new information. Dysfunctional attitudes could feasibly affect some of these factors, and hinder a patient for example, in their willingness to engage in patterned behaviour, and to change with new patterns of information.

In support of such a theory, dysfunctional beliefs have been found to act as better predictors of severity of impairment for chronic illness than subjective measurements of pain, and they also can affect how effective treatments for such pain can be (Riley, Ahern, & Follick, 1988).

3.5 Safety behaviours:

A final example of the effect of dysfunctional attitudes towards activity in CFS may be through safety behaviours. These are behaviours often referred to as instrumental in anxiety disorders such as obsessive compulsive disorder (Salkovskis, 1985, 1991) and panic disorder (Salkovskis, Clark, & Gelder, 1996). Such behaviours consist of avoiding certain activities or situations, since a catastrophic outcome of the activity or situation is feared if a patient engages in it. These behaviours are generally viewed as negative for a patient's functioning, and can act to prevent a sufferer from carrying out certain activities they believe detrimental to their condition at that time. It is part of the aim of CBT and GET programmes of treatment for CFS to combat such behaviours, and fear of commencing activities (NICE, 2007).

Silver, Surawy and Sanders (2004) have noted that these types of behaviour can occur with high frequency in CFS patients, particularly those with low mood and low sense of self-worth. However, a second, unexplored possibility may occur: that these behaviours are *not* employed at a time when it would be functional to do so for CFS patients. For the second group of patients in Moss-Morris's (2005) study, these patients appear to push themselves to unreasonable limits. It is possible that the patient's dysfunctional attitudes about unreasonably high levels of attainment and achievement (linked to their sense of self-identity), influences this lack of safety behaviours. Instead, the motivation for some patients may be to achieve high activity levels, at an unsuitable time period in the course of the illness for doing so.

In critique of this theory, differences of course exist between CFS and anxiety disorders. CFS is not classed as a psychiatric illness, and thus the role of dysfunctional beliefs do not play exactly the same role as in relieving Obsessive Compulsive Disorder, for example. However, based on Surawy *et al.* (1995), Moss-Morris's (2005) findings and NICE (2006) and NICE (2007) guidance, the role of dysfunctional attitudes in CFS though appears justified in their inclusion in patient functioning concerns.

3.6 Dysfunctional attitudes concerning attainment and achievement, and research interest in CFS with home functioning:

In attitudes towards goals, it is important to note that the general role of goal attainment and achievement are not limited to clinical samples, but for people in general. Mehrabian (2000), for example, identified Disciplined Goal Orientation as one of three Factors that significantly contribute to life success. Brehm and Brummett (1998) have also summarized that routine goal directed behaviours are thought to be regulated by input from the cognitive system. Our choice of goals is thought to be mediated by beliefs about whether such goals can be achieved in the long term.

Part of the problems for goal setting with CFS patients may be in expectations that they will continue to maintain levels of pre-morbid attainment and achievement after the onset of CFS – e.g. exceptional (and unrealistically high) levels of goal attainment and achievement concerning what they can regularly achieve. These are present in the aforementioned Surawy *et al.* (1995) model of CFS. In another example, Bazelmans, Prins and Bleijenberg (2002) have distinguished a group of patients they termed "relatively active". These patients had a large degree of non-accepting and demanding cognitions about what activities they should be doing to attain and achieve in CFS. These expectations may serve patients if trying to maintain gradual levels of activity. However, if expectations are too great for their level of symptoms and capacity, patients may try and do too much, with periods of extended fatigue as a result. This group of patients in the study benefitted from CBT treatment to modify such attitudes.

Summary:

In summarizing this review, the home activities patients manage to perform, and how these are performed, could feasibly be significantly disrupted by maintaining and having dysfunctional attitudes about goal attainment and achievement. There is at present little evidence in the CFS literature to know the number of patients that may hold such attitudes. Moreover, little is also known about the exact type of dysfunctional attitudes that may influence activity levels. These can then be examined as a possible key factor in dealing with problems in maintaining levels of home functioning in patients suffering from CFS.

Routine

3.7 Definition of routine, and importance to functioning

Routine has been suggested as activities being performed on a consistent manner by an individual, on a daily or weekly basis (Clark, 2000; Howe, 2002; Wagner & Ryan, 2004). In the literature, the ability to maintain a level of consistency over time in performing activities has been termed routinization. Routinization has been characterised by two factors: having Order in Life and Disliking Disruption to our lives (J.W. Reich & Zautra, 1991). It is important to clarify that routinization and functioning are not the same concept. For example, a person engaged in regular routines does not necessarily mean that they are engaged in any productive or meaningful activities as part of them. Nevertheless, the role of routinization has important implications for functioning.

In a review by Reich and Williams (2003), routinization has been cited as a basic part of human functioning. One way in which we function effectively (and particularly relevant for home functioning) can be measured by the extent to which we construct consistent and effective social routines for ourselves. Consistent positive outcomes for daily functioning are likely influenced by how consistent our routines are. For example, if a person can work at a project at the same time each day for a prescribed period, it is likely

that they will succeed in finishing that project. Likewise, few of us can run our days effectively by sleeping in the middle of the daytime and eating in early morning hours. We would be out of synch with most of the rest of the population, and this would present difficulty in maintaining productivity and functioning (T. K. Monk, Flaherty, & Frank, 1990). Functioning in general appears to be greatly reduced for most people without consistent routines in their lives (Zisberg, Young , Schepp, & Zysberg, 2007).

3.8 Biological and neuropsychological regulation of routine:

Other research has also linked routinization of our behaviour as important enough to be regulated at the biological level in humans. Maclean (1985) has declared a role of basic neurophysiological processes in regulating habit-based behavioural routines. Dunn's (2000) findings have developed this theory, concluding that habitual behaviours may help to maintain the biological homeostasis of an organism.

3.9 Routinization, its significance in CFS, and research interest in CFS with home functioning

Routinization has been little discussed in current CFS literature to date, despite the scheduling of activities as an important focus for CBT and GET treatments in CFS patients. It is recognized that not all patients may want or consider routine to be beneficial in all circumstances. Even if an individual has regular routines, as cited, it is not always the case that these are made up of productive and worthwhile activity. However, the importance of habitual patterns of behaviour has been recognized as important for functioning (Rogers & Holm, 2000). J. W. Reich (2000) for example, has investigated the predictive power of physical functioning on routine in women with fibromyalgia. This study, again examining physical functioning capacity, found this was significantly associated with routine. A limitation of this study is of course its use with fibromyalgia patients, not CFS patients. However, the presence of fatigue symptoms in fibromyalgia patients is similar to the fatigue problems found in CFS patients (Buchwald,

1996). Thus these findings are worthy of some consideration when considering CFS patients functioning as well.

Perhaps the closest current commentary on forms of routine in CFS patients is investigation into circadian rhythms and activity level in CFS patients (Tryon, Jason, Frankenberry, & Torres Harding, 2004). Activity levels of CFS patients in this study were reduced in a CFS group versus a non clinical participant group. Periods of rest and activity also were significantly less regular than in the control group. This appears to indicate that CFS patients may attempt to do more at some times than at others.

Since their general functioning and ability to perform activities is then significantly reduced with the onset of the illness, routinized living appears a challenge for CFS patients. While not explicitly mentioning routine, it has been noted that most patients' are limited in terms of their activities and very sporadic in performing them, with such activities not necessarily being meaningful (Ray, Jeffries, & Weir, 1995). Reich and Williams (2003) summary suggests that CFS patients, with reduced physical capacity, may suffer long term negative health consequences and physical functioning difficulties because of disturbed routines.

While these studies refers to physical functioning, not home functioning as such, the clear conclusion is that if routine is lost due to physical problems, difficulties may result. For the CFS patient - whose home functioning may be more prominent in their daily lives due to home confinement from symptoms - routine in their home lives could be important, due to the problems that may arise from losing routine in daily life. Both Ray, Jeffries and Weir's (1995) and Reich and Williams (2003) studies infer that problems in routine could be a significant factor in patients' difficulty in performing many of their home duties. Such duties inevitably involve minimum sustained activity and physical ability in order to perform.

If patients also cannot maintain routine well, the implications could also extend even beyond their basic home functioning, into their ability to maintain any kind of activity, due to failing health. Despite the limitations of the concept, routine is increasingly recognized as having widespread implications for health. J. W. Reich (2000) and J. W. Reich and Williams (2003), in a review of the function and purpose of routinization in daily life, note the importance of routine and habit (maintenance of stable patterns) in contributing to mental health, for example. Reich and Williams summarize this literature finding effectively:

"It [has been] demonstrated that physical health interacts with the degree to which a person reports having a routinized pattern of living. The effect of this interaction is to result in poorer mental health when the disruptive effects of physical illness reduce physical functioning for people who are more routinized. The evidence suggests that interventions to improve mental health among patients with medical problems might be improved by accounting for the personality trait of "routinization" (p 50).

Since mental health difficulties though can, as cited, result from loss of routine, the loss of routine due to illness may not be easily to mentally cope with. Since general functioning, including home functioning, appears to specifically reduce with the onset of mental illness (Bird, 1999; Lee, 2000), maintaining routine appears an important factor for CFS patients: particularly at home, extending potentially into other areas. This makes the routine of patients a salient question to also investigate alongside dysfunctional attitudes about attainment and achievement, in the home functioning of patients.

4. Study question 3: Dysfunctional attitudes concerning goal attainment and achievement, relationship with routine.

4.1 The Reich and Williams model:

So far in this Introduction, routine and dysfunctional attitudes have been considered as separate entities. However, it is also a possibility that a CFS patient's routine might be improved by holding functional attitudes concerning goal attainment and achievement.

In linking cognitions and routinization, Reich and Williams (2003) in examining the theories concerning routinization, propose another, unexplored avenue in routine theory. In this study, they assessed the underlying constructs of aspects of the sensory (biological), motivational (cognitive) and behavioural aspects of routine. Their conclusion in a factor analysis of these aspects was that a two factor model was most likely to represent routine adequately. One factor represented *cognitions* and *beliefs* about habit and routine, and the other represented sensory stimulation and reaction, *habitual behaviours*, and motivations of approach and avoidance. According to this analysis then, in essence, a patient will comply with biological feedback of their actions (immediate sensory sensations and whether these behaviours bring comfort/discomfort, pain or no pain) *and* considerations over whether their behaviours are habitual or not.

4.2 Significance of predictive relationship within CFS, and research interest in CFS

The results of this analysis do not suggest that attitudes about attainment and achievement are specifically part of the cognitions and beliefs about habit and routine mentioned. However, the role of attitudes could conceivably be in helping to organise routines the patient adopts in trying to cope with the illness. van Damme, Crombez, van Houdenhove, Mariman and Michielsen (2006) have documented that levels of acceptance – scaling down unrealistic or unattainable levels of attainment and achievement - made for better functional outcomes in CFS patients. Although not related explicitly to routine, consistent and sustained activity in this study was linked to this role of acceptance of realistic level of achievement and attainment. The cognitions and beliefs about routine in the J. W. Reich and Williams (2003) two factor analysis of routine may suggest that such dysfunctional attitudes could form part of the Reich and Williams factor found in this study.

In summarizing, dysfunctional attitudes, and the relationship between these and routine, may be important to explore. Their possible role in contributing to maintaining consistent routine in patients is not yet fully understood, and if they are in reality distinctly separate from routine in their effects on home functioning.

5. Controlling variables

5.1 Essential controlling factors: Patient's level of chronic fatigue symptoms and depressive symptoms

A CFS patient's level of symptoms (their clinical level and duration of fatigue), as explained in the earlier part of this Introduction, is likely to invariably have effects on social relationships. It will also have a capacity to influence home functioning, both from fatigue affecting capacity to do home duties, and since safety behaviours appear to be exercised with patients suffering from CFS symptoms (Silver et al., 2004). It is unknown the degree to which CFS symptoms affect routine in the literature, but sudden onset of CFS symptoms could feasibly affect it. Therefore it is salient to consider for all study questions.

However another factor, depression, is also likely to exert effects. This will first be on social relationships. It is likely to have effects on affecting motivation and capacity to interact positively with others socially (Paykel, Weissman, Prusoff, & Tonks, 1971). Low mood is also implicated as a factor affecting how people perceive of response tendencies in the EExp model (Gross & John, 1995). For home functioning, motivation and capacity to attend to home duties is also likely to be reduced, and low mood and self regard appears to increases safety behaviours (Silver et al., 2004).

Depression also has been found to result in less consistent routines for depressive patients (Haynes, 2003), and is thus mandated to control in observing routine as well.

Depression frequently has a close relationship with CFS. Due to its complexity and it sometimes being mistaken for CFS, further exploration is merited to clarity depression's relationship with CFS.

5.2 Depression: its relationship with CFS

Depression is estimated to be the most common co-morbid illness alongside CFS. Estimates vary, but recent research has concluded 25% of patients attending medical clinics have a DSM-IV diagnosis of major depression, while 50-75% of patients will be diagnosed at some point in their lifetime (Afari & Buchwald, 2003). Depression has also been cited as a significant predictor of CFS, after infection with mononucleosis (Moss-Morris & Spence, 2006). Thus it appears depression has a strong co-morbid relationship with CFS.

Historically with this co-morbid relationship, CFS and depression have been thought to be closely linked. They have at times been mistaken for the same disorder, and share common diagnostic features. These include diminished interest in activities, hypersomnia, psychomotor retardation, fatigue or loss of energy, insomnia and diminished ability to think or concentrate (DSM-IV-TR, 2000). However, the aetiology for these seems to differ in each illness. Fatigue in CFS must persist for six months. Feelings of fatigue are common in both disorders, but fatigue is often noted in CFS as physically rather than mentally disabling.

The reduced impairment in CFS patients is also often due to inability (or the perceived inability) to perform activities. This is in contrast to reduced interest in activities, as in depression. CFS patients may state that what they feel is different from sadness, and more often to do with frustration and physical inability to do activities, rather than the mental effort of doing them. They also have fewer feelings of low self esteem, suicidal ideation, and hopelessness. In contrast, while the actual number of activities in depressed individuals does not appear to go down (T. H. Monk, Kupfer, Frank, & Ritenour, 1991), it appears that their activities may be less socially orientated and meaningful than activities of individuals who are not depressed.

Demitrack, Zubieta, Engleberg, Yargic and Pande's (1994) study reflects these points, giving epidemiological evidence the two conditions are not the same entity. While 63%

of their research sample of CFS patients fulfilled diagnostic criteria for major depressive disorder, only 14% of a group of atypical depressive patients fulfilled diagnostic criteria for CFS. Other findings also reflect this conclusion (e.g. Hawk, Jason, & Torres Harding, 2006). Additionally, recent phenomenological research has supported the notion of a "discrete fatigue" syndrome clearly distinguishable from depression (Cho, Skowera, Cleare, & Wessely, 2006).

While there are then clear differences between CFS and depression, the co-morbid incidence of depression and CFS is considerable. It is also often clear that living with the effects of CFS could lead to depressive symptoms over time. Clinical trials revealed antidepressants having some efficacy in helping alleviate such symptoms. In review by Wessely et al. (1998), anti-depressants are not recommended as a first line treatment for CFS, since they do not appear to relieve fatigue and pain for CFS, especially in the short term. However, recent research has revealed substantial benefits for long term antidepressant use, suggesting that relieving mood may have substantial effects on improving fatigue levels (Thomas & Smith, 2006)

In summary, depression appears to leave individuals to interact and integrate socially with others who have a more positive outlook on life, and in tasks of everyday living, making it an important factor to control for in predicting functioning, while being separate from CFS.

6. Rationale and Aims of the study:

6.1 Study question 1: Emotional expressivity and social relationships with friends and family:

Emotional expressivity is defined as a measure of positive and negative behaviour, in response to an emotional program generated by certain inputs. The support of other people is also noted as a key factor in helping CFS patients cope with and manage their illness, since long term social difficulties are likely to negatively influence the prognosis

and course of a patient's illness. This area is under researched in the CFS literature at present. Since reduced positive expressed behaviour appears to reduce CFS patients' social relationships, with reduced social support as a result, it is then proposed that increased levels of reported positive expressed behaviour will result in better social relationships with other people. Patients' CFS symptoms and low mood likely accounts for some reduction in social relationships. This will then be controlled for in investigating this.

6.2 Study question 2: Dysfunctional attitudes concerning attainment and achievement, routine, and home functioning.

Attitudes towards goal attainment and attainment appear to be important variables in predicting good recovery and improvement in many conditions, including CFS. The attitudes held by CFS patients concerning attainment and achievement appear possibly unrealistic and excessive. Since CFS patients appear to be - in general - highly achievement and attainment orientated, when patients do have some capacity for doing activities, excessively high expectations may motivate them to attempt to do more than they are capable of doing at any one time. They may they exhaust themselves as a result, and this affects patients' ability to perform their home duties effectively.

Similarly, regular routine and the routines of CFS patients appear to be generally fragmented and erratic. Irregular bursts and periods of activity, running contrary to the pacing of activities suggested by the protocol of CBT and GET treatments of CFS, may also see regular exhaustion and reduction for patients of home activities and functioning at home. While a patients' level of CFS symptoms and mood may again account for some of these difficulties, it is suggested that irregular routines could also adversely affect patients' home functioning.

It is then suggested patients' negative excessive expectations about what they should be able to achieve and their levels of routine, may severely affect patients' ability to function well at their home duties.

6.3 Study question 3: Dysfunctional attitudes concerning attainment and achievement, and predicting routine:

According to Reich and Williams' (2003) model concerning the possible role of dysfunctional cognitions and attitudes as implicitly being a part of routine, it also is feasible that dysfunctional attitudes can directly influence routine themselves. The relationship between these variables can be observed, to see whether dysfunctional attitudes are independent factors separate from routine. Subsequently, it is suggested that dysfunctional attitudes concerning goal attainment and achievement could directly predict social routine.

6.4 Controlling variables: CFS symptoms and depressive symptoms

In addition another, more minor aim, is proposed. This is to observe the contribution of the controlling effects of depression and CFS symptoms for the first three main aims, and the extent these significantly contribute to patients' social relationships and home functioning respectively, as estimated.

7. Hypotheses

It is then hypothesized that:

- After controlling for effects of severity of depression and chronic fatigue symptoms, patient's tendency to have higher levels of expressing emotions positively will predict higher positive functioning in their social relationships.
- 2. After controlling for severity of depression and chronic fatigue symptoms, patients' tendency to have lower levels of dysfunctional attitudes of goal attainment and achievement and better social routine will predict better home functioning.

 After controlling for severity of depression and chronic fatigue symptoms, patient's tendency to have higher scores on goal attainment and achievement will predict worse social routine.

CHAPTER 2: DESIGN AND METHODOLOGY

8.1 Overview of Chapter 2:

This chapter presents an overview of the methodology used for this study, including design considerations, sampling methods, and description and examples of measures used for the relevant variables in this study.

8.2 Design

This study had a cross sectional, within group design with chronic fatigue syndrome diagnosed individuals. Multiple linear regressions were used to analyse statistical trends with this group.

8.3 Epistemological orientation

The epistemological orientation of the researcher is that of an inquisitive explorer – trying to discover if the named variables may be important factors for patients in predicting severity of functioning. The positivist view, using scientific enquiry and empirical acquisition of knowledge, was preferred over the social constructionist or reflexivist means of acquiring knowledge. This was due to one of the aims of the research being to ensure that conclusions reached might be confidently generalised to a wider population.

8.4 Ethical conflicts of interest

No conflicts of interest are declared between the researcher and any funding bodies of the research.

8.5 Participants

The sample was drawn from a chronic fatigue service in the North East of England, via participants registered as chronic fatigue patients to this service. The number of patients registered with this CFS service in the area at time of data collection was approximately 140. However, the number of undiagnosed patients in the area may be significantly higher than this, with limits on funding restricting the total number of patients that may receive diagnosis and treatment. Around 40-70 new diagnoses per year are made each year in this service. With a cachement area estimated at 400,000 of the total UK population, this means that approximately .035 % of the estimated total CFS population were registered with this service. Numbers of sufferers, according to general population estimates, would be circa 800-1600 sufferers within the service cachement area. Of these, 400-800 (50%) of these would require treatment to help with functioning (NICE, 2007).

8.6 Sample

A total of 57 participants were recruited for the study. All were under the care of the service's clinical team. All had a history of referral to the service by Primary Care Physicians, usually after a period of experiencing unexplained fatigue. Participant age range was from 18 to 65 (mean = 43.02; SD = 10.77). Sex distribution was 16 males (28.1%, 16/57) and 41 females (71.9%. 16/57) in the sample.

8.7 Inclusion criteria

The inclusion criteria were: male and female patients between the ages of 18 and 70. Diagnosis was confirmed after initial referral from a Primary Care Physician, and diagnosis by physicians in the service. All participants had competent verbal and written communication skills, with reasonable fluency in English.

8.8 Exclusion criteria

Participants were excluded from the sample on the basis of suffering from diagnosed comorbid illnesses outlined in CDC (1994) exclusion criteria (outlined in Introduction). All participants were also confirmed previously as confirming to the Oxford research criteria (Sharpe et al., 1991) for CFS by the multidisciplinary team in the participating service. Perceived inability to complete measures from the referring team also resulted in exclusion. This resulted, out of 140 possible participants in the population, 71 (50.7%, 71/140) were excluded by the Team on the basis of these difficulties.

8.9 Ethical considerations

The study was reviewed through the Hull and East Riding Local Ethics Committee (Appendix J)

8.10 Confidentiality

Participants were informed information would be kept confidential unless the researcher ascertained there to be significant issues relating to risk to self or to others. If so, this information would be disclosed to the managing Clinical Team. All individual participant questionnaire responses were restricted to the author and Research Supervisor.

If there was reasonable cause to suspect mental health difficulties in any participant from their participation, the researcher would discuss this with them. If further input was needed regarding this, the researcher would provide information concerning the appropriate steps for a mental health referral to local Primary Care Services.

All data obtained from participants was anonymized, with each participant given a unique numerical identifier.

8.11 Informed Consent

The purpose of the study was explained fully to each participant. The Information Sheet (Appendix G) was distributed to participants beforehand by the referring consultants, and was also included in the letter of invitation sent to participants. Each participant then signed a Consent Form (Appendix H). This ensured each participant was fully briefed prior to participating.

8.12 Impact of research and debriefing

In the information sheet, and in briefing the participant, it was highlighted that some questions could feel somewhat unusual to answer, and there was a minor potential for distress in some participants. However, all participants were free to talk about any concerns or queries after the initial interview. They were also given e-mail and telephone contact details after the initial interview for further contact with the experimenter if this was needed.

8.13 Recruitment

All participants in the study were previously unknown to the author, to minimise experimenter bias.

A total of 56 participants (80%, 56/70) were contacted after a member of the Chronic Fatigue Multidisciplinary Team introduced the study to the participants. If initial agreement from the participant was obtained, an invitation letter and information sheet was then sent to the participants, with an appointment for their interview.

14 participants (20%, 14/70) alternatively were telephoned by the author after initial recommendation by the team. An information sheet was presented to the participant by the member of the Team (Appendix G). The study was then explained further, and an appointment made over the telephone. An information sheet was then presented to the

participant at the start of the interview session. It was verified by the interviewer that this sheet was fully understood before commencing with the interview, and consent for the interview obtained.

8.14 Response Rate

Of the participants approached by the Team, 13 (18.6%, 13/70) declined to participate. If participants initially accepted but then reversed their decision, they informed the author by e-mail, or by telephone to the Department of Clinical Psychology, whose number was included on the information sheet and given by the researcher when telephoning any participant. A member of the Chronic Fatigue Multidisciplinary Team, or the author by e-mail, informed the participant that if they felt they could take part in the study in the near future, they were welcome to contact the author.

8.15 Sampling method

Opportunistic sampling was used, with referrals done by the Chronic Fatigue Multidisciplinary Team, with all eligible participants in the local area contributing. A total of 41 females (71.9%, 41/57) were included, as opposed to 16 males (28.1%, 16/57). This roughly mirrors the demographic sex distribution found in chronic fatigue overall in the UK (of 4:1), although slightly more males are included than the ratio criteria would dictate. Participants were not offered any monetary incentives or reward for participation.

9. Measures:

9.1 Background Information

Demographic data was collected from the demographic sections of the Beck Depression Inventory II, from the Life Functioning Questionnaire, and from patient verbal accounts in interviews. According to British Psychological Society Guidelines, ethnicity of each participant was also noted.

9.2 Level of chronic fatigue symptoms

The Chalder Fatigue Questionnaire (CFQ: Chalder et al., 1993). Appendix A

This is a widely used 14 item, self-report questionnaire, measuring the severity of physical and mental fatigue symptoms. It has 9 physical and mental fatigue items, on a four point scale ranging from "Less than usual" to "Much more than usual". Questions about duration of tiredness and percentage of time feeling tired are also included (although these are not generally scored, according to the scoring guidelines). An open ended question for participants to give a reason for their tiredness is also given. The CFQ has been designed to measure current CFS fatigue levels in hospital and community patient populations, and is recommended for use with current chronic fatigue syndrome patients.

9.3 Level of depressive symptoms:

The Beck Depression Inventory II (BDI-II: A.T. Beck, Steer, & Brown, 1996) Appendix B

This is a widely used 21 item, self-report questionnaire measuring the severity of depressive symptoms in adults and adolescents. It measures the somatic, cognitive and behavioural aspects of depressive symptoms reported by the participant in the preceding fortnight.

9.4 Emotional Expressivity:

The Berkeley Expressivity Questionnaire (BEQ: Gross & John, 1995) Appendix C

This is a 16 item, self-report questionnaire measuring the type and level of an individual's emotional expressivity. Each item has a seven point scale ranging from (1) "strongly disagree" to (7) strongly agree. The BEQ has three subscales, measuring the

level of the three moderators (a) Positive Expressivity, the degree to which positive emotional response tendencies are expressed behaviourally (b) Negative Expressivity, the degree to which negative emotional response tendencies are expressed behaviourally and (c) Impulse Strength, the general strength of emotional response tendencies in a person. An overall composite Emotional Expressivity score can also be obtained by adding the three subscale scores together.

Participants completed all items, but only the Positive Expressivity items were used for this study. This study focused on positive expressivity, since differences in this provided a logical basic starting point for interpreting behavioural differences between CFS patients. The number of study questions is also limited in the context of a student thesis. Negative Expressivity items were recorded for possible further investigation with CFS patients at a later date.

9.5 Level of social functioning (social relationships; home activities):

The Life Functioning Questionnaire (LFQ: Altschuler, Mintz, & Leight, 2002) Appendix D

The LFQ is a 14 item, self-report questionnaire assessing role functions of participants in 4 domains of functioning: in the workplace, in duties at home, and in leisure time with two groups: family and friends. Questions measuring the frequency, conflict with others, and enjoyment of these activities and duties are rated on a four point scale, ranging from "no problems" to "severe problems". If patients have no role in a particular domain, a tick box is also provided to indicate this status. Additional questions specifying the number of days at work missed, reasons for difficulties in role functioning (in the last month) and work, living and financial situation (in the last six months) are also included. Participants select one answer applicable to them from a list of these questions. There is also an option to select if participants have no friend or family contacts, which would exclude them from the analysis.

The LFQ was a measure developed in part to address some identified weaknesses of the Social Adjustment Scale (Cooper, Osborn, Gath, & Feggetter, 1982). These weaknesses included deficiency in measuring fully the work section of functioning, and lack of connection of psychiatric symptoms to social functioning problems (Altschuler et al., 2002). Good rates of reliability and validity were found in field trials for the LFQ with a clinical sample of bipolar patients (Altschuler et al., 2002). This questionnaire appears especially suitable for populations with mood difficulties (frequent to CFS), and because it is relatively brief and gender neutral, appears especially suitable for CFS patients. Only the sections addressing social relationships with family, friends, and home duties were used in this study.

9.6 Goal attainment and achievement:

Subscales of the Dysfunctional Attitude Scale, Short Version (DAS-24: Lam, Wright, & Smith, 2004): Appendix E

These were derived from the Dysfunctional Attitudes Scale for Bipolar Disorder (DAS BD: Lam et al., 2004). The DAS-24 is a 24 item, self-report questionnaire used to assess dysfunctional attitudes. It was derived from Lam et al's (2004) principal components analysis of data associated with attitudes of bipolar patients. These patients had completed the original version of the Dysfunctional Attitudes Scale (Power et al., 1994). Each item has a seven point scale, ranging from "totally agree" (1) to "totally disagree" (7). The four subscales of the DAS-24 measure Goal Attainment, Dependency, Achievement and Anti-Dependency. Only the Goal Attainment and Achievement Subscales of the DAS-24 were used in this study.

9.7 Routine

Social Rhythm Metric (SRM: T. K. Monk et al., 1990) Appendix F

This is a 17 item, self-report questionnaire measuring the regularity and irregularity of a person's lifestyle, via timing of everyday, life events. It has a diary-like format, consisting of fifteen specified and two unspecified, optional events which are unique to the participant. The 17 events are: 1) Get out of bed, 2) First contact with another person, 3) Morning beverage, 4) Breakfast, 5) Go Outside, 6) Start work, housework or volunteer activities, 7) Lunch, 8) Afternoon nap, 9) Have dinner, 10) Exercise, 11) Evening snack or drink, 12) TV news, 13) Other TV program, 14) Activity A, 15) Activity B 16) Return home for the last time, 17) Go to bed. The participant fills in details on a daily basis of which activity took place, and who else was involved with the activity, if anyone.

Participants normally completed this measure following the week after the initial interview, for 7 consecutive days. Good validity and reliability has been reported for this measure (T. K. Monk et al., 1990).

10 Procedure

After patient's informed consent to take part was verified, each participant was briefed on the nature of the study. Emphasis was placed that participants' own feelings and responses were of priority. Participants were also informed that if they felt excess tiredness or fatigue whilst completing the measures, they could let the researcher know, and short breaks could be administered if necessary.

Participants then completed in consecutive order the Chalder Fatigue Questionnaire (CFQ, Appendix A), and the Beck Depression Inventory, II (BDI-II, Appendix B). These scales measured the two mediating variables of the study. Participants then completed in consecutive order the Berkeley Expressivity Questionnaire (BEQ, Appendix C), the Life Functioning Questionnaire (LFQ, Appendix D) and the Dysfunctional Attitudes
Subscales concerning Goal Attainment and Achievement of the DAS-24 (DAS-24, Appendix E): the scales measuring the predictor and dependent variables of the study. An approximate time of 45 minutes to one hour was sufficient for completing measures for most participants, with three participants completing measures in a longer time period. Minimum time to complete the measures for a participant was 25 minutes. Maximum time to complete was 1 hour, 45 minutes. Participants were however not time restricted in any way.

After participants completed the final measure, the procedure for completing the Social Rhythm Metric (Appendix F) was explained, with a paper version also used to explain with participants. An electronic version, saved in Microsoft Word 2003, Microsoft Works 2003 and Rich Text format, was e-mailed to the participant, or saved direct to the participant's computer via floppy diskette or USB memory stick. Participants then completed the Social Rhythm Metric online as their scheduled final activity each day, and this was e-mailed back to the researcher. Alternatively, for participants without access to e-mail, the SRM was provided as a paper measure, with 7 days supply of paper version sheets. This was supplied along with a postage paid, addressed envelope, so participants could post results to the researcher at the end of the 7 day period.

Each participant then was debriefed, and given an opportunity to ask questions or give any feedback they wished. All participants were thanked verbally. The timeline of the research was also explained, and a summary of the study e-mailed or posted to participants.

A letter describing details of the participant's participation in the study was also included to be sent to the participant's General Practitioner (Appendix I).

11 Data analysis software

Data were analysed with SPSS version 15.0.1 (SPSS, 2006), via multiple linear regression analyses. This included an algorithm constructed in SPSS Syntax (Appendices K and L) to score the SRM responses of the participants.

12 Power calculations

It was difficult to compute the power for this conventionally. This is mainly due to the novelty of the EExp measure. The desired p-value for the EExp measure is unknown, since it has not been used in a clinical study of this type. Nor are the controlling effects of the CFQ and BDI-II certain in relation to the total variance in social relationship and home functioning scores they represent.

12.1 Study question 1:

Based on theoretical considerations of the effects of CFS symptoms and depressive symptoms on patients' functioning as reported in the Introduction, and the large number of items on the BDI-II and CFQ relevant to functioning, an estimate of up to 45% of the social relationships of patients was made up of the severity of chronic fatigue symptoms and depressive symptoms in patients.

The EExp model also incorporates components of personality, cognition, and emotion when generating positive response tendencies which translate into differences in expressive behaviour. Based on these components, variance in positive expressivity is estimated to account for up to 25% of variance, considered to be a small to medium effect (Cohen, 1988).

An estimated additional 30% of variance was accounted for by factors outside the patient's remit (for example, most patients do not work, and so will not have the social interaction opportunities this presents), and other extraneous factors.

The G*Power, Version 3 power analysis computer program was used to compute appropriate power (Faul, Erdfelder, Lang, & Buchner, 2007). Based on an effect size f^2 of 0.25 (25% variance as specified) for the EExp model, α prob error set at 0.05, and reasonable Power (1- β) set at 0.80 (Clark-Carter, 2004), and numbers of predictors at 3, this computation set the sample size required at 48.

A different sample size was also calculated on the basis of the "rule of thumb" minimum number of participants needed to perform the multiple linear regressions. In order to detect differences in these regressions, it has been suggested that the sample size should exceed the number of predictor variables by a minimum of 5 cases per predictor. A more optimum figure is near 10 per predictor variable (Brace, Kemp, & Snelgar, 2000). A minimum of 15 participants, with 30 participants as a better figure, would then be required.

12.2 Study question 2

Similar criteria of BDI-II and CFQ variance making up 45% of the variance for home functioning and 30% accounted for by other social and unknown extraneous variables was used. This resulted in estimated variance for the DAS and SRM jointly as around 25%, since no theoretical basis is yet suggested for either routine or attitudes accounting for more variance than the other.

Based on an effect size f^2 of 0.25 (25% variance) for the two variables, α prob error set at 0.05, and Power (1- β) set at 0.80 and numbers of predictors at 4, this computation set the sample size at 53.

With the rule of thumb method, with a maximum of 4 predictor variables, it was calculated that a minimum of 20 participants would be required. A figure closer to 40 would be more likely to give greater power.

12.3 Study question 3

Routine would be logically expected to be disrupted by depressive symptoms and chronic fatigue symptoms. It is then logical that the BDI-II and CFQ would account for a large proportion of the variance in routine. Thus up to 50% of the variance is estimated to be accounted for by depression and chronic fatigue symptoms. With other social and unknown extraneous variables, this accounts for around 30% of the total variance. This would put dysfunctional attitudes at around 20% of the total variance.

Based on an effect size f^2 of 0.20 (20% variance) for the two variables, α prob error set at 0.05, and Power (1- β) set at 0.80 and numbers of predictors at 4, the G*Power computation set the sample size at 65.

With the rule of thumb method, with 4 predictor variables entered into a regression model, it was calculated that a minimum of 20 participants would be required to detect any significant differences. A figure closer to 40, would also be more likely to give greater power.

CHAPTER 3: RESULTS

13.1 Overview of Chapter 3:

This chapter begins by considering normal distribution of the data obtained. The chapter then describes relevant demographic and clinical characteristics of the participants, and the scores recorded on the measures used in the study with this sample.

The chapter then examines correlations between study variables. Certain correlations will be highlighted for their relevance to the study questions, and the background they provide to understanding the regression analyses. Secondly, regression analyses for the criterion variables for each study question are presented in tabular form, with results of the regressions described following each table. Each research question is presented in its own section for ease of presentation.

13.2 Normality and statistical significance:

For meeting the assumptions of normality, scatterplots and residuals for each variable were independently examined. All predictor and criterion variables were found to be sufficiently normally distributed except the CFQ. This was partly negatively skewered, with an elevated mean score. Given this is a study involving patients with severe chronic fatigue symptoms this was expected. Disproportionately large effects for CFS symptoms were noted as a possibility in the regressions.

13.3 Information on regression analyses

Multiple hierarchical linear regression analyses were used to assess adjusted relationships between the criterion variables and predictor variables. Predictor variables were primarily chosen on the basis of the study hypotheses. Pearson's correlations were performed prior to the regression analyses to investigate relationships between the criterion variables and the predictor variables.

14 Significant demographic and clinical characteristics:

14.1 Demographic characteristics of sample

All participants were White, and resident within the UK (100%, 57/57). Reflecting the occupational status of many CFS patients, only 8.8% of the sample (5/57) reported they were in full time paid work at time of participation; an additional 8.8% of the sample (5/57) was in part time paid work. Overall, a significant number 52.8% (30/57) reported that they were not working in any job, education, or engaged in any homemaking duties.

Demographic	Mean (SD)	Median (Range)
Age	43.02 (10.78)	26.00 (18-65)
Sex	16 (M) 41 (F)	-
Time in service	16.96 months	-
Sessions of cognitive therapy	7.14 (7.94)	5.00 (0-35)
Full time work	5/57 (8.8%)	_
Part time work	5/57 (8.8%)	_
Part time transitional job	1/57 (1.8%)	-
Full time student	1/57 (1.8%)	-
Full or part time houseperson	12/57 (21%)	-
Early retirement	2/57 (3.6%)	_
No defined role	30/57 (52.8%)	_

Table 1: Demographic characteristics of sample (N = 57):

57/57 of patients reported some family contact; 48/57 reported some degree of friendship contact. 54/57 of participants reported some degree of household duties. These numbers are used in the subsequent regressions for each study question.

14.2 Clinical characteristics of sample (Table 2):

The psychiatric exclusion of other known psychiatric conditions, based on the diagnostic criteria for CFS, factored out any present confounding co-morbid disorders (relevant diagnostic criteria and any possible co-morbid disorders are explained in the Introduction). These conditions, as described in the NICE guideline, include all primary psychiatric disorders that may otherwise explain CFS symptoms. This includes psychotic disorders, bipolar disorder, dementia, eating disorders, alcohol and substance misuse, but not major depression (NICE, 2007), which was controlled for in this study. One patient reported previous infection with Lyme disease prior to onset of CFS. 6 of the participants (10.53%, 6/57) also reported currently taking medication for depression, and 5 were taking for anxiety disorders (8.8%, 5/57). 3 patients took medication for both of these disorders (5.3%, 3/57).

Table 2: Clinical characteristics of sample (N=57)

Disorder	No. (%)
Anxiety disorder	5/57 (8.8%)
Depressive disorder	6/57 (10.53%)
Co-morbidity between anxiety and depressive disorders	3/57 (5.3%)

14.3 Scores on study measures:

Table 3 (below) indicates the scores of participants on the various measures of the study:

Outcome Measure	Mean (SD)	Median (Range)
BDI-II	26.26 (10.33)	26.00 (10-52)
CFQ	8.89 (2.66)	10.00 (0-11)
EExp Pos	5.23 (1.07)	5.25 (1.75-7.00)
LFQ Fri (N = 48)	6.94 (2.11)	7.00 (3-12)
LFQ Fam	7.12 (2.37)	7.00 (3-12)
LFQ Hom ($N = 54$)	10.93 (3.14)	11.50 (5-16)
DAS Att	14.12 (8.03)	14.00 (0-28)
DAS Ach	16.09 (9.02)	18.00 (0-35)
SRM (N = 40)	3.57 (1.03)	3.61 (1.79-5.90)

Table 3: Scores on the study's measures (N = 57, unless stated):

6/57 of participants fell within the "minimum to no depression range" (0-13). Of the remainder, 11/57 fell in the mild depression range (14-19), 17/57 in the "moderate" depression range (20-28) and 23/57 in the "severe" depression range (29-63) on the BDI-II. Mean score for the overall sample was 26.26 (range 10-52).

Most participants also scored relatively high levels of CFS symptoms on the CFQ. The sample had a mean score of 9.07. In trials for efficacy of CBT with CFS patients using the CFQ (Deale et al., 1997) patients had mean scores in a CBT treatment group of 10.2 (SD = 1.3) and 9.5 in a relaxation group (SD = 2.6), putting this sample only slightly lower than the standardization sample for the measure.

Mean score on Positive Expressivity on the EExp was 5.23 (range 1.75 - 7.00). This is similar to the scores reported in the development study of the BEQ of M = 5.5 SD = 0.98 (Gross & John, 1995). Mean score was therefore slightly lower for this sample than for non-clinical participants. (J.J. Gross & John).

DAS achievement mean score was 14.68 (range 0-29). DAS attainment mean score was 12.82 (range 0-24). Mean scores on the development study for this measure (Lam et al., 2004) were 20.44 (SD = 7.14) for achievement, and 24.43 (SD = 7.57) for attainment, with patients diagnosed with unipolar depression. This would indicate lower levels of attainment and achievement for CFS patients than unipolar depressives.

SRM mean score was 3.57 (SD = 1.03). Mean score in this case was similar, and slightly above, the T. H. Monk, Petrie, Hayes and Kupfer (1994) (M = 3.4, SD = .8) non-clinical sample originally tested with this measure. This indicates that participants in this sample reported higher levels of reported daily routine than non-clinical participants.

15 Correlation matrices (Table 4 and Table 5)

Before investigation with any predictive regressions, it is salient to examine relevant correlations between the study variables. Since all variables were continuous rather than discrete or qualitative, Pearson two-tailed correlations were used to investigate the correlation between variables. Due to the relatively high number of correlations, only correlations with probability p < .01 are commented upon.

For purposes of simplifying understanding, several theoretically important correlations between the control measures (CFQ and BDI-II) and the EExp Pos are highlighted in Table 3 before correlations relevant to results of the hypotheses are highlighted in Table 4.

A minimum significance level of p <.05 was employed for each correlation. However highly significant correlations were flagged at the < p .01 level.

	CFQ	BDI-II	EExp-
			Pos
CFQ	Х	.344**	263*
BDI-II		Х	334*
EExp –Pos			Х

Table 4: Correlation between controlling variables, and between positive expressivity and controlling variables

* Correlation is significant at the p < .05 level (2 tailed).

** Correlation is significant at the p <.01 level (2-tailed)

(N for each correlation = 57, unless stated)

Measure key

CFQ - Chalder Fatigue Questionnaire

BDI-II - Beck Depression Inventory II

EExp- Pos - Berkeley Expressivity Questionnaire, Positive Items

Depressive symptoms and CFS symptoms, as might be anticipated, are significantly correlated (r = .344, p < p .01).

Table 5 (below) outlines correlations between the main predictor variables and the criterion variables in this study. A minimum significance level of p <.05 was again employed for each correlation. Highly significant correlations were flagged at the < p .01 level.

LFQ-LFQ -LFQ DAS-DAS -**SRM** Fri Fam Hom Ach Att (n=40) (n=48)(n=54) .056 .070 .186 -.110 .232 .370** **CFQ** .352* .345* .451** -.179 **BDI-II** .088 .129 EExp-Pos .523** .468** +LFQ – Fri (n=48) (n=48) .387** + LFQ -Fam .152 .270* -347*(n = 40)LFQ -+ Hom (n = 54)DAS – + -.233 Ach -.160 +DAS – Att

 Table 5: Correlations between predictor variables and main criterion variables

* Correlation is significant at the p < 05 level (2-tailed)

** Correlation is significant at the p < .01 level (2-tailed)

(N for each correlation = 57, unless otherwise stated)

Measure key

CFQ - Chalder Fatigue Questionnaire

BDI-II - Beck Depression Inventory II

EExp Pos - Berkeley Expressivity Questionnaire, Positive Items

LFQ Fri - Life Functioning Questionnaire, Friends Subscale

LFQ Fam - Life Functioning Questionnaire, Family Subscale

LFQ Hom - Life Functioning Questionnaire, Home Duties Subscale

DAS Att - Dysfunctional Attitude Scale Attainment Subscale

DAS Ach - Dysfunctional Attitude Scale, Achievement Subscale

SRM - Social Rhythm Metric Scale

Again, a number of correlations worthy of notice are highlighted in Table 4:

(a) Between the BDI and LFQ Hom:

Between the BDI-II and the LFQ Hom, a highly significant correlation was found (r = .451, p < .01, two tailed). This is notably higher than for the CFQ on the LFQ Hom.

(b) LFQ subscales, and correlations between these subscales:

Most LFQ variables are significantly correlated with each other, indicating positive associations between each of the subscales.

(c) Between the CFQ and LFQ Hom

Between the CFQ and the LFQ Hom, a highly positive correlation is found, which is highly significant (r = .370, p < .01, two tailed).

(d) Between the BDI-II and LFQ Hom

Between the BDI-II and the LFQ Hom however, a highly positive correlation was also found (r = .451, p < .01, two tailed).

16 Regression analyses

Regression models:

16.1 Positive expressivity predicting social relationships with friends: regression results

Table 6: Hierarchical regression: predictor variables regressing onto the criterion variable LFQ Fri:

Adjusted	Criterion	Step	Predictor	Unstandardized	Standardized	95% CI for		Р
R ² of	variable		Variable	β	β	Unstand. β		
model						Lower	Upper	
.137	LFQ Fri	1	BDI-II	.067	.308	.002	.132	.043*
			CFQ	.108	.123	155	.372	.412
.170	LFQ Fri	1	BDI-II	.074	.341	.009	.140	.027*
			CFQ	.128	.144	136	.391	.334
		2	EExp Pos	.409	.187	214	1.032	.193

* = p < .05, two tailed, N = 48.

As seen in Table 6, the BDI-II and CFQ were entered in the first block, the EExp Pos in the second. The BDI-II was the only variable as a significant predictor within the first model ($\beta = .308$, p <.05). This variable was also the only significant variable in the second model ($\beta = .341$, p <.05). Depressive symptoms then significantly predicted poorer social relationships with friends, whilst positive expressivity did not.

16.2: Positive expressivity predicting social relationships with family: regression results

In a hierarchical regression of the factors involved in predicting the criterion variable, the BDI-II and the CFQ were again entered into the first block, with the EExp Pos entered

into the second. The results of this are shown in Table 7 below:

Table 7: Hierarchical regression, predictor variables regressing onto the criterion variable LFO Fam:

Adjusted	Criterion	Step	Predictor	Unstandardized	Standardized	95% CI for		Р
R ² of	variable		Variable	β	β	Unstand. β		
model						Lower	Upper	
.123	LFQ Fam	1	BDI-II	.085	.369	.022	.147	.009*
			CFQ	063	071	305	.179	.603
.187	LFQ Fam	1	BDI-II	.102	.444	.039	.165	.002*
			CFQ	023	026	261	.216	.849
		2	EExp-Pos	.598	.271	.007	1.188	.047*

* = p < .05, two tailed, N = 57.

As seen in Table 6, in the first model, the BDI-II (β = .369, p <.05) was the only variable which was a significant predictor. In the second model, both the BDI-II (β = .444, p <.05) and EExp Pos (β = .271, p <.05) were significant predictors. Depressive symptoms and positive expressivity then predicted worse social relationships with family.

16.3 Dysfunctional attitudes and routine predicting home functioning: regression results

In a hierarchical regression predicting severity of home functioning (criterion variable = LFQ Hom), the BDI-II and the CFQ were entered into the first block, with the DAS Att and DAS Ach entered into the second. The results of this regression are shown in Table 8 below:

Adjusted	Criterion	Step	Predictor	Unstandardized	Standardized	95% CI	for	Р
R ² of	variable		Variable	β	β	Unstand. β		
model						Lower	Upper	
.212	LFQ Hom	1	BDI-II	.122	.407	.027	.216	.013*
			CFQ	.200	.179	152	.551	.257
.256	LFQ Hom	1	BDI-II	.117	.393	.004	.230	.042*
			CFQ	.182	.163	166	.530	.296
		2	DAS Ach	093	270	249	.062	.231
			DAS Att	.069	.177	109	.247	.437
			SRM	971	299	1.925	017	.046*

Table 8: Hierarchical regression, with main predictor variables regressing onto criterion variable LFQ Hom:

* = p < .05, two tailed, N = 39

As observed in Table 8, the BDI-II was the only variable retained in the first model as significant ($\beta = .407$, p <.05). In the second model, the BDI-II was retained as a significant predictor of home functioning ($\beta = .393$, p <.05), alongside the SRM ($\beta = .-299$, p <.05). Depressive symptoms then predicted worse home functioning, with routine predicting better home functioning.

16.4 Dysfunctional attitudes predicting routine: regression results

In a hierarchical regression predicting degree of routine (criterion variable = SRM), the BDI-II and the CFQ were entered into the first block, with the DAS Att and DAS Ach entered into the second block. The results of this regression are shown in Table 9 below:

Adjusted	Criterion	Step	Predictor	Unstandardized	Standardized	95% CI	95% CI for	
R ² of	variable		Variable	β	β	Unstand. β		
model						Lower	Upper	
.035	SRM	1	BDI-II	015	161	049	.018	.359
			CFQ	018	053	137	.101	.760
.068	SRM	1	BDI-II	007	073	047	.033	.730
			CFQ	026	077	147	.095	.663
		2	DAS Ach	028	259	085	.028	.319
			DAS Att	.011	.091	054	.077	.733

Table 9: Hierarchical regression, with main predictor variables regressing onto criterion variable SRM:

* = p < .05, two tailed, N = 40

As observed in Table 9, in both the first and second models, no variables were significant in predicting the SRM. Routine was then not significantly predicted by any of the specified variables.

CHAPTER 4: DISCUSSION

17.1 Overview of Chapter 4:

This chapter begins with the main conclusions that can be drawn from the study. This chapter then discusses and evaluates the findings of this study, relating to the study aims. A critique of the study, with the limitations of these findings, and potential difficulties in interpreting any results, then follows. Clinical implications of the findings from each study question are each discussed, and ideas for future research suggested.

17.2 Main study conclusions

The major findings of the current study were:

- 1. Depression is likely to be an important controlling variable in predicting the social functioning or home functioning of chronic fatigue patients. Symptoms of chronic fatigue are not significant compared to depressive symptoms as a controlling variable.
- Patients' positive emotional expressivity did not significantly predict social functioning in relationships with friends, after controlling for depressive symptoms and chronic fatigue symptoms.
- Patients' positive emotional expressivity significantly predicted worse social functioning in relationships with family, after controlling for depressive symptoms and chronic fatigue symptoms.
- 4. Patients' degree of dysfunctional attitudes concerning attainment and achievement did not significantly predict home functioning, after controlling for depressive symptoms and chronic fatigue symptoms. However degree of social routine did significantly predict better home functioning.

17.3 Controlling variables: depressive symptoms and chronic fatigue symptoms

Overall, depressive symptoms were the best predictor in each of the regression models, being significant for both social relationships and home functioning. However, chronic fatigue symptoms were not significant in any of the first two study questions. Neither depressive symptoms nor chronic fatigue symptoms were significant predictors for the third study question.

Formal diagnosed depression in this sample was not measured: only depressive symptoms were. However, Afari and Buchwald's (2003) finding of 25% of CFS patients in clinics having major depression symptoms might actually be exceeded in the current study's sample. According to the BDI-II criteria for diagnosing depression, 26 patients (45.6% of this sample) would have met criteria for at least a moderate level of depression, based on the symptoms they reported. Despite this, depressive symptoms' contribution to functioning difficulties was less than the variance originally estimated for them in the G*Power power calculations. Depressive symptoms then do appear to be an important predictor, but other predictors not included in the study may be of equal or greater importance.

While the effect of CFS symptoms on functioning in patients' lives has generally not been disputed, the results here would suggest they are not a major factor in predicting poor functioning, and that other variables are worthy of greater focus.

17.4 Study question 1: Emotional expressivity and social relationships

The first aim of the current study was to predict if positive emotional expressivity could predict functioning in social relationships. Increased positive expressivity scores were a significant predictor, but only in predicting social functioning with family, not with friends.

The original finding of impaired social functioning in CFS patients of Schweitzer et al. (1995) was supported here, with the high mean scores for social functioning difficulties recorded in this sample. The results found here also seem to complement the bio-psychosocial model of CFS (Friedberg & Jason, 1998): positive expressivity appears to be a relevant psycho-social variable, having a relationship with social relationships. However, positive expressivity does predict social relationships in a negative direction, not a positive one. This contradicts traditional theory that increases in reported positive behaviour will facilitate positive social outcomes for CFS patients (H. S. Friedman et al., 1988; Snyder, 1987). The hypotheses concerning positive expressivity predicting functioning with friends and family were originally proposed on this basis.

If the items on the BEQ have ecological validity for this sample of CFS patients, with patients reporting positive expressivity accurately, patients have a similar mean score and standard deviation on positive expressive behaviour as non-clinical participants (Gross & John, 1995). The question can then be asked: why should increase in scores on positive behaviour, with level of positive behaviour comparable to non-clinical participants, predict worse social functioning? Since these findings were unexpected, theories are speculative. However, referring back to the cognitive model of Surawy et al. (1995) (Figure 4, following page) offers one theory.



Figure 4: Theoretical cognitive model of aetiology of CFS (adapted from Surawy et al., 1995).

In the above model, achieving (a) high standards of performance and responsibility, and (b) being in control of emotional states and not showing weakness is proposed as part of a typical CFS patient's mental makeup. Part (b) seems relevant to the current findings. Some patients may be trying – whether consciously or not - to display consistently positive behaviour. This might be to correspond to following a perceived display rule – "control of emotions and not showing weakness" they believe is expected of them in everyday social interactions. Being positive in their behaviour may then be what some patients strive for, and if their self reports are accurate, they achieve it to some degree. However, this approach does not seem to be effective for CFS patients, considering the social relationship difficulties, chronic fatigue symptoms and depressive symptoms patients reported by patients in this study. If patients' striving for positive expressivity does indeed concur with a patient's assumption consistent with part (b), such a dysfunctional assumption concerning display of emotions indicates this could might actually be a factor in increasing symptoms and emotional distress, according to the

Surawy et al. model. The resulting distress may lead to impaired social relationships, as a result of attempting to "be somebody" that a patient cannot maintain. This distress may possibly be reflected in the depressive symptoms patients reported, as well as in increased chronic fatigue symptoms. Depressive symptoms were the best predictor of reduced social relationships in the regression

If this attempted positive expressivity is then not actually reflective of a patient's true feelings, this expressivity may be the result of demand effects patients believe are present from people round them - believing positive behaviour is what people wish to see from them. Secondly, patients also have a vested interest in not being seen as being psychologically different from non-clinical populations (Jason, Holbert, Torres-Harding, & Taylor, 2004). A presentation of no differences emotionally from other people may be what patients are attempting to present. These factors may then motivate patients to try to appear to behave positively, even though this is not what they actually may be feeling according to the model.

CFS patients' perhaps making external attributions about the cause and control of their illness have also been noted previously in the literature (e.g. Heijmans, 1998; Moss-Morris, 2005). If these types of attributions are made by patients, then it is also feasible that the levels of positive expressive behaviour may be a result of a patient feeling that a sense of personal responsibility for their condition is taken from them, and their behaviour becomes more positive as a result. Such attributions then could function as a coping mechanism and means of displacing or avoiding negative affect in CFS, and examining these types of feelings.

If this type of avoidance does exist, it is not necessarily always positive. Processing distress and reality of CFS may be important to improve a patient's condition (Godfrey, Chalder, Ridsdale, Seed, & Ogden, 2007). Negative affective behaviour was not the focus of the research questions in this study, but similar results to the non-clinical sample when measuring the current sample on negative affective behaviour on the BEQ were found (M = 3.72, SD = 0.95, to the non-clinical sample M = 3.7, SD = 1.0). However, this does not

mean that negative affect, in whatever quantity and when experienced, does not have effects for CFS patients in coping with their condition. This effect of negative affect could be explored further empirically.

Another possible theory, previously applied to patients with chronic illnesses or depression, may be the solicitation of symptoms by some people who interact with patients.

Solicitation of "illness" symptoms could be a goal of people around the patient for their own emotional benefit (Schmaling et al., 2000). Maintaining a patient in an illness state may provide a sense of role, self esteem or self identity for a carer. Positive expressivity may then not be adaptable in a CFS context from some patients, if some people around them are gaining a sense of identity or purpose from caring roles. Positive expressive behaviour from a patient would not be congruent with a "sick" image of the patient desired, regardless of a patient's efforts to present positive behaviour to people round them.

The effect was only significant for family members, not friends. If the solicitation effects suggested above are accurate for some patients, why would this be only for family members not friends? One answer may be that conditioning to a patient's illness state of chronic fatigue syndrome may be more likely to take place in family than friends. Friends often will not have the same frequency and degree of social contact patients have with family, especially since family members often act as sole carers for patients (McCrone et al., 2004). Family may simply be then more likely to become accustomed to a patient's ill presentation. Once so accustomed, family members may engage socially with patients slightly better who maintain a state of both increased chronic fatigue symptoms, and reduced positive expressivity. This state may be more consistent and predictable than patients who are sometimes capable of positive social interaction and sometimes not.

It is not certain from these results that family members actively wish for negative expressive behaviour from patients, even if solicitation is occurring. Positive expressive behaviour not accepted as consistent with a patient's clinical presentation by a family member however is suggested as a possible factor in poorer relationships with family, as part of a solicitation process. The negative direction of chronic fatigue symptoms found (with social relationships getting worse as symptoms get better), although not statistically significant, may support this theory.

Some caution should be taken with this theory. Any solicitation or conditioning effects could be equally as valid for soliciting patients to remain in a depressive state as for remaining in a CFS state. Depressive patients, independent of any CFS symptoms, themselves may be the target of solicited negative responses from those around them (e.g. Giesler, Josephs, & Swann Jr., 1996). Any solicitation or conditioning effects could also feasibly be an interaction – an effort by those around to maintain the patient in both CFS *and* depressive states.

17.5 Study question 2: Home functioning

The third aim of this study was to investigate if dysfunctional attitudes concerning goal attainment and achievement, and social routine, predicted worse home functioning.

Dysfunctional attitudes concerning achievement and attainment:

The main findings were that social routine was a significant predictor, but goal attainment and achievement were not. While most participants reported impairment on home functioning, the relatively wide range of scores on this indicates some patients manage better at this than others. However, the current findings did not support attainment and achievement attitudes patients hold influencing impaired home activity in any way.

It is useful at this point to refer back to the two kinds of CFS patient Moss-Morris and Chalder (2003) proposed. These are patients who either withdraw from physical activity to cope with CFS symptoms, or patients who frequently attempt excessive activity due to inflated expectations about what they should be doing. The patients in this study appear more consistent with the first rather than the second kind, since attitudes concerning goal attainment and achievement did not predict home functioning levels. Bazelmans, Prins and Bleijenberg (2002) also coined a category of patients they termed "relatively active", with a degree of non-accepting and demanding cognitions about what activities they should be doing. This category may also be consistent with the group of patients in this study.

The attainment and achievement attitudes reported by patients in this study also had means lower than those reported by unipolar depressive patients (Lam et al, 2004). Patients in this study generally then did not appear to hold such excessive attitudes as unipolar depressives. The uncertain future prognosis for many CFS patients may be one explanation contributing to these lower attainment and achievement attitudes. Patients may not attempt to improve activity levels if they believe there is no prospect of recovery. This would again match with the first kind of patient proposed by Moss-Morris and Chalder (2003), outlined above. This kind of patients was also suggested by Moss-Morris and Chalder to have poor expectations for recovery from CFS. Patients could also have feelings of learned helplessness due to depressive symptoms they are suffering (Seligman, 1974).These feelings of learned helplessness could also influence CFS patients in reducing home activity.

Surawy et al's (1995) model in CFS suggests patients believe they must achieve high standards of performance and responsibility, and this contributes to reduction in overall functioning. Pacht (1984) also suggested CFS patients having high overall expectations for their functioning in all areas. Surawy et al and Pacht's assertions are not supported for home functioning from the current study. Instead, patients' expectations appear to have been reduced in trying to cope with CFS.

Routine:

Concerning routine, many patients appeared to succeed in maintaining regular activities on an everyday and weekly basis. Indeed, patients mean score in this study was higher than the mean score for non-clinical participants originally tested on this measure (Monk et al, 1990). However, the high range of scores and a relatively high standard deviation recorded suggests some patients adopt routines easier than others.

According to Reich and Williams (2003), routine forms a consistent part of the functioning of CFS patients in their daily lives, and Zisberg et al. (2007) suggest functioning is reduced without consistent routine in people's lives generally. The results for this study suggest routine in CFS patients is consistent with these assertions. The current findings do seem to contradict Ray, Jeffries and Weir (1995) finding, that CFS patients are sporadic in their activity levels. For the activity levels recorded in this study at least, many patients appeared quite consistent.

Originally, Reich and Zautra (1991) proposed two parts to routine – maintaining Order in Life and Disliking Disruption. From the current study, many patients seem able to maintain some degree of order in their lives, due to their high scores on routine. This improves their home functioning. However, other variables appear to reduce performance on home functioning, regardless of whether routine is maintained. Depressive symptoms, from the results, appear to be one of these variables.

Depressive symptoms were a greater predictor than routine of home functioning difficulties in this study. Any effect routine has on home functioning however seems to be independent of the effects of depressive symptoms. Routine's effect in the regression model is in the opposite direction – negative - from that of depressive symptoms - positive. This may mean routine is not vulnerable to disruption from any effects of any depressive symptoms.

There appears to be a possibility then, since routine is in an opposite direction to depressive symptoms, that routine in CFS patients is not under the control of any cognitive processes affected by any depressive state. This is explored more fully in the results for study question 3, below.

17.6 Study question 3: Dysfunctional attitudes and routine

The final major aim of this study was if social routine could be predicted from scores on dysfunctional attainment and achievement, after controlling for chronic fatigue and depressive symptoms. Neither attitudes concerning attitude or achievement were significant predictors.

In considering the Reich and Williams' (2003) model of the components of routine, if their theory of routine being wholly a part of cognitive processes is accurate, dysfunctional attitudes do not appear to be part of these processes. The link between routine and dysfunctional attitudes originally cited by van Damme, Crombez, van Houdenhove, Mariman and Michielsen (2006) also does not appear to be supported by these findings.

These results indicate routine may be being maintained independently of either attainment or achievement attitudes. Routine also was not substantially affected by other variables, including depressive symptoms and chronic fatigue symptoms. This may mean that it can be measured and maintained independently of any of these variables in CFS patients, and is not affected by any levels of them.

17.7 Critique of Research

Design

A cross sectional design was used. This type of design suited the study questions, rather than an experimental approach. Experimentally manipulating variables affecting social relationships or home functioning in patients may raise ethical objections. This study did not use a control group. The research questions selected were ones of prediction, not comparison. Not having a control group may be a weakness of this study, as comparisons could not directly be made with controls. Self-report measures were used to assess the independent and dependent variables. Within CFS, self report measures have and continue to be successfully used in measuring functioning (e.g. Heim et al., 2006). However, measurement of these variables may be improved even further if triangulation could be used. For example, family and friend reports may be useful for this.

Patients were given the chance of raising queries about the questionnaire: hence some patients completed the forms in front of the researcher. However, the fact a trainee clinical psychologist was in the room while patients completed these measures may have caused some patients to be wary of filling in the "wrong answer". Employing a non-psychologist confederate to do this job was not an option due to budget constraints, but may be an option to minimize demand effects in future. Using postal questionnaires may be an option to reduce these effects, but this risks low response rates and lack of any opportunity to clarify misunderstandings.

The fact this was a psychological study alone may influence patients to give answers they believed "psychologically normal". This is a difficulty in all psychological research with CFS patients, and cannot be avoided without withholding from patients the research is psychological. This would obviously present ethical difficulties.

Sample:

The sample was recruited through one chronic fatigue service. Hence this may not be a representative sample of patients suffering from chronic fatigue. On most demographics, the sample in this study did appear fairly typical of the CFS population as a whole. Positive bias of female to male participants was found as expected, and mean and median ages were close to the typical means for the CFS population (Sharpe, Hotopf & Wessely, 1998). The incidence of diagnosed depression in this sample, as previously cited, is lower than BDI-II measurements taken in this study suggest it should be.

Although as noted many CFS patients appear adverse to any psychological measurement or labelling, the relevance of the study questions was not disputed by any patient, and no patient commented participating was a negative experience. Whilst this is positive, out of 70 patients originally approached to take part, 13 declined. Psychological labelling then could have been a concern for some of the patients who withdraw, but this is unable to be confirmed in this study.

Measures:

Participants reported few difficulties in completing the BEQ, even with this not being originally designed for CFS patients. For the SRM, many participants completed this successfully, but others had problems. The two expected methods of completing the SRM were by e-mail, or posting paper copies. Some patients reported difficulties completing either due to fatigue problems, or forgetfulness. One alternative method to supplement the SRM may be specialist wristbands measuring regular activity, known as actigraphs (Kop et al., 2005). These may be less fatiguing, and may be more reliable (but more expensive) than the SRM. Alternatively, relative and/or friend ratings of the patient's routine can be taken. Using different methods in unison also could triangulate routine scores.

The LFQ was successfully completed by all participants with few problems. However, the LFQ's format does assume home functioning is equally important for all patients. For example, a proportion of patients may place more importance on doing household tasks than others. This may be important to consider in future studies.

Finally, four items on the BDI-II are common physical symptoms on the CFQ. These are loss of energy; changes in sleeping pattern; concentration difficulties, and tiredness or fatigue. These shared items suggest the two measures could be assessing the same underlying factors in a patient. This problem is unavoidable when studying patients suffering both CFS and depressive symptoms, but does present a measurement issue. (Cho et al., 2006) suggest both conditions in a patient can be validly measured separately. Using other measures of depression less sensitive to physical symptoms might be an option. For reasons of comparison though with other published studies, the BDI-II was chosen for the current one.

Analysis:

Each regression was slightly reduced in terms of sample size, compared to the sample size predicted by the G*Power calculations. A possibility that some type II errors could exist in the final regression models then exists. However, each regression has, or is close to, the rule of thumb figures for regressions (Brace et al., 2000). This reduces concerns over power affecting conclusions.

17.8 Clinical Implications:

Firstly, these results suggest patients' social difficulties are not the sole result of CFS symptoms, and addressing depressive symptoms' may be of equal importance in order to promote functioning. In the current NICE CFS guideline, depression is described as a co-morbid condition that may occur alongside CFS, and any depressive symptoms are advised to be treated using the same NICE guideline as for unipolar depression (NICE, 2007, p 29). The CFS guideline does not specify that depressive symptoms could play a more major role in functioning difficulties than CFS symptoms. Depressive symptoms have been measured as an indicator of poor functioning (e.g. Deale, Chalder, Marks & Wessely, 1997), but not as a variable which might influence different areas of functioning itself. The current study suggests that they may have this role.

Secondly, if positive expressivity results in social relationship difficulties with family members from solicitation effects, psycho education about these effects could help develop positive relationships between patients and their families. Recognising and explaining solicitation that might be occurring could also be done by a therapist working with them. The EExp model (Figure 3, Introduction) could also be taught to patients to

increase their awareness of any response tendencies and expressive behaviours they have which could be problematic socially.

Recent developments from positive psychology have also suggested treatments for various conditions should emphasise building and developing patient's strengths and positive wellbeing (e.g. Seligman, Steen, Park, & Peterson, 2005). Positive expressivity as a trait would appear to fit within the general positive psychology remit. From the current results, treating patients with CFS by trying to develop positive expressivity however might not be a good idea. If positive expressivity is something the patient is maintaining as a front for other people's benefit, or to avoid being seen as "different", then persuading patients this is not necessary may instead help them to manage better socially.

For remedying home functioning difficulties, patients are seemingly capable of maintaining some routine. Their level of depressive symptoms however negatively affects their home functioning. Treating depressive symptoms first, followed by improving and maintaining routine, appears important for improving patients' home activity.

Guidelines for specifically improving home activity have not appeared in the latest version of the NICE CFS guidelines (NICE, 2007). Only guidelines for improving activity in general are outlined, using CBT and GET principles. With routine appearing to be separate from CFS symptoms or depressive symptoms, this may support it being taught and maintained in patients, regardless of level of these symptoms. Routine has also been described as a behavioural variable – one that can be resistant to cognitive processes alone when trying to change any planned behaviours (e.g. Ajzen & Manstead, 2007). This behavioural aspect of routine might be taken advantage of, by developing routine with patients using behaviourist methods and theory. Teaching patients that routine is something they can develop regardless of their CFS or depressive state, and ensuring patients can see positive results from maintaining routines over time, may help patients to improve their home functioning. Once developed, routine's resistant aspect to change should help patients maintain any routine they have adopted.

17.9 Future Research:

For positive expressivity, apart from replicating the current findings, the proposed link between positive expressivity and the Surawy et al. (1995) model in the discussion of positive expressivity requires further investigation. Any solicitation effects from family with patients also need to be verified.

Secondly, the Berkeley Expressivity Questionnaire should be tested both with non clinical participants and other patient groups. Testing with other clinical populations who suffer disability and incapacitation similar to CFS is particularly important. This would provide a means to compare the current findings against other clinical groups, both for levels of positive expressivity, and to observe if reduced social relationships can be predicted in the same way.

This study also used the positive expressivity items on the BEQ only. It would be useful to also examine the negative expressivity and impulsivity responses of the measure with CFS patients, to see the effect these have on social relationships.

For home functioning, first it is useful to verify that home functioning is salient for all CFS patients. Revising the Life Functioning Questionnaire to include a question about this would be possible. Secondly, it may be useful to learn whether withdrawing from activity, non-demanding cognitions, and learned helplessness may be encouraging patients to reduce their home functioning. Learned helplessness can be measured by the existing Learned Helplessness Scale (Quinless & Nelson, 1988) and measures of non-demanding cognitions and withdrawal from activity could be developed. Regressing these onto the home functioning section of the LFQ would then indicate whether these variables are significant or not.

Thirdly, routine in this study predicted improved home functioning, whilst appearing independent of depressive symptoms, or CFS symptoms. This should be capable of being tested empirically. In testing independence of routine from depressive symptoms for example, routine could be increased with both depressed and non depressed patients. Patients would have similar baseline routine scores, and the same duration and type of therapy. This should result in identical increases in routine for both groups.

Fourthly, it is possible patients may have some functional attitudes, concerning activities they feel they *are* capable of doing at home. Such attitudes may serve patients in performing limited amounts of activity they may not otherwise do. Interaction effects of these functional attitudes alongside the dysfunctional ones may be relevant in examining patients' ability to do their household duties.

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Appendix A – Chalder Fatigue Questionnaire (CFQ)

Chronic Fatigue Questionnaire

Patient No #: Date: Trust ID Number:

Please answer all the questions simply by underlining or circling the answer which you think most nearly applies to you.

We would like to know whether or not you have been having any problems with feeling tired, weak, or lacking in energy in the last month. If you have been feeling tired for a long time we want you to compare yourself to how you felt when last well.

Do you have problems	Less	No more	More	Much more
with tiredness?	than usual	than usual	than usual	than usual
Do you need to	Less	No more	More	Much more
rest more?	than usual	than usual	than usual	than usual
Do you feel sleepy	Less	No more	More	Much more
or drowsy?	than usual	than usual	than usual	than usual
Do you have problems	Less	No more	More	Much more
starting things?	than usual	than usual	than usual	than usual
Do you lack energy?	Less	No more	More	Much more
	than usual	than usual	than usual	than usual
Do you have less	Less	No more	More	Much more
strength in your muscles?	than usual	than usual	than usual	than usual
Do you feel weak?	Less	No more	More	Much more
	than usual	than usual	than usual	than usual
Do you have difficulty	Less	No more	More	Much more
concentrating?	than usual	than usual	than usual	than usual
Do you make slips	Less	No more	More	Much more
of the tongue when speaking	? than usual	than usual	than usual	than usual
Do you have problems	Less	No more	More	Much more
thinking clearly?	than usual	than usual	than usual	than usual
How is your memory?	Less	No more	More	Much more
	than usual	than usual	than usual	than usual

If you are tired at the moment, please indicate approximately how long this has lasted.

Not applicable	Less than	Less than	Between 3	6 Months
	1 week	3 months	& 6 months	or more

Overall what percentage of the time do you feel tired?

None of the time	25% of	50% of	75% of	All the time					
	the time	the time	the time						
Why do you think you are tired? (Please try to give one reason).									

Appendix B: Beck Depression Inventory II (BDI-II)

The Beck Depression cannot be reproduced in the public domain due to copyright laws. More information, and a chance to purchase this measure, can be found at http://www.pearson-uk.com

Appendix C: The Berkeley Expressivity Questionnaire (BEQ)

Positive items are highlighted with a "P"

For each statement below, please indicate your agreement or disagreement. Do so by filling in the

blank in front of each item with the appropriate number from the following rating scale:

1	2	3	4	5	6	7	
Strongly			Neutral			Strongly	
<u>disagree</u>						<u>agree</u>	

P_____1. Whenever I feel positive emotions, people can easily see exactly what I am feeling.

_____ 2. I sometimes cry during sad movies.

_____ 3. People often do not know what I am feeling.

P_____4. I laugh out loud when someone tells me a joke that I think is funny.

5. It is difficult for me to hide my fear.

P_____6. When I'm happy, my feelings show.

_____7. My body reacts very strongly to emotional situations.

8. I've learned it is better to suppress my anger than to show it.

9. No matter how nervous or upset I am, I tend to keep a calm exterior.

P 10. I am an emotionally expressive person.

11. I have strong emotions.

12. I am sometimes unable to hide my feelings, even though I would like to.

_____13. Whenever I feel negative emotions, people can easily see exactly what I am feeling.

14. There have been times when I have not been able to stop crying even though I tried to stop.

____15. I experience my emotions very strongly.

____16. What I'm feeling is written all over my face.

Appendix D – Life Functioning Questionnaire (LFQ)

LIFE FUNCTIONING QUESTIONNAIRE (LFQ) - PART 1

Assessment of Work and Social Functioning: Self Report (Patient/Self-Rated)

Part 1

How much difficulty have you had in the following areas over the last month? (*Please indicate by marking the box that best describes your degree of difficulty functioning, if any, over the last month.*)

LEISURE TIME

DEGREE OF DIFFICULTY FUNCTIONING

A: Leisure activities with friends

If you never spend time with your friends, or if you have no friends, indicate by placing a checkmark in this box 🛛 and go to "**B**"

	no problems	mild problems	moderate problems	severe problems
	1	2	3	4
1. <u>Time:</u> amount of time spent with	?	?	?	?
iriends				
2. <u>Conflict</u> : getting along with friends	?	?	?	?
3. Enjoyment: enjoying time spent	?	?	?	?
together				

If you are having ANY difficulty, what do you think is the cause?

B: Leisure activities with family

If you never spend time with your family, or if you have no family, indicate by placing a checkmark in this box \square and go to "C"

	no problems	mild problems	moderate problems	severe problems	
	1	2	3	4	
1. <u>Time:</u> amount of time spent with	?	?	?	?	
family					
2. Conflict: getting along with family	?	?	?	?	
3. Enjoyment: enjoying and having	?	?	?	?	
an interest in family activities					

If you are having ANY difficulty, what do you think is the cause?

DUTIES/RESPONSIBILTIES

DEGREE OF DIFFICULTY FUNCTIONING

C. Duties at home

(e.g. housework, paying bills, grocery shopping, mowing lawn, childcare tasks, car repairs) (If you have no duties at home, or are homeless, indicate this by placing a checkmark in this box □, and go to "**D**")

n	o problems	mild problems	moderate problems	severe problems	
	1	2	3	4	
7. <u>Time:</u> amount of time performing	?	?	?	?	
duties					
8. Conflict: can you perform these du	ties 🛛	?	?	?	
without undue friction with others?					
9. Enjoyment: enjoying and having	?	?	?	?	
an interest in home duties?					
10. Performance: quality of work	?	?	?	?	
(doing a good job; getting the job don	e)				

If you are having ANY difficulty, what do you think is the cause?

D: Duties at work, school, or activity center

(If you are not working or not in school, indicate this by placing a checkmark

in this box \mathbb{P} , and go to the next page).

	no problems	mild problems	moderate problems	severe problems
	1	2	3	4
1. Time: amount of time spent at work	r, ?	?	?	?
school, etc.				
2. Conflict: getting along with co-	?	?	?	?
workers and supervisors				
3. Enjoyment: enjoying/satisfaction	?	?	?	?
and interest from work				
4. Performance: quality of work	?	?	?	?

If you are having ANY difficulty, what do you think is the cause?

How many days did you miss over this last month at work or school due to your illness?

<u>A: Wo</u>	<u>ork</u>	<u>B: School</u>
?	1. not applicable	I. not applicable
?	2. 0-5 days	2. 0-5 days
?	3. 6-10 days	3. 6-10 days
?	4. 11-20 days	2 4. 11-20 days
?	5. over 20 days	Is. over 20 days

Reasons causing difficulty in Role Functioning

Did any of the factors below cause you difficulties at work this month, or cause you to work less than full time or not at all? (*Please mark all that apply for <u>this month.</u>*)

- 1. In Too depressed most of the time
- 2. Too manic most of the time
- 3. Couldn't get my mood stable long enough to work too up and down
- 4. A fraid to work at usual level because afraid of precipitating another episode
- 5. De Wanted to work but the kind of job that I could get for my broken resume i.e., gaps in work history) was too demeaning for my educational level
- 6. De Mood ok and wanted to work but couldn't get a job due to my broken resume (i.e. gaps in work history)
- 7. Couldn't get along with others
- 8. D Wanted my old job but couldn't get it
- 9. Could get my old job but felt embarrassed to go back
- 10. Disability cheque was greater that could have made otherwise
- 11. Didn't have a job for a long time prior to this most recent episode
- 12. Physical symptoms (e.g. difficulty concentrating, blurred vision, fatigue/sedation) interfered with my functioning
- 13. Didn't need to work (retired, supported by someone else. etc) but I could if need be
- 14.
 Medication side effects interfered with functioning
- 15. Other (please explain):

Part II – Life Functioning Questionnaire

Please mark the box of the answer(s) that best describes your situation:

- 1. Work situation this month (Please mark only those boxes that apply in the last 30 days)
 - **Competitive Job** (paid job obtained without assistance of rehab program)
 - 1. $\ensuremath{\mathbbm Z}$ Full time at same or higher job level that that held prior to most recent episode
 - 2. Deart time at same or higher job level that that held prior to most recent episode
 - 3. If Full time job at lower job level than that held prior to most recent episode
 - 4. $\ensuremath{\mathbbmath$\mathbbms$}$ Full time job at lower job level than that held prior to most recent episode
- Transitional Job (paid job obtained through vocational rehabilitation program)
 5.
 Full time
 6.
 Part time
- Work Training 7. 🛛 Work training
- Sheltered Workshop 8. 🛛 Sheltered Workshop
- Volunteer 9. 2 Full time 10. 2 Part time
 - Student 11. 2 Full time 12. 2 Part time

.

- Housewife/Husband 13.
 ☐ As full time job 14.
 ☐ As part time job
- Not working in job, school or home 15. 2 Not working in job, school or home
- Other 16. 🛛 Other (please explain)
- 2. How many days per week are you scheduled to attend:

1. ____ Work 2. ____ School 3. ____ Day Hospital 4. ____ Activity Center

- 3. Living situation over <u>last six months</u> (*Please mark all that apply*):
- 1. 🛛 Hospital
- 2. Skilled nursing facility 24 hour nursing service
- 3. Intermediate care facility less than 24 hour nursing facility
- 4.
 Supervised group living (long term)
- 5. Transitional group home (halfway or quarterway house)
- 6. D Family foster care
- 7. Do-operative apartment, supervised (staff on premises)
- 8. Do operative apartment, unsupervised (staff not on premises)
- 9. Board and care home (private proprietary home for adults, with program and supervision)
- 10. Boarding house (includes meals, no program or supervision)
- 11. Rooming or boarding house or hotel (includes single room occupancy, no meals are provided, cooking facilities may be available)
- 12. Private house or apartment
- 13. 🛛 Shelter
- 14. 2 Prison

15. No residence (that is, you often need to live/sleep on the streets, or other areas not generally intended for residence)

- 4. Financial situation over the <u>last six months</u> (*Please mark all that apply*):
- 1. Received no pay (fully supported by someone else; e.g. parents, spouse, etc.)
- 2. Received wages for work performed
- 3. Received Income Support or Disability Benefit
- 4. Received pension/retirement benefits
- 5. Other (please specify):
- 5. A. When did you last work full time? (Please mark only ONE box):
- 1. □ I work full time now (SKIP TO THE END)
- 2. I have never worked full time
- 3. I Within the last 2 years
- 4. □ 2-5 years ago
- 5. 2 5-10 years ago
- 6. Over 10 years ago

B: How long were you working full time, the last time you worked full time: (*Please mark only ONE box*):

- 1. \square Less than one month
- 2. It Less than 6 months
- 3. I Less than 1 year
- 4. I year or more

C: Why did you stop working full time? (If more than one reason, please rank in order of importance l = most important, 2 = next important, etc.):

 1. Mental illness 2. Physical illness
 3. Children
4. Couldn't find job after leaving/being laid off from previous job
5. Retired
6. Other <i>(please explain)</i> :

Reasons causing difficulty in Role Functioning

Did any of the factors below cause you difficulties at work this month, or cause you to work less than full time or not at all? (*Please mark all that apply for <u>this month.</u>*)

- 16. Too depressed most of the time
- 17. ^D Too manic most of the time
- 18. Couldn't get my mood stable long enough to work too up and down
- 19. Afraid to work at usual level because afraid of precipitating another episode
- 20. De Wanted to work but the kind of job that I could get for my broken resume i.e., gaps in work history) was too demeaning for my educational level
- 21.
 ☐ Mood ok and wanted to work but couldn't get a job due to my broken resume (i.e. gaps in work history)
- 22. Couldn't get along with others
- 23. I Wanted my old job but couldn't get it
- 24. Could get my old job but felt embarrassed to go back
- 25. Disability cheque was greater that could have made otherwise
- 26. Didn't have a job for a long time prior to this most recent episode
- 27. Depresent Physical symptoms (e.g. difficulty concentrating, blurred vision, fatigue/sedation) interfered with my functioning
- 28. Didn't need to work (retired, supported by someone else. etc) but I could if need be
- 29. Dedication side effects interfered with functioning
- 30. ☑ Other (please explain):

Appendix E – Dysfunctional Attitudes Scale – Short Version (DAS 24) Achievement Attitudes in Italics, Attainment in Normal Type This scale lists different attitudes or beliefs which people sometimes hold. Please read each statement carefully and decide how much you agree or disagree with what it says.

For each of the attitudes, please indicate your answer by placing a tick (/) under the column that <u>best describes how you think</u>. Be sure to choose only one answer for each attitude. But please note that because people are different, there is no right or wrong answer to these statements.

To decide whether a given answer is typical of your way of looking at things, simply keep in mind what you are like <u>most of the time</u>.

Attitudes	Totally	Agree	Agree	Neutral	Disagree	Disagree	Totally
	agree	very	very		Slightly	very	Disagree
	-	much	slightly			much	_
People who							
have good							
ideas are							
more worthy							
than those							
who do not.							
I should be							
happy all the							
time							
If I don't set							
the highest							
standards for							
myself, I am							
likely to end							
up a second							
rate person							
If I am to be							
a worthwhile							
person, I							
must be truly							
outstanding							
in at least one							
major respect							
I ought to be							
able to solve							
my problems							
quickly and							
without a							
great deal of							
effort							
A person							
should be							
able to							

control what				
happens to				
them				
I must be a				
useful				
productive				
creative				
person or life				
has no				
nurnose				
puipose				
If I do not do				
well at the				
time people				
will not				
respect me				
A person				
should do				
well at				
everything				
they				
undertake				
I should				
always have				
complete				
control over				
my feelings				
If I try hard				
enough. I				
should be				
able to excel				
at anything I				
attempt				

Appendix F: Social Rhythm Metric (SRM)

Social Rhythm Metric Please fill out at the End of The Day:

Pernandent No		Dov		it at th		Date	•	20	0
		Day.	TIME					20	0
			TIME			People 1 = Just pr 2 = Active involved	esent ly		
Activity	Tick if did not do	Clock time	AM	PM	Tick if alone	Spouse/ partner	Children	Other family members	Other persons
OUT OF BED									
FIRST CONTACT IN PERSON OR PHONE WITH ANOTHER PERSON									
HAVE MORNING BEVERAGE									
HAVE BREAKFAST									
GO OUTSIDE FOR THE FIRST TIME									
START WORK/SCHOOL/ HOUSEWORK/ VOLUNTEER ACTIVITIES/ FAMILY CARE									
HAVE LUNCH									
TAKE AFTERNOON NAP									
HAVE DINNER									
PHYSICAL EXERCISE									
HAVE AN EVENING SNACK/DRINK									
WATCH EVENING TV NEWS PROGRAM									
WATCH ANOTHER TV PROGRAM									
ACTIVITY A:									
ACTIVITY B:									
RETURN HOME (LAST TIME)									
GO TO BED									

Appendix G – Participant Information Sheet



Providing mental health, learning disability and addictions services

Psychological factors and chronic fatigue syndrome

You are being invited to take part in a research study. Before you decide to take part, it is important you understand why the research is being done, and what it will involve. Please take the time to read the following information carefully. Talk to others about the study if you wish.

The first part tells you what the study is about, and what will happen if you take part. The second part gives some more detailed information about how the study is conducted.

Please ask us if there is anything that is not clear or if you would like more information. Please take time to decide in taking part.

What is the purpose of the study?

(a) To understand what part some factors (such as expressing feelings and other selfmanagement behaviour) may play in how well patients with chronic fatigue manage socially.

(b) To understand how certain beliefs may influence how regular the daily activities and routines of chronic fatigue patients are.

(c) To use the information gained in helping to plan and improve the treatment of chronic fatigue patients.

This research will also help to complete a Doctorate in Clinical Psychology for the Chief Investigator (Mr Orr).

Why have I been chosen?

You have been chosen as you suffer from chronic fatigue syndrome, which is what this study is investigating.

Do I have to take part?

No. It is up to you to decide whether or not to take part. If you do, please keep this information sheet for reference. You will also be asked to sign a consent form. If you agree to take part, you are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect the care you will receive.

Your participation may help us to understand chronic fatigue syndrome better and may help aid the treatment and care of chronic fatigue patients in the future.





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Improving Working Lives

Humber Mental Health

Providing mental health, learning disability and addictions services.

What will happen to me if I take part?

This research will involve you in two ways. First, I would visit you at home, or meet you at another place if you wish. This would be at a time convenient for you, and would involve about 45 mins to one hour of your time. You would answer some short questionnaires, and some simple questions in this time.

These questions ask about what sort of things you do when you feel happy or upset, how you feel you are getting on with people at the moment, the kind of activities you do with family and friends, and what you feel you are capable of doing at the minute.

Secondly, there would also be a simple diary measure for you to fill in. This takes about 2 minutes each day, over 7 days, and records what you do each day, and when you can do it. This can be e-mailed or posted back to us.

What would I have to commit to?

This would only be to one visit from the researcher, and completing the diary each day over seven days. This can be done on computer and send back to us by e-mail instantly. If you cannot do this, we would be able to complete this with you by telephone each evening. Or else, you would be able to mail these back to us each day.

Are there any risks or disadvantages to taking part?

It is unlikely that taking part in the study will result in any problems, or be distressing in any way for you. Some of the questions in the study, because they ask about some of your attitudes and your feelings, may feel a little unusual to answer. If you do have any concerns at any time, please feel free to discuss these with the researcher present.

What are the possible benefits of taking part?

By taking part, it is likely you will gain knowledge about some of your own attitudes and feelings about your illness, and how you manage your illness, which you might not have thought about before. If it is found that the factors we are studying are important in managing chronic fatigue, this may help the health service in helping patients in managing their illness in the future.

What happens when the study is completed?

When the study is finished, if you wish, you can receive a summary of the results, and any recommendations which the study could hold for care of patients in the future.

What if there is a problem?



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Any complaint about the way you have been dealt with during the study or any possible harm you might suffer can be addressed. This can be through feeding back your concerns to the investigating team. If you are still not satisfied, you may take a complaint to the NHS Trust involved.

Will my taking part in the study he kept confidential?

Yes. Apart from the team providing your care, only your GP will also know you are taking part. However, apart from the Chief Investigator (Mr Barry Orr) and research supervisor (Professor Dominic Lam) NO ONE, including the GP and chronic fatigue team, will have access to the information you provide without your permission. It is possible that some of the team providing your care may request to see some of the information you provide to help with your care in future. But we would need to ask for your content first.

What will happen to the results of the research study?

The results will be published in a thesis, held by the University of Hull. A summary of the results will also be presented to the team providing your care. You can also receive a summary of the results if you wish.

All results will be anonymized, so you will not be able to be identified.

Who has reviewed the study?

This study has been reviewed by the Hull and East Riding Ethics Committee.

Contact Details:

For any other information about the study please contact:

Mr Barry Orr 01482464101 b.j.orr@psy.hull.ac.uk

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Professor Dominic Lam 01482464101 d.lam@hull.oc.uk



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Appendix H – Participant Consent Form

		Providing ment	al health, learning disability and addictions service	190
	Study No: 06/Q1104/103 Patient Identification Nun	ober for this Trial:		
		Consent Fo	orm	
	Title of Project: Psycholog in patients with chronic fa	gicul factors, level of s tigue syndrome	ocial functioning, and social routine	
		Name of Researcher	Barry Orr Please initial box	
	1. I confirm that I have re (version 2) for the above information, ask questions	ad and understand the study. I have had the o and have had these at	information sheet date 27/07/06 portunity to consider the swered satisfactorily.	
	 I understand that my pa at any time without giving being affected. 	rticipation is voluntary any reason, without n	and that I am free to withdraw in medical care or legal rights	
	3. I understand that releva data collected during the s	nt medical sections of tudy may be looked at	any of my medical notes and by responsible individuals from	
	Hull and East Riding Com authorities, where it is rele permission for these indiv	munity Health NHS T evant to my taking part iduals to have access to	rust, and from regulatory in this research. I give s my records.	
	Hull and East Riding Com authorities, where it is rele permission for these indiv 4. I agree to my GP being	munity Health NHS T want to my taking part iduals to have access to informed of my partic	rust, and from regulatory in this research. I give o my records.	
	Hull and East Riding Com authorities, where it is rele permission for these indiv 4. I agree to my GP being 5. I agree to take part in th	munity Health NHS T evant to my taking part iduals to have access to informed of my particle e above study.	rust, and from regulatory in this research. I give o my records.	
	Hull and East Riding Com authorities, where it is rele permission for these indiv 4. I agree to my GP being 5. I agree to take part in th	munity Health NHS T evant to my taking part iduals to have access to informed of my particle e above study.	rust, and from regulatory in this research. I give in records.	
	Hull and East Riding Com authorities, where it is rele permission for these indiv 4. I agree to my GP being 5. I agree to take part in th Name of Patient	munity Health NHS T evant to my taking part iduals to have access to informed of my partic e above study.	rust, and from regulatory in this research. I give iny records. pation in the study.	
	Hull and East Riding Com authorities, where it is rele permission for these indiv 4. I agree to my GP being 5. I agree to take part in th Name of Patient Researcher	munity Health NHS T evant to my taking part iduals to have access to informed of my partic e above study. Date Date	rest, and from regulatory in this research. I give in y records.	
	Hull and East Riding Com authorities, where it is rele permission for these indiv 4. I agree to my GP being 5. I agree to take part in th Name of Patient Researcher	munity Health NHS T evant to my taking part iduals to have access to informed of my partic e above study. Date Date	rust, and from regulatory in this research. I give in y records.	
(33)	Hull and East Riding Com authorities, where it is rele permission for these indiv 4. I agree to my GP being 5. I agree to take part in th Name of Patient Researcher	munity Health NHS T evant to my taking part iduals to have access to informed of my partic e above study. Date Date	rest, and from regulatory in this research. I give in y records.	

Humber Mental Health NHS Teaching NHS Trust
Appendix I: Letter to Participant's GP

Humber Mental Health

Providing mental health, learning disability and addictions services.

Dear Dr XXX.

Your registered patient XXX has agreed to take part in a study concerning the impact of psychological factors on social functioning in chronic fatigue syndrome. This study aims to assess principally if positive emotional expressivity (how positive patients are in expressing their feelings behaviourally) is related to how well patients function socially. Secondly, the study aims to assess if patients who set high goals and expect high standards of themselves, and have irregular daily routines, have poorer home functioning.

The patient is visited at a place of their choice in a consultation lasting approximately 1 hour. In this consultation, they will fill in questionnaire instruments. Patients are asked about their level of chronic fatigue symptoms, and degree of depressive symptoms. For the principal questions, the patient will report their degree of positive expressive behaviour, and their role functioning with friends and family. For the second question, the patient is asked to report the level of expected attainment and achievement attitudes they hold for themselves, and their role functioning at home. After the consultation, the patient will complete a simple measure of the activities they do daily over the following 7 days. This is returned to the principal investigator via e-mail or post.

This study is being conducted principally by Barry Orr, Trainee Clinical Psychologist, under Hull and East Riding Community Health NHS Trust and the University of Hull. Academic supervision is under Professor Dominic Lam, and Course Director, Department of Clinical Psychology, University of Hull, Field supervision is under Dr Sarah Cluley, Consultant Liaison Psychiatrist, Hull and East Yorkshire Hospitals NHS Trust. Only the principal investigator and academic supervisior have access to data given by the patient. The consulting chronic fatigue team will have a summary of results of the study upon completion, as will the patient on request.

Patients in this study are not submitted to any medical or care change or intervention: treatment of their condition is unaffected. Information given by patients in the study is confidential. However, clinicians involved in the patient's care may request information to help in patients' future care. Patient consent is obtained prior to any such information being sent.

If you have any questions or comments about this study, please feel free to contact me or Professor Lam on:

Office number: Mobile: h.j.orr@psy.hull.ac.uk or d.lam@hull.ac.uk

Yours sincerely, Barry Orr Clinical Researcher, Trainee Clinical Psychologist

01482 464106

07738 726769



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Appendix J: Local Research Ethics Committee Approval Letter



Hull and East Riding Local Research Ethics Committee

Room SC30 Contetion House (Trust Headquarters) Wilerby Hit Business Park Wilerby HULL HU10 6ED

> Telephone: 01482 300246 Facalmile: 01482 303908

25 August 2006

Mr Bany On Trainee Clinical Psychologist University of Hull Department of Clinical Psychology Hentford Building University of Hut Hu6 7RX

Dear Mr Orr

Full title of study:

REC reference number:

Psychological factors, level of social functioning and social routine in patients with chronic fatigue syndrome. 06/Q1104/103

Thank you for your letter of 02 August 2006, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

Ethical review of research sites

The Committee has designated this study as exempt from site-specific assessment (SSA There is no requirement for [other] Local Research Ethics Committees to be informed or for site-specific assessment to be carried out at each site.

Conditions of approval

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

An advisory committee to North and East Yorkshire and Northern Lincoinshire Strategic Health Authority

08/01104/103

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Application	Parts A and B	19 June 2006
Investigator CV	Mr B O/T	
Protocol	version 1	29 June 2006
Interview Schedules/Topic Guides	Version 1	29 June 2006
Questionnaire: Social Adjustment Scale	Modified Cooper Osborn Gath & Feggetter 1982	
Questionnaire: Emotional Expressivity Questionnaire	Gross & John 1995	
Questionnaire: Dysfunctional Attitude Scale	Lam et al 2004	
Questionnaire: Characteristic Questionnaire		
Questionnaire: Social Rhythm Metric		
Ouestionnaire: 2 Part Life Functioning Questionnaire		
Questionnaire BDI Questionnaire		
Questionnaire: Chronic Fatigue Questionnaire		
Letter of invitation to participant	Version 1	29 June 2006
Letter of invitation to participant	2	27 July 2006
GP/Consultant Information Sheets	GP Letter Version 1	29 June 2006
Participant Information Sheet	2	27 July 2006
Participant Information Sheet	Version 1	29 June 2006
Participant Consent Form	Version 1	29 June 2006
Participant Consent Form	2	27 July 2006
Response to Request for Further Information	Letter addressing all concerns of the committee	02 August 2008
Signature of supervisor	for main application	19 June 2006
Protocol Flow chart	Version 1	29 June 2006
Supervisor CV	Prof D Lam	100000000000000000000000000000000000000

Research governance approval

You should arrange for the R&D department at all relevant NHS care organisations to be notified that the research will be taking place, and provide a copy of the REC application, the protocol and this letter.

All researchers and research collaborators who will be participating in the research must obtain final research governance approval before commencing any research procedures. Where a substantive contract is not held with the care organisation, it may be necessary for an honorary contract to be issued before approval for the research can be given.

SF1 list of approved altes

05/01104/103

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Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

Please quote this number on all correspondence

06/Q1104/103

With the Committee's best wishes for the success of this project

Yours sincerely

Email louise hunn@humber.hts.uk

Enclosures:

Standard approval conditions

Copy to:

Humber Mental Health Teaching NHS Trust Trust HQ, Willerby Hill Beverley Road, Willerby, Hull

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Page 3

Appendix K: Social Rhythm Metric Flow Diagram For Scoring



Appendix L: SPSS Syntax, Derived from Social Rhythm Metric Flow Diagram (Appendix K)

*** Out of Bed command line *** COMPUTE Bedinimea = MEAN(Bed1,Bed2,Bed3,Bed4,Bed5,Bed6,Bed7) . VARIABLE LABELS Bedinimea 'out of bed initial mean' . EXECUTE . COMPUTE BediniSD = SD(Bed1,Bed2,Bed3,Bed4,Bed5,Bed6,Bed7) . VARIABLE LABELS Bedinimea 'out of bed initial SD' . EXECUTE . COMPUTE Bedissdlt10 = BediniSD<0.16666667 . EXECUTE . COMPUTE Bedfinmea = (Bedissdlt10) *Bedinimea . EXECUTE . COMPUTE Bed1dist = (ABS(Bed1-Bedinimea)/BediniSD) <= 1.5 . VARIABLE LABELS Bed1dist 'Is Bed1 no more than 1.5 SDs from the Bed mean?'. EXECUTE . COMPUTE Bed2dist = (ABS(Bed2-Bedinimea)/BediniSD) <= 1.5 . VARIABLE LABELS Bed2dist 'Is Bed2 no more than 1.5 SDs from the Bed mean?'. EXECUTE . COMPUTE Bed3dist = (ABS(Bed3-Bedinimea)/BediniSD) <= 1.5 . VARIABLE LABELS Bed3dist 'Is Bed3 no more than 1.5 SDs from the Bed mean?'. EXECUTE . COMPUTE Bed4dist = (ABS(Bed4-Bedinimea)/BediniSD) <= 1.5. VARIABLE LABELS Bed4dist 'Is Bed4 no more than 1.5 SDs from the Bed mean?'. EXECUTE . COMPUTE Bed5dist = (ABS(Bed5-Bedinimea)/BediniSD) <= 1.5. VARIABLE LABELS Bed5dist 'Is Bed5 no more than 1.5 SDs from the Bed mean?'. EXECUTE . COMPUTE Bed6dist = (ABS(Bed6-Bedinimea)/BediniSD) <= 1.5 . VARIABLE LABELS Bed6dist 'Is Bed6 no more than 1.5 SDs from the Bed mean?'. EXECUTE. COMPUTE Bed7dist = (ABS(Bed7-Bedinimea)/BediniSD) <= 1.5 . VARIABLE LABELS Bed7dist 'Is Bed7 no more than 1.5 SDs from the Bed mean?'. EXECUTE . COUNT HOWMANYBEDS = Bed1dist Bed2dist Bed3dist Bed4dist Bed5dist Bed6dist Bed7dist (1) . EXECUTE . COMPUTE BedHT=(Bed1dist*Bed1+Bed2dist*Bed2+Bed3dist*Bed3+Bed4dist*Bed4+Bed5d ist*Bed5+Bed6dist*Bed6+Bed7dist*Bed7)/HOWMANYBEDS. VARIABLE LABELS 'Habitual time for Bed'.

EXECUTE.

```
COMPUTE
BedHT=(BediniSD<0.16666667)*Bedinimea+(BediniSD>=0.16666667)*BedHT.
EXECUTE.
COMPUTE Bedht2 = ((1-MISSING(Bed1))*Bed1dist*Bed1+(1-
MISSING(Bed2))*Bed2dist
*Bed2+(1-MISSING(Bed3))*Bed3dist*Bed3+(1-
MISSING(Bed4)) *Bed4dist*Bed4+(1
 -MISSING(Bed5))*Bed5dist*Bed5+(1-MISSING(Bed6))*Bed6dist*Bed6+(1
-MISSING(Bed7))*Bed7dist*Bed7)/HOWMANYBEDS .
EXECUTE .
COMPLITE
Bedht2=(BediniSD<0.16666667)*Bedinimea+(BediniSD>=0.16666667)*Bedht2
EXECUTE.
COMPUTE Bed1hit2 = (ABS(Bed1-Bedht2)) <= 0.75 .
VARIABLE LABELS Bed1hit2 'Is Bed1 within 3/4 of an hour of the
habitual time for Bed?'
EXECUTE .
COMPUTE Bed2hit2 = (ABS(Bed2-Bedht2)) <= 0.75 .
VARIABLE LABELS Bed2hit2 'Is Bed2 within 3/4 of an hour of the
habitual time for Bed?'
EXECUTE .
COMPUTE Bed3hit2 = (ABS(Bed3-Bedht2)) <= 0.75.
VARIABLE LABELS Bed3hit2 'Is Bed3 within 3/4 of an hour of the
habitual time for Bed?'
EXECUTE .
COMPUTE Bed4hit2 = (ABS(Bed4-Bedht2)) <= 0.75 .
VARIABLE LABELS Bed4hit2 'Is Bed4 within 3/4 of an hour of the
habitual time for Bed?'
EXECUTE .
COMPUTE Bed5hit2 = (ABS(Bed5-Bedht2)) <= 0.75 .
VARIABLE LABELS Bed5hit2 'Is Bed5 within 3/4 of an hour of the
habitual time for Bed?'
EXECUTE .
COMPUTE Bed6hit2 = (ABS(Bed6-Bedht2)) <= 0.75 .
VARIABLE LABELS Bed6hit2 'Is Bed6 within 3/4 of an hour of the
habitual time for Bed?'
EXECUTE .
COMPUTE Bed7hit2 = (ABS(Bed7-Bedht2)) <= 0.75.
VARIABLE LABELS Bed7hit2 'Is Bed7 within 3/4 of an hour of the
habitual time for Bed?'
EXECUTE .
COUNT
  HOWMANYBEDhits2 = Bed1hit2 Bed2hit2 Bed3hit2 Bed4hit2 Bed5hit2
Bed6hit2
  Bed7hit2 (1) .
EXECUTE .
```

*** First Contact in Person or Phone with Another Person Command line * * * COMPUTE Coninimea = MEAN(Con1,Con2,Con3,Con4,Con5,Con6,Con7) . VARIABLE LABELS Coninimea 'First contact with another person inital mean'. EXECUTE . COMPUTE ConiniSD = SD(Con1,Con2,Con3,Con4,Con5,Con6,Con7) . VARIABLE LABELS ConiniSD 'First contact with another person initial SD'. EXECUTE . COMPUTE Conissdlt10 = ConiniSD<0.16666667 . EXECUTE . COMPUTE Confinmea = (Conissdlt10) *Coninimea . EXECUTE . COMPUTE Conldist = (ABS(Conl-Coninimea)/ConiniSD) <= 1.5 . VARIABLE LABELS Conldist 'Is Conl no more than 1.5 SDs from the Con mean?'. EXECUTE . COMPUTE Con2dist = (ABS(Con2-Coninimea)/ConiniSD) <= 1.5 . VARIABLE LABELS Con2dist 'Is Con2 no more than 1.5 SDs from the Con mean?'. EXECUTE . COMPUTE Con3dist = (ABS(Con1-Coninimea)/ConiniSD) <= 1.5 . VARIABLE LABELS Con3dist 'Is Con3 no more than 1.5 SDs from the Con mean?'. EXECUTE . COMPUTE Con4dist = (ABS(Con4-Coninimea)/ConiniSD) <= 1.5. VARIABLE LABELS Con4ist 'Is Con4no more than 1.5 SDs from the Con mean?'. EXECUTE . COMPUTE Con5dist = (ABS(Con5-Coninimea)/ConiniSD) <= 1.5 . VARIABLE LABELS Con5dist 'Is Con5 no more than 1.5 SDs from the Con mean?'. EXECUTE . COMPUTE Con6dist = (ABS(Con6-Coninimea)/ConiniSD) <= 1.5 . VARIABLE LABELS Con6dist 'Is Con6 no more than 1.5 SDs from the Con mean?'. EXECUTE . COMPUTE Con7dist = (ABS(Con7-Coninimea)/ConiniSD) <= 1.5 . VARIABLE LABELS Con7dist 'Is Con7 no more than 1.5 SDs from the Con mean?'. EXECUTE . COUNT HOWMANYCONS = Con1dist Con2dist Con3dist Con4dist Con5dist Con6dist Con7dist (1) . EXECUTE .

```
COMPUTE
ConHT=(Con1dist*Con1+Con2dist*Con2+Con3dist*Con3+Con4dist*Con4+Con5d
ist*Con5+Con6dist*Con6+Con7dist*Con7)/HOWMANYCONS.
VARIABLE LABELS 'Habitual time for Con'.
EXECUTE.
COMPUTE
ConHT=(ConiniSD<0.16666667) *Coninimea+(ConiniSD>=0.16666667) *ConHT.
EXECUTE.
COMPUTE Conht2 = ((1-MISSING(Con1))*Conldist*Conl+(1-
MISSING(Con2))*Con2dist
 *Con2+(1-MISSING(Con3))*Con3dist*Con3+(1-
MISSING(Con4))*Con4dist*Con4+(1
-MISSING(Con5))*Con5dist*Con5+(1-MISSING(Con6))*Con6dist*Con6+(1
-MISSING(Con7))*Con7dist*Con7)/HOWMANYCONS .
EXECUTE .
COMPUTE
Conht2=(ConiniSD<0.16666667)*Coninimea+(ConiniSD>=0.166666667)*Conht2
EXECUTE.
COMPUTE Conlhit2 = (ABS(Conl-Conht2)) <= 0.75 .
VARIABLE LABELS Conlhit2 'Is Conl within 3/4 of an hour of the
habitual time for Con?'
EXECUTE .
COMPUTE Con2hit2 = (ABS(Con2-Conht2)) <= 0.75.
VARIABLE LABELS Con2hit2 'Is Con2 within 3/4 of an hour of the
habitual time for Con?'
EXECUTE
COMPUTE Con3hit2 = (ABS(Con3-Conht2)) <= 0.75 .
VARIABLE LABELS Con3hit2 'Is Con3 within 3/4 of an hour of the
habitual time for Con?'
EXECUTE .
COMPUTE Con4hit2 = (ABS(Con4-Conht2)) <= 0.75 .
VARIABLE LABELS Con4hit2 'Is Con4 within 3/4 of an hour of the
habitual time for Con?'
EXECUTE .
COMPUTE Con5hit2 = (ABS(Con5-Conht2)) <= 0.75 .
VARIABLE LABELS Con5hit2 'Is Con5 within 3/4 of an hour of the
habitual time for Con?'
EXECUTE .
COMPUTE Con6hit2 = (ABS(Con6-Conht2)) <= 0.75.
VARIABLE LABELS Con6hit2 'Is Con6 within 3/4 of an hour of the
habitual time for Con?'
EXECUTE
COMPUTE Con7hit2 = (ABS(Con7-Conht2)) <= 0.75 .
VARIABLE LABELS Con7hit2 'Is Con7 within 3/4 of an hour of the
habitual time for Con?'
EXECUTE .
```

COUNT

HOWMANYCONhits2 = Con1hit2 Con2hit2 Con3hit2 Con4hit2 Con5hit2 Con6hit2 Con7hit2 (1) EXECUTE . *** Have Morning Beverage command line *** COMPUTE Bevinimea = MEAN(Bev1, Bev2, Bev3, Bev4, Bev5, Bev6, Bev7) . VARIABLE LABELS Bevinimea 'Have morning beverage day initial mean' . EXECUTE . COMPUTE Bevinisd = SD(Bev1, Bev2, Bev3, Bev4, Bev5, Bev6, Bev7) . VARIABLE LABELS Bevinisd 'Have morning beverage day initial SD' . EXECUTE . COMPUTE Bevissdlt10 = BeviniSD<0.16666667 . EXECUTE . COMPUTE Bevfinmea = (Bevissdlt10) *Bevinimea . EXECUTE . COMPUTE Bev1dist = (ABS(Bev1-Bevinimea)/BeviniSD) <= 1.5 . VARIABLE LABELS Bev1dist 'Is Bev1 no more than 1.5 SDs from the Bev mean?'. EXECUTE . COMPUTE Bev2dist = (ABS(Bev2-Bevinimea)/BeviniSD) <= 1.5 . VARIABLE LABELS Bev2dist 'Is Bev2 no more than 1.5 SDs from the Bev mean?'. EXECUTE . COMPUTE Bev3dist = (ABS(Bev3-Bevinimea)/BeviniSD) <= 1.5 . VARIABLE LABELS Bev4dist 'Is Bev4 no more than 1.5 SDs from the Bev mean?'. EXECUTE COMPUTE Bev4dist = (ABS(Bev4-Bevinimea)/BeviniSD) <= 1.5 . VARIABLE LABELS Bev4dist 'Is Bev4 no more than 1.5 SDs from the Bev mean?'. EXECUTE . COMPUTE Bev5dist = (ABS(Bev5-Bevinimea)/BeviniSD) <= 1.5 . VARIABLE LABELS Bev6dist 'Is Bev5 no more than 1.5 SDs from the Bev mean?'. EXECUTE . COMPUTE Bev6dist = (ABS(Bev6-Bevinimea)/BeviniSD) <= 1.5 . VARIABLE LABELS Bev6dist 'Is Bev6 no more than 1.5 SDs from the Bev mean?'. EXECUTE . COMPUTE Bev7dist = (ABS(Bev7-Bevinimea)/BeviniSD) <= 1.5 . VARIABLE LABELS Bev7dist 'Is Bev7 no more than 1.5 SDs from the Bev mean?'. EXECUTE . COUNT HOWMANYBEVS = Bev1dist Bev2dist Bev3dist Bev4dist Bev5dist Bev6dist Bev7dist (1) .

```
COMPUTE
BevHT=(Bev1dist*Bev1+Bev2dist*Bev2+Bev3dist*Bev3+Bev4dist*Bev4+Bev5d
ist*Bev5+Bev6dist*Bev6+Bev7dist*Bev7)/HOWMANYBEVS.
VARIABLE LABELS 'Habitual time for Bev'.
EXECUTE.
COMPUTE
BevHT=(Bevinisd<0.16666667)*Bevinimea+(BeviniSD>=0.16666667)*BevHT.
EXECUTE.
COMPUTE Bevht2 = ((1-MISSING(Bev1))*Bev1dist*Bev1+(1-
MISSING(Bev2))*Bev2dist
 *Bev2+(1-MISSING(Bev3))*Bev3dist*Bev3+(1-
MISSING(Bev4)) *Bev4dist*Bev4+(1
 -MISSING(Bev5))*Bev5dist*Bev5+(1-MISSING(Bev6))*Bev6dist*Bev6+(1
 -MISSING(Bev7))*Bev7dist*Bev7)/HOWMANYBEVS .
EXECUTE .
COMPUTE
Bevht2=(BeviniSD<0.16666667)*Bevinimea+(BeviniSD>=0.16666667)*Bevht2
EXECUTE.
COMPUTE Bev1hit2 = (ABS(Bev1-Bevht2)) <= 0.75 .
VARIABLE LABELS Bev1hit2 'Is Bev1 within 3/4 of an hour of the
habitual time for Bev?'
EXECUTE .
COMPUTE Bev2hit2 = (ABS(Bev2-Bevht2)) <= 0.75 .
VARIABLE LABELS Bev2hit2 'Is Bev2 within 3/4 of an hour of the
habitual time for Bev?'
EXECUTE
COMPUTE Bev3hit2 = (ABS(Bev3-Bevht2)) <= 0.75 .
VARIABLE LABELS Bev3hit2 'Is Bev3 within 3/4 of an hour of the
habitual time for Bev?'
EXECUTE .
COMPUTE Bev4hit2 = (ABS(Bev4-Bevht2)) <= 0.75 .
VARIABLE LABELS Bev4hit2 'Is Bev4 within 3/4 of an hour of the
habitual time for Bev?'
EXECUTE .
COMPUTE Bev5hit2 = (ABS(Bev5-Bevht2)) <= 0.75 .
VARIABLE LABELS Bev5hit2 'Is Bev5 within 3/4 of an hour of the
habitual time for Bev?'
EXECUTE
COMPUTE Bev6hit2 = (ABS(Bev6-Bevht2)) <= 0.75 .
VARIABLE LABELS Bev6hit2 'Is Bev6 within 3/4 of an hour of the
habitual time for Bev?'
EXECUTE .
COMPUTE Bev7hit2 = (ABS(Bev7-Bevht2)) <= 0.75 .
VARIABLE LABELS Bev7hit2 'Is Bev7 within 3/4 of an hour of the
habitual time for Bev?'
EXECUTE .
```

EXECUTE .

COUNT HOWMANYBEVhits2 = Bev1hit2 Bev2hit2 Bev3hit2 Bev4hit2 Bev5hit2 Bev6hit2 Bev7hit2 (1) . EXECUTE . *** Have Breakfast Command line *** COMPUTE Breinimea = MEAN(Bre1,Bre2,Bre3,Bre4,Bre5,Bre6,Bre7) . VARIABLE LABELS Breinimea 'Have breakfast day initial mean' . EXECUTE . COMPUTE BreiniSD = SD(Bre1,Bre2,Bre3,Bre4,Bre5,Bre6,Bre7) . VARIABLE LABELS BreiniSD 'Have breakfast day initial SD' . EXECUTE . COMPUTE Breissdlt10 = BreiniSD<0.16666667 . EXECUTE . COMPUTE brefinmea = (Breissdlt10) *breinimea . EXECUTE . COMPUTE Breldist = (ABS(Brel-Breinimea)/BreiniSD) <= 1.5 . VARIABLE LABELS Breldist 'Is Brel no more than 1.5 SDs from the Bre mean?'. EXECUTE . COMPUTE Bre2dist = (ABS(Bre2-Breinimea)/BreiniSD) <= 1.5 . VARIABLE LABELS Bre2dist 'Is Bre2 no more than 1.5 SDs from the Bre mean?'. EXECUTE COMPUTE Bre3dist = (ABS(Bre3-Breinimea)/BreiniSD) <= 1.5 . VARIABLE LABELS Bre3dist 'Is Bre3 no more than 1.5 SDs from the Bre mean?'. EXECUTE . COMPUTE Bre4dist = (ABS(Bre4-Breinimea)/BreiniSD) <= 1.5 . VARIABLE LABELS Bre4dist 'Is Bre4 no more than 1.5 SDs from the Bre mean?'. EXECUTE . COMPUTE Bre5dist = (ABS(Bre5-Breinimea)/BreiniSD) <= 1.5 . VARIABLE LABELS Bre5dist 'Is Bre5 no more than 1.5 SDs from the Bre mean?'. EXECUTE . COMPUTE Bre6dist = (ABS(Bre6-Breinimea)/BreiniSD) <= 1.5 . VARIABLE LABELS Bre6dist 'Is Bre6 no more than 1.5 SDs from the Bre mean?'. EXECUTE . COMPUTE Bre7dist = (ABS(Bre7-Breinimea)/BreiniSD) <= 1.5 . VARIABLE LABELS Bre7dist 'Is Bre7 no more than 1.5 SDs from the Bre mean?'. EXECUTE . COUNT HOWMANYBRES = Bre1dist Bre2dist Bre3dist Bre4dist Bre5dist Bre6dist

```
Bre7dist (1) .
EXECUTE .
COMPUTE
BreHT=(Bre1dist*Bre1+Bre2dist*Bre2+Bre3dist*Bre3+Bre4dist*Bre4+Bre5d
ist*Bre5+Bre6dist*Bre6+Bre7dist*Bre7)/HOWMANYBRES.
VARIABLE LABELS 'Habitual time for Bre'.
EXECUTE.
COMPUTE
BreHT=(BreiniSD<0.16666667) *Breinimea+(BreiniSD>=0.16666667) *BreHT.
EXECUTE
COMPUTE Breht2 = ((1-MISSING(Bre1))*Bre1dist*Bre1+(1-
MISSING(Bre2))*Bre2dist
 *Bre2+(1-MISSING(Bre3))*Bre3dist*Bre3+(1-
MISSING(Bre4)) *Bre4dist*Bre4+(1
 -MISSING(Bre5))*Bre5dist*Bre5+(1-MISSING(Bre6))*Bre6dist*Bre6+(1
 -MISSING(Bre7))*Bre7dist*Bre7)/HOWMANYBRES .
EXECUTE .
COMPUTE
Breht2=(BreiniSD<0.166666667) *Breinimea+(BreiniSD>=0.166666667) *Breht2
EXECUTE.
COMPUTE Brelhit2 = (ABS(Brel-Breht2)) <= 0.75.
VARIABLE LABELS Bre1hit2 'Is Bre1 within 3/4 of an hour of the
habitual time for Bre?'
EXECUTE .
COMPUTE Bre2hit2 = (ABS(Bre2-Breht2)) <= 0.75 .
VARIABLE LABELS Bre2hit2 'Is Bre2 within 3/4 of an hour of the
habitual time for Bre?'
EXECUTE .
COMPUTE Bre3hit2 = (ABS(Bre3-Breht2)) <= 0.75 .
VARIABLE LABELS Bre3hit2 'Is Bre3 within 3/4 of an hour of the
habitual time for Bre?'
EXECUTE .
COMPUTE Bre4hit2 = (ABS(Bre4-Breht2)) <= 0.75 .
VARIABLE LABELS Bre4hit2 'Is Bre4 within 3/4 of an hour of the
habitual time for Bre?'
EXECUTE .
COMPUTE Bre5hit2 = (ABS(Bre5-Breht2)) <= 0.75.
VARIABLE LABELS Bre5hit2 'Is Bre5 within 3/4 of an hour of the
habitual time for Bre?'
EXECUTE .
COMPUTE Bre6hit2 = (ABS(Bre6-Breht2)) <= 0.75 .
VARIABLE LABELS Bre6hit2 'Is Bre6 within 3/4 of an hour of the
habitual time for Bre?'
EXECUTE .
COMPUTE Bre7hit2 = (ABS(Bre7-Breht2)) <= 0.75 .
VARIABLE LABELS Bre7hit2 'Is Bre7 within 3/4 of an hour of the
habitual time for Bre?'
```

```
EXECUTE .
COUNT
  HOWMANYBREhits2 = Bre1hit2 Bre2hit2 Bre3hit2 Bre4hit2 Bre5hit2
Bre6hit2
 Bre7hit2 (1) .
EXECUTE .
*** Go outside for the first time command line ***
COMPUTE Outinimea = MEAN(Out1,Out2,Out3,Out4,Out5,Out6,Out7) .
VARIABLE LABELS Outinimea 'Go outside for first time day initial
mean'
EXECUTE .
COMPUTE OutiniSD = SD(Out1,Out2,Out3,Out4,Out5,Out6,Out7) .
VARIABLE LABELS OutiniSD 'Go outside for first time day initial SD'
EXECUTE .
COMPUTE Outissdlt10 = outiniSD<0.16666667 .
EXECUTE .
COMPUTE outfinmea = (Outissdlt10) *outinimea .
EXECUTE .
COMPUTE outldist = (ABS(Outl-outinimea)/outiniSD) <= 1.5 .
VARIABLE LABELS outldist 'Is outl no more than 1.5 SDs from the Out
mean?'.
EXECUTE .
COMPUTE out2dist = (ABS(Out2-outinimea)/outiniSD) <= 1.5 .
VARIABLE LABELS out2dist 'Is out2 no more than 1.5 SDs from the Out
mean?'.
EXECUTE .
COMPUTE out3dist = (ABS(Out3-outinimea)/outiniSD) <= 1.5 .
VARIABLE LABELS out4dist 'Is out4 no more than 1.5 SDs from the Out
mean?'.
EXECUTE .
COMPUTE out4dist = (ABS(Out4-outinimea)/outiniSD) <= 1.5 .
VARIABLE LABELS out4dist 'Is out4 no more than 1.5 SDs from the Out
mean?'.
EXECUTE .
COMPUTE out5dist = (ABS(Out5-outinimea)/outiniSD) <= 1.5 .
VARIABLE LABELS out5dist 'Is out5 no more than 1.5 SDs from the Out
mean?'.
EXECUTE .
COMPUTE out6dist = (ABS(Out6-outinimea)/outiniSD) <= 1.5 .
VARIABLE LABELS out6dist 'Is out6 no more than 1.5 SDs from the Out
mean?'.
EXECUTE .
COMPUTE out7dist = (ABS(Out7-outinimea)/outiniSD) <= 1.5 .
VARIABLE LABELS out7dist 'Is out7 no more than 1.5 SDs from the Out
mean?'.
EXECUTE .
```

```
COUNT
  HOWMANYOUTS = Out1dist Out2dist Out3dist Out4dist Out5dist
Out6dist
 Out7dist (1) .
EXECUTE .
COMPUTE
OutHT=(Outldist*Outl+Out2dist*Out2+Out3dist*Out3+Out4dist*Out4+Out5d
ist*Out5+Out6dist*Out6+Out7dist*Out7)/HOWMANYOUTS.
VARIABLE LABELS 'Habitual time for Out'.
EXECUTE.
COMPUTE
OutHT=(OutiniSD<0.16666667) *Outinimea+(OutiniSD>=0.16666667) *OutHT.
EXECUTE.
COMPUTE Outht2 = ((1-MISSING(Out1))*Out1dist*Out1+(1-
MISSING(Out2)) *Out2dist
 *Out2+(1-MISSING(Out3))*Out3dist*Out3+(1-
MISSING(Out4))*Out4dist*Out4+(1
 -MISSING(Out5))*Out5dist*Out5+(1-MISSING(Out6))*Out6dist*Out6+(1
-MISSING(Out7))*Out7dist*Out7)/HOWMANYOUTS .
EXECUTE .
COMPUTE
Outht2=(OutinisD<0.16666667)*Outinimea+(OutinisD>=0.16666667)*Outht2
EXECUTE.
COMPUTE Outlhit2 = (ABS(Outl-Outht2)) <= 0.75 .
VARIABLE LABELS Outlhit2 'Is Outl within 3/4 of an hour of the
habitual time for Out?'
EXECUTE .
COMPUTE Out2hit2 = (ABS(Out2-Outht2)) <= 0.75 .
VARIABLE LABELS Out2hit2 'Is Out2 within 3/4 of an hour of the
habitual time for Out?'
EXECUTE .
COMPUTE Out3hit2 = (ABS(Out3-Outht2)) <= 0.75 .
VARIABLE LABELS Out3hit2 'Is Out3 within 3/4 of an hour of the
habitual time for Out?'
EXECUTE .
COMPUTE Out4hit2 = (ABS(Out4-Outht2)) <= 0.75 .
VARIABLE LABELS Out4hit2 'Is Out4 within 3/4 of an hour of the
habitual time for Out?'
EXECUTE .
COMPUTE Out5hit2 = (ABS(Out5-Outht2)) <= 0.75 .
VARIABLE LABELS Out5hit2 'Is Out5 within 3/4 of an hour of the
habitual time for Out?'
EXECUTE .
COMPUTE Out6hit2 = (ABS(Out6-Outht2)) <= 0.75 .
VARIABLE LABELS Out6hit2 'Is Out6 within 3/4 of an hour of the
habitual time for Out?'
EXECUTE .
```

```
COMPUTE Out7hit2 = (ABS(Out7-Outht2)) <= 0.75 .
VARIABLE LABELS Out7hit2 'Is Out7 within 3/4 of an hour of the
habitual time for Out?'
EXECUTE .
COUNT
 HOWMANYOUThits2 = Out1hit2 Out2hit2 Out3hit2 Out4hit2 Out5hit2
Out6hit2
 Out7hit2 (1) .
EXECUTE .
*** Start Work/School/Housework/Volunteer Activities/Family Care
command line ***
COMPUTE Workinimea = MEAN (work1, work2, work3, work4, work5, work6, work7)
VARIABLE LABELS Workinimea 'Start work/school/activities day initial
mean'
EXECUTE .
COMPUTE workiniSD = SD(work1,work2,work3,work4,work5,work6,work7) .
VARIABLE LABELS OutiniSD 'Start work/school/activities day initial
SD'.
EXECUTE .
COMPUTE Workissdlt10 = workiniSD<0.16666667 .
EXECUTE .
COMPUTE workfinmea = (Workissdlt10) *workinimea .
EXECUTE .
COMPUTE work1dist = (ABS(Work1-workinimea)/workiniSD) <= 1.5 .
VARIABLE LABELS work1dist 'Is work1 no more than 1.5 SDs from the
Work mean?' .
EXECUTE .
COMPUTE work2dist = (ABS(Work2-workinimea)/workiniSD) <= 1.5 .
VARIABLE LABELS work2dist 'Is work2 no more than 1.5 SDs from the
Work mean?' .
EXECUTE .
COMPUTE work3dist = (ABS(Work3-workinimea)/workiniSD) <= 1.5 .
VARIABLE LABELS work3dist 'Is work3 no more than 1.5 SDs from the
Work mean?' .
EXECUTE .
COMPUTE work4dist = (ABS(Work4-workinimea)/workiniSD) <= 1.5.
VARIABLE LABELS work4dist 'Is work4 no more than 1.5 SDs from the
Work mean?' .
EXECUTE .
COMPUTE work5dist = (ABS(Work5-workinimea)/workiniSD) <= 1.5 .
VARIABLE LABELS work5dist 'Is work5 no more than 1.5 SDs from the
Work mean?' .
EXECUTE .
COMPUTE work6dist = (ABS(Work6-workinimea)/workiniSD) <= 1.5 .
VARIABLE LABELS work6dist 'Is work6 no more than 1.5 SDs from the
Work mean?' .
```

```
EXECUTE
COMPUTE work7dist = (ABS(Work7-workinimea)/workiniSD) <= 1.5 .
VARIABLE LABELS work7dist 'Is work7 no more than 1.5 SDs from the
Work mean?' .
EXECUTE .
COUNT
 HOWMANYWORKS = Work1dist Work2dist Work3dist Work4dist Work5dist
Work6dist
 Work7dist (1) .
EXECUTE .
COMPUTE
WorkHT=(Work1dist*Work1+Work2dist*Work2+Work3dist*Work3+Work4dist*Wo
rk4+Work5dist*Work5+Work6dist*Work6+Work7dist*Work7)/HOWMANYWORKS.
VARIABLE LABELS 'Habitual time for Work'.
EXECUTE.
COMPUTE
WorkHT=(WorkiniSD<0.16666667) *Workinimea+(WorkiniSD>=0.166666667) *Wor
kнт.
EXECUTE.
COMPUTE Workht2 = ((1-MISSING(Work1)) *Work1dist*Work1+(1-
MISSING(Work2)) *Work2dist
 *Work2+(1-MISSING(Work3))*Work3dist*Work3+(1-
MISSING(Work4))*Work4dist*Work4+(1
 -MISSING(Work5)) *Work5dist*Work5+(1-
MISSING(Work6))*Work6dist*Work6+(1
-MISSING(Work7))*Work7dist*Work7)/HOWMANYWORKS .
EXECUTE .
COMPUTE
Workht2= (WorkiniSD<0.16666667) *Workinimea+ (WorkiniSD>=0.16666667) *Wo
rkht2.
EXECUTE.
COMPUTE Work1hit2 = (ABS(Work1-Workht2)) <= 0.75 .
VARIABLE LABELS Work1hit2 'Is Work1 within 3/4 of an hour of the
habitual time for Work?'
EXECUTE .
COMPUTE Work2hit2 = (ABS(Work2-Workht2)) <= 0.75 .
VARIABLE LABELS Work2hit2 'Is Work2 within 3/4 of an hour of the
habitual time for Work?'
EXECUTE .
COMPUTE Work3hit2 = (ABS(Work3-Workht2)) <= 0.75 .
VARIABLE LABELS Work3hit2 'Is Work3 within 3/4 of an hour of the
habitual time for Work?'
EXECUTE .
COMPUTE Work4hit2 = (ABS(Work4-Workht2)) <= 0.75 .
VARIABLE LABELS Work4hit2 'Is Work4 within 3/4 of an hour of the
habitual time for Work?'
```

EXECUTE COMPUTE Work5hit2 = (ABS(Work5-Workht2)) <= 0.75 . VARIABLE LABELS Work5hit2 'Is Work5 within 3/4 of an hour of the habitual time for Work?' EXECUTE . COMPUTE Work6hit2 = (ABS(Work6-Workht2)) <= 0.75 . VARIABLE LABELS Work6hit2 'Is Work6 within 3/4 of an hour of the habitual time for Work?' EXECUTE . COMPUTE Work7hit2 = (ABS(Work7-Workht2)) <= 0.75 . VARIABLE LABELS Work7hit2 'Is Work7 within 3/4 of an hour of the habitual time for Work?' EXECUTE . COUNT HOWMANYWORKhits2 = Work1hit2 Work2hit2 Work3hit2 Work4hit2 Work5hit2 Work6hit2 Work7hit2 (1) . EXECUTE . *** Have Lunch command line *** COMPUTE luninimea = MEAN(lun1,lun2,lun3,lun4,lun5,lun6,lun7) . VARIABLE LABELS Luninimea 'Have lunch day initial mean' EXECUTE . COMPUTE luniniSD = SD(lun1,lun2,lun3,lun4,lun5,lun6,lun7) . VARIABLE LABELS luniniSD 'Have lunch day initial SD' . EXECUTE . COMPUTE Lunissdlt10 = luniniSD<0.16666667 . EXECUTE . COMPUTE lunfinmea = (Lunissdlt10) *luninimea . EXECUTE . COMPUTE lun1dist = (ABS(Lun1-luninimea)/luniniSD) <= 1.5 . VARIABLE LABELS lun1dist 'Is lun1 no more than 1.5 SDs from the Lunch mean?' . EXECUTE . COMPUTE lun2dist = (ABS(Lun2-luninimea)/luniniSD) <= 1.5 . VARIABLE LABELS lun2dist 'Is lun2 no more than 1.5 SDs from the Lunch mean?' . EXECUTE . COMPUTE lun3dist = (ABS(Lun3-luninimea)/luniniSD) <= 1.5 .</pre> VARIABLE LABELS lun3dist 'Is lun3 no more than 1.5 SDs from the Lunch mean?' . EXECUTE . COMPUTE lun4dist = (ABS(Lun4-luninimea)/luniniSD) <= 1.5 .</pre> VARIABLE LABELS lun4dist 'Is lun4 no more than 1.5 SDs from the Lunch mean?' . EXECUTE . COMPUTE lun5dist = (ABS(Lun5-luninimea)/luniniSD) <= 1.5 .

```
VARIABLE LABELS lun5dist 'Is lun5 no more than 1.5 SDs from the
Lunch mean?' .
EXECUTE .
COMPUTE lun6dist = (ABS(Lun6-luninimea)/luniniSD) <= 1.5 .
VARIABLE LABELS lun6dist 'Is lun6 no more than 1.5 SDs from the
Lunch mean?' .
EXECUTE .
COMPUTE lun7dist = (ABS(Lun7-luninimea)/luniniSD) <= 1.5 .
VARIABLE LABELS lun7dist 'Is lun7 no more than 1.5 SDs from the
Lunch mean?' .
EXECUTE .
COUNT
  HOWMANYLUNS = Lun1dist Lun2dist Lun3dist lun4dist lun5dist
lun6dist
  lun7dist (1) .
EXECUTE .
COMPUTE
LunHT=(Lun1dist*Lun1+Lun2dist*Lun2+Lun3dist*Lun3+Lun4dist*Lun4+Lun5d
ist*Lun5+Lun6dist*Lun6+Lun7dist*Lun7)/HOWMANYLUNS.
VARIABLE LABELS 'Habitual time for Lun'.
EXECUTE.
COMPUTE
LunHT=(LuniniSD<0.16666667)*Luninimea+(LuniniSD>=0.16666667)*LunHT.
EXECUTE.
COMPUTE Lunht2 = ((1-MISSING(Lun1))*Lun1dist*Lun1+(1-
MISSING(Lun2))*Lun2dist
*Lun2+(1-MISSING(Lun3))*Lun3dist*Lun3+(1-
MISSING(Lun4))*Lun4dist*Lun4+(1
 -MISSING(Lun5))*Lun5dist*Lun5+(1-MISSING(Lun6))*Lun6dist*Lun6+(1
 -MISSING(Lun7))*Lun7dist*Lun7)/HOWMANYLUNS .
EXECUTE .
COMPUTE
Lunht2=(LuniniSD<0.16666667)*Luninimea+(LuniniSD>=0.16666667)*Lunht2
EXECUTE.
COMPUTE Lun1hit2 = (ABS(Lun1-Lunht2)) <= 0.75 .
VARIABLE LABELS Lun1hit2 'Is Lun1 within 3/4 of an hour of the
habitual time for Lun?'
EXECUTE .
COMPUTE Lun2hit2 = (ABS(Lun2-Lunht2)) <= 0.75 .
VARIABLE LABELS Lun2hit2 'Is Lun2 within 3/4 of an hour of the
habitual time for Lun?'
EXECUTE .
COMPUTE Lun3hit2 = (ABS(Lun3-Lunht2)) <= 0.75 .
VARIABLE LABELS Lun3hit2 'Is Lun3 within 3/4 of an hour of the
habitual time for Lun?'
EXECUTE .
```

COMPUTE Lun4hit2 = (ABS(Lun4-Lunht2)) <= 0.75 . VARIABLE LABELS Lun4hit2 'Is Lun4 within 3/4 of an hour of the habitual time for Lun?' EXECUTE . COMPUTE Lun5hit2 = (ABS(Lun5-Lunht2)) <= 0.75 . VARIABLE LABELS Lun5hit2 'Is Lun5 within 3/4 of an hour of the habitual time for Lun?' EXECUTE . COMPUTE Lun6hit2 = (ABS(Lun6-Lunht2)) <= 0.75 . VARIABLE LABELS Lun6hit2 'Is Lun6 within 3/4 of an hour of the habitual time for Lun?' EXECUTE COMPUTE Lun7hit2 = (ABS(Lun7-Lunht2)) <= 0.75 . VARIABLE LABELS Lun7hit2 'Is Lun7 within 3/4 of an hour of the habitual time for Lun?' EXECUTE . COUNT HOWMANYLUNhits2 = Lun1hit2 Lun2hit2 Lun3hit2 Lun4hit2 Lun5hit2 Lun6hit2 Lun7hit2 (1) . EXECUTE . *** Take Afternoon Nap command line *** COMPUTE napinimea = MEAN(nap1,nap2,nap3,nap4,nap5,nap6,nap7) . VARIABLE LABELS napinimea 'Nap initial mean' EXECUTE . COMPUTE napiniSD = SD(nap1,nap2,nap3,nap4,nap5,nap6,nap7) . VARIABLE LABELS napiniSD 'Nap initial SD' . EXECUTE . COMPUTE Napissdlt10 = napiniSD<0.16666667 . EXECUTE . COMPUTE napfinmea = (Napissdlt10) * napinimea . EXECUTE . COMPUTE napldist = (ABS(Napl-napinimea)/napiniSD) <= 1.5 . VARIABLE LABELS napldist 'Is napl no more than 1.5 SDs from the Nap mean?'. EXECUTE . COMPUTE nap2dist = (ABS(Nap2-napinimea)/napiniSD) <= 1.5 . VARIABLE LABELS nap2dist 'Is nap2 no more than 1.5 SDs from the Nap mean?'. EXECUTE . COMPUTE nap3dist = (ABS(Nap3-napinimea)/napiniSD) <= 1.5 .</pre> VARIABLE LABELS nap3dist 'Is nap3 no more than 1.5 SDs from the Nap mean?'. EXECUTE . COMPUTE nap4dist = (ABS(Nap4-napinimea)/napiniSD) <= 1.5 . VARIABLE LABELS nap4dist 'Is nap4 no more than 1.5 SDs from the Nap mean?'.

```
EXECUTE
COMPUTE nap5dist = (ABS(Nap5-napinimea)/napiniSD) <= 1.5 .
VARIABLE LABELS nap5dist 'Is nap5 no more than 1.5 SDs from the Nap
mean?'
EXECUTE .
COMPUTE nap6dist = (ABS(Nap6-napinimea)/napiniSD) <= 1.5 .
VARIABLE LABELS nap6dist 'Is nap6 no more than 1.5 SDs from the Nap
mean?'.
EXECUTE .
COMPUTE nap7dist = (ABS(Nap7-napinimea)/napiniSD) <= 1.5 .
VARIABLE LABELS nap7dist 'Is nap7 no more than 1.5 SDs from the Nap
mean?'
EXECUTE .
COUNT
  HOWMANYNAPS = nap1dist nap2dist nap3dist nap4dist nap5dist
nap6dist
  nap7dist (1) .
EXECUTE .
COMPUTE
NapHT=(Nap1dist*Nap1+Nap2dist*Nap2+Nap3dist*Nap3+Nap4dist*Nap4+Nap5d
ist*Nap5+Nap6dist*Nap6+Nap7dist*Nap7)/HOWMANYNAPS.
VARIABLE LABELS 'Habitual time for Nap.
EXECUTE.
COMPUTE
NapHT=(NapiniSD<0.166666667)*Napinimea+(NapiniSD>=0.166666667)*NapHT.
EXECUTE.
COMPUTE Napht2 = ((1-MISSING(Nap1))*Nap1dist*Nap1+(1-
MISSING(Nap2))*Nap2dist
*Nap2+(1-MISSING(Nap3))*Nap3dist*Nap3+(1-
MISSING(Nap4))*Nap4dist*Nap4+(1
 -MISSING(Nap5)) *Nap5dist*Nap5+(1-MISSING(Nap6)) *Nap6dist*Nap6+(1
 -MISSING(Nap7))*Nap7dist*Nap7)/HOWMANYNAPS .
EXECUTE .
COMPUTE
Napht2=(NapiniSD<0.16666667) *Napinimea+(NapiniSD>=0.16666667) *Napht2
EXECUTE.
COMPUTE Nap1hit2 = (ABS(Nap1-Napht2)) <= 0.75 .
VARIABLE LABELS Nap1hit2 'Is Nap1 within 3/4 of an hour of the
habitual time for Nap?'
EXECUTE .
COMPUTE Nap2hit2 = (ABS(Nap2-Napht2)) <= 0.75 .
VARIABLE LABELS Nap2hit2 'Is Nap2 within 3/4 of an hour of the
habitual time for Nap?'
EXECUTE .
COMPUTE Nap3hit2 = (ABS(Nap3-Napht2)) <= 0.75 .
```

VARIABLE LABELS Nap3hit2 'Is Nap3 within 3/4 of an hour of the habitual time for Nap?' EXECUTE . COMPUTE Nap4hit2 = (ABS(Nap4-Napht2)) <= 0.75 . VARIABLE LABELS Nap4hit2 'Is Nap4 within 3/4 of an hour of the habitual time for Nap?' EXECUTE . COMPUTE Nap5hit2 = (ABS(Nap5-Napht2)) <= 0.75 . VARIABLE LABELS Nap5hit2 'Is Nap5 within 3/4 of an hour of the habitual time for Nap?' EXECUTE . COMPUTE Nap6hit2 = (ABS(Nap6-Napht2)) <= 0.75 . VARIABLE LABELS Nap6hit2 'Is Nap6 within 3/4 of an hour of the habitual time for Nap?' EXECUTE . COMPUTE Nap7hit2 = (ABS(Nap7-Napht2)) <= 0.75 . VARIABLE LABELS Nap7hit2 'Is Nap7 within 3/4 of an hour of the habitual time for Nap?' EXECUTE . COUNT HOWMANYNAPhits2 = Nap1hit2 Nap2hit2 Nap3hit2 Nap4hit2 Nap5hit2 Nap6hit2 Nap7hit2 (1) . EXECUTE . *** Have Dinner command line *** COMPUTE dininimea = MEAN(din1,din2,din3,din4,din5,din6,din7) . VARIABLE LABELS dininimea 'Dinner initial mean' EXECUTE . COMPUTE dininiSD = SD(din1,din2,din3,din4,din5,din6,din7) . VARIABLE LABELS dininiSD 'Dinner initial SD' . EXECUTE . COMPUTE Dinissdlt10 = dininiSD<0.16666667 . EXECUTE . COMPUTE dinfinmea = (Dinissdlt10)*dininimea . EXECUTE . COMPUTE dinldist = (ABS(dinl-dininimea)/dininiSD) <= 1.5 . VARIABLE LABELS din1dist 'Is din1 no more than 1.5 SDs from the Dinner mean?' . EXECUTE . COMPUTE din2dist = (ABS(din2-dininimea)/dininiSD) <= 1.5 . VARIABLE LABELS din2dist 'Is din2 no more than 1.5 SDs from the Dinner mean?' . EXECUTE . COMPUTE din3dist = (ABS(din3-dininimea)/dininiSD) <= 1.5 . VARIABLE LABELS din3dist 'Is din3 no more than 1.5 SDs from the Dinner mean?' . EXECUTE .

```
COMPUTE din4dist = (ABS(din4-dininimea)/dininiSD) <= 1.5 .
VARIABLE LABELS din4dist 'Is din4 no more than 1.5 SDs from the
Dinner mean?' .
EXECUTE .
COMPUTE din5dist = (ABS(din5-dininimea)/dininiSD) <= 1.5 .
VARIABLE LABELS din5dist 'Is din5 no more than 1.5 SDs from the
Dinner mean?' .
EXECUTE .
COMPUTE din6dist = (ABS(din6-dininimea)/dininiSD) <= 1.5 .
VARIABLE LABELS din6dist 'Is din6 no more than 1.5 SDs from the
Dinner mean?' .
EXECUTE
COMPUTE din7dist = (ABS(din7-dininimea)/dininiSD) <= 1.5 .
VARIABLE LABELS din7dist 'Is din7 no more than 1.5 SDs from the
Dinner mean?' .
EXECUTE .
COUNT
  HOWMANYDINS = din1dist din2dist din3dist din4dist din5dist
din6dist
  din7dist (1) .
EXECUTE .
COMPUTE
DinHT=(Din1dist*Din1+Din2dist*Din2+Din3dist*Din3+Din4dist*Din4+Din5d
ist*Din5+Din6dist*Din6+Din7dist*Din7)/HOWMANYDINS.
VARIABLE LABELS 'Habitual time for Din'.
EXECUTE
COMPUTE
DinHT=(DininiSD<0.166666667)*Dininimea+(DininiSD>=0.166666667)*DinHT.
EXECUTE.
COMPUTE Dinht2 = ((1-MISSING(Din1))*Din1dist*Din1+(1-
MISSING(Din2))*Din2dist
*Din2+(1-MISSING(Din3))*Din3dist*Din3+(1-
MISSING(Din4))*Din4dist*Din4+(1
-MISSING(Din5))*Din5dist*Din5+(1-MISSING(Din6))*Din6dist*Din6+(1
-MISSING(Din7))*Din7dist*Din7)/HOWMANYDINS .
EXECUTE .
COMPUTE
Dinht2=(DininiSD<0.16666667)*Dininimea+(DininiSD>=0.16666667)*Dinht2
EXECUTE.
COMPUTE Din1hit2 = (ABS(Din1-Dinht2)) <= 0.75 .
VARIABLE LABELS Din1hit2 'Is Din1 within 3/4 of an hour of the
habitual time for Din?'
EXECUTE .
COMPUTE Din2hit2 = (ABS(Din2-Dinht2)) <= 0.75 .
VARIABLE LABELS Din2hit2 'Is Din2 within 3/4 of an hour of the
habitual time for Din?'
```

```
EXECUTE
COMPUTE Din3hit2 = (ABS(Din3-Dinht2)) <= 0.75 .
VARIABLE LABELS Din3hit2 'Is Din3 within 3/4 of an hour of the
habitual time for Din?'
EXECUTE .
COMPUTE Din4hit2 = (ABS(Din4-Dinht2)) <= 0.75 .
VARIABLE LABELS Din4hit2 'Is Din4 within 3/4 of an hour of the
habitual time for Din?'
EXECUTE .
COMPUTE Din5hit2 = (ABS(Din5-Dinht2)) <= 0.75 .
VARIABLE LABELS Din5hit2 'Is Din5 within 3/4 of an hour of the
habitual time for Din?'
EXECUTE .
COMPUTE Din6hit2 = (ABS(Din6-Dinht2)) <= 0.75 .
VARIABLE LABELS Din6hit2 'Is Din6 within 3/4 of an hour of the
habitual time for Din?'
EXECUTE .
COMPUTE Din7hit2 = (ABS(Din7-Dinht2)) <= 0.75 .
VARIABLE LABELS Din7hit2 'Is Din7 within 3/4 of an hour of the
habitual time for Din?'
EXECUTE .
COUNT
  HOWMANYDINhits2 = Din1hit2 Din2hit2 Din3hit2 Din4hit2 Din5hit2
Din6hit2
 Din7hit2 (1) .
EXECUTE .
*** Physical Exercise Command line ***
COMPUTE exeinimea = MEAN(exe1,exe2,exe3,exe4,exe5,exe6,exe7) .
VARIABLE LABELS exeinimea 'Exercise initial mean'
EXECUTE .
COMPUTE exeiniSD = SD(exe1,exe2,exe3,exe4,exe5,exe6,exe7) .
VARIABLE LABELS exeiniSD 'Exercise initial SD' .
EXECUTE .
COMPUTE Exeissdlt10 = exeiniSD<0.16666667 .
EXECUTE .
COMPUTE exefinmea = (Exeissdlt10) * exeinimea .
EXECUTE .
COMPUTE exeldist = (ABS(exel-exeinimea)/exeiniSD) <= 1.5 .
VARIABLE LABELS exeldist 'Is exel no more than 1.5 SDs from the
Exercise mean?' .
EXECUTE .
COMPUTE exe2dist = (ABS(exe2-exeinimea)/exeiniSD) <= 1.5 .</pre>
VARIABLE LABELS exe2dist 'Is exe2 no more than 1.5 SDs from the
Exercise mean?' .
EXECUTE .
COMPUTE exe3dist = (ABS(exe3-exeinimea)/exeiniSD) <= 1.5 .</pre>
```

VARIABLE LABELS exe3dist 'Is exe3 no more than 1.5 SDs from the Exercise mean?' . EXECUTE . COMPUTE exe4dist = (ABS(exe4-exeinimea)/exeiniSD) <= 1.5 . VARIABLE LABELS exe4dist 'Is exe4 no more than 1.5 SDs from the Exercise mean?' . EXECUTE . COMPUTE exe5dist = (ABS(exe5-exeinimea)/exeiniSD) <= 1.5 . VARIABLE LABELS exe5dist 'Is exe5 no more than 1.5 SDs from the Exercise mean?' . EXECUTE . COMPUTE exe6dist = (ABS(exe6-exeinimea)/exeiniSD) <= 1.5 . VARIABLE LABELS exe6dist 'Is exe6 no more than 1.5 SDs from the Exercise mean?' . EXECUTE . COMPUTE exe7dist = (ABS(exe7-exeinimea)/exeiniSD) <= 1.5 . VARIABLE LABELS exe7dist 'Is exe7 no more than 1.5 SDs from the Exercise mean?' . EXECUTE . COUNT HOWMANYEXES = exeldist exe2dist exe3dist exe4dist exe5dist exe6dist exe7dist (1) . EXECUTE . COMPUTE ExeHT=(Exeldist*Exe1+Exe2dist*Exe2+Exe3dist*Exe3+Exe4dist*Exe4+Exe5d ist*Exe5+Exe6dist*Exe6+Exe7dist*Exe7)/HOWMANYEXES. VARIABLE LABELS 'Habitual time for Exe'. EXECUTE. COMPUTE ExeHT=(ExeiniSD<0.16666667)*Exeinimea+(ExeiniSD>=0.16666667)*ExeHT. EXECUTE. COMPUTE Exeht2 = ((1-MISSING(Exel))*Exeldist*Exel+(1-MISSING(Exe2))*Exe2dist *Exe2+(1-MISSING(Exe3))*Exe3dist*Exe3+(1-MISSING(Exe4))*Exe4dist*Exe4+(1 -MISSING(Exe5))*Exe5dist*Exe5+(1-MISSING(Exe6))*Exe6dist*Exe6+(1 -MISSING(Exe7)) *Exe7dist*Exe7) /HOWMANYEXES . EXECUTE . COMPUTE Exeht2=(ExeiniSD<0.16666667)*Exeinimea+(ExeiniSD>=0.16666667)*Exeht2 EXECUTE. COMPUTE Exelhit2 = (ABS(Exel-Exeht2)) <= 0.75 . VARIABLE LABELS Exelhit2 'Is Exel within 3/4 of an hour of the habitual time for Exe?' EXECUTE .

COMPUTE Exe2hit2 = (ABS(Exe2-Exeht2)) <= 0.75 . VARIABLE LABELS Exe2hit2 'Is Exe2 within 3/4 of an hour of the habitual time for Exe?' EXECUTE . COMPUTE Exe3hit2 = (ABS(Exe3-Exeht2)) <= 0.75 . VARIABLE LABELS Exe3hit2 'Is Exe3 within 3/4 of an hour of the habitual time for Exe?' EXECUTE . COMPUTE Exe4hit2 = (ABS(Exe4-Exeht2)) <= 0.75 . VARIABLE LABELS Exe4hit2 'Is Exe4 within 3/4 of an hour of the habitual time for Exe?' EXECUTE COMPUTE Exe5hit2 = (ABS(Exe5-Exeht2)) <= 0.75 . VARIABLE LABELS Exe5hit2 'Is Exe5 within 3/4 of an hour of the habitual time for Exe?' EXECUTE . COMPUTE Exe6hit2 = (ABS(Exe6-Exeht2)) <= 0.75 . VARIABLE LABELS Exe6hit2 'Is Exe6 within 3/4 of an hour of the habitual time for Exe?' EXECUTE . COMPUTE Exe7hit2 = (ABS(Exe7-Exeht2)) <= 0.75 . VARIABLE LABELS Exe7hit2 'Is Exe7 within 3/4 of an hour of the habitual time for Exe?' EXECUTE . COUNT HOWMANYEXEhits2 = Exe1hit2 Exe2hit2 Exe3hit2 Exe4hit2 Exe5hit2 Exe6hit2 Exe7hit2 (1) . EXECUTE . *** Have an Evening Snack/Drink Command line *** COMPUTE snainimea = MEAN(sna1,sna2,sna3,sna4,sna5,sna6,sna7) . VARIABLE LABELS snainimea 'Snack initial mean' EXECUTE . COMPUTE snainiSD = SD(sna1, sna2, sna3, sna4, sna5, sna6, sna7) . VARIABLE LABELS snainiSD 'Snack initial SD' . EXECUTE . COMPUTE snafinmea = (Snaissdlt10)*snainimea . EXECUTE . COMPUTE Snaissdlt10 = snainiSD<0.16666667 . EXECUTE . COMPUTE snaldist = (ABS(snal-snainimea)/snainiSD) <= 1.5 . VARIABLE LABELS snaldist 'Is snal no more than 1.5 SDs from the Snack mean?' . EXECUTE . COMPUTE sna2dist = (ABS(sna2-snainimea)/snainiSD) <= 1.5 . VARIABLE LABELS sna2dist 'Is sna2 no more than 1.5 SDs from the Snack mean?' .

```
EXECUTE
COMPUTE sna3dist = (ABS(sna3-snainimea)/snainiSD) <= 1.5 .
VARIABLE LABELS sna3dist 'Is sna3 no more than 1.5 SDs from the
Snack mean?' .
EXECUTE .
COMPUTE sna4dist = (ABS(sna4-snainimea)/snainiSD) <= 1.5 .</pre>
VARIABLE LABELS sna4dist 'Is sna4 no more than 1.5 SDs from the
Snack mean?' .
EXECUTE .
COMPUTE sna5dist = (ABS(sna5-snainimea)/snainiSD) <= 1.5 .
VARIABLE LABELS sna5dist 'Is sna5 no more than 1.5 SDs from the
Snack mean?' .
EXECUTE .
COMPUTE sna6dist = (ABS(sna6-snainimea)/snainiSD) <= 1.5 .</pre>
VARIABLE LABELS sna6dist 'Is sna6 no more than 1.5 SDs from the
Snack mean?' .
EXECUTE .
COMPUTE sna7dist = (ABS(sna7-snainimea)/snainiSD) <= 1.5 .
VARIABLE LABELS sna7dist 'Is sna7 no more than 1.5 SDs from the
Snack mean?' .
EXECUTE .
COUNT
  HOWMANYSNAS = snaldist sna2dist sna3dist sna4dist sna5dist
sna6dist
  sna7dist (1) .
EXECUTE .
COMPUTE
SnaHT=(Sna1dist*Sna1+Sna2dist*Sna2+Sna3dist*Sna3+Sna4dist*Sna4+Sna5d
ist*Sna5+Sna6dist*Sna6+Sna7dist*Sna7)/HOWMANYSNAS.
VARIABLE LABELS 'Habitual time for Sna'.
EXECUTE.
COMPUTE
SnaHT=(SnainiSD<0.16666667)*Snainimea+(SnainiSD>=0.166666667)*SnaHT.
EXECUTE.
COMPUTE Snaht2 = ((1-MISSING(Snal))*Snaldist*Snal+(1-
MISSING(Sna2))*Sna2dist
 *Sna2+(1-MISSING(Sna3))*Sna3dist*Sna3+(1-
MISSING(Sna4))*Sna4dist*Sna4+(1
 -MISSING(Sna5))*Sna5dist*Sna5+(1-MISSING(Sna6))*Sna6dist*Sna6+(1
 -MISSING(Sna7))*Sna7dist*Sna7)/HOWMANYSNAS .
EXECUTE .
COMPUTE
Snaht2=(SnainiSD<0.16666667)*Snainimea+(SnainiSD>=0.16666667)*Snaht2
EXECUTE.
COMPUTE Snalhit2 = (ABS(Snal-Snaht2)) <= 0.75 .
```

VARIABLE LABELS Snalhit2 'Is Snal within 3/4 of an hour of the habitual time for Sna?' EXECUTE . COMPUTE Sna2hit2 = (ABS(Sna2-Snaht2)) <= 0.75 . VARIABLE LABELS Sna2hit2 'Is Sna2 within 3/4 of an hour of the habitual time for Sna?' EXECUTE . COMPUTE Sna3hit2 = (ABS(Sna3-Snaht2)) <= 0.75 . VARIABLE LABELS Sna3hit2 'Is Sna3 within 3/4 of an hour of the habitual time for Sna?' EXECUTE . COMPUTE Sna4hit2 = (ABS(Sna4-Snaht2)) <= 0.75 . VARIABLE LABELS Sna4hit2 'Is Sna4 within 3/4 of an hour of the habitual time for Sna?' EXECUTE . COMPUTE Sna5hit2 = (ABS(Sna5-Snaht2)) <= 0.75 . VARIABLE LABELS Sna5hit2 'Is Sna5 within 3/4 of an hour of the habitual time for Sna?' EXECUTE . COMPUTE Sna6hit2 = (ABS(Sna6-Snaht2)) <= 0.75 . VARIABLE LABELS Sna6hit2 'Is Sna6 within 3/4 of an hour of the habitual time for Sna?' EXECUTE . COMPUTE Sna7hit2 = (ABS(Sna7-Snaht2)) <= 0.75 . VARIABLE LABELS Sna7hit2 'Is Sna7 within 3/4 of an hour of the habitual time for Sna?' EXECUTE . COUNT HOWMANYSNAhits2 = Snalhit2 Sna2hit2 Sna3hit2 Sna4hit2 Sna5hit2 Sna6hit2 Sna7hit2 (1) . EXECUTE . *** Watch Evening TV News Program Command line *** COMPUTE newinimea = MEAN(new1, new2, new3, new4, new5, new6, new7) . VARIABLE LABELS newinimea 'Evening news initial mean' EXECUTE . COMPUTE newiniSD = SD(new1, new2, new3, new4, new5, new6, new7) . VARIABLE LABELS newiniSD 'Evening news initial SD' . EXECUTE . COMPUTE Newissdlt10 = newiniSD<0.16666667 . EXECUTE . COMPUTE newfinmea = (Newissdlt10) * newinimea . EXECUTE . COMPUTE new1dist = (ABS(new1-newinimea)/newiniSD) <= 1.5 . VARIABLE LABELS new1dist 'Is new1 no more than 1.5 SDs from the News mean?'. EXECUTE .

COMPUTE new2dist = (ABS(new2-newinimea)/newiniSD) <= 1.5 . VARIABLE LABELS new2dist 'Is new2 no more than 1.5 SDs from the News mean?'. EXECUTE . COMPUTE new3dist = (ABS(new3-newinimea)/newiniSD) <= 1.5 . VARIABLE LABELS new3dist 'Is new3 no more than 1.5 SDs from the News mean?'. EXECUTE . COMPUTE new4dist = (ABS(new4-newinimea)/newiniSD) <= 1.5 . VARIABLE LABELS new4dist 'Is new4 no more than 1.5 SDs from the News mean?'. EXECUTE . COMPUTE new5dist = (ABS(new5-newinimea)/newiniSD) <= 1.5 . VARIABLE LABELS new5dist 'Is new5 no more than 1.5 SDs from the News mean?'. EXECUTE . COMPUTE new6dist = (ABS(new6-newinimea)/newiniSD) <= 1.5 . VARIABLE LABELS new6dist 'Is new6 no more than 1.5 SDs from the News mean?'. EXECUTE . COMPUTE new7dist = (ABS(new7-newinimea)/newiniSD) <= 1.5 . VARIABLE LABELS new7dist 'Is new7 no more than 1.5 SDs from the News mean?'. EXECUTE . COUNT HOWMANYNEWS = new1dist new2dist new3dist new4dist new5dist new6dist new7dist (1) . EXECUTE . COMPUTE NewHT=(New1dist*New1+New2dist*New2+New3dist*New3+New4dist*New4+New5d ist*New5+New6dist*New6+New7dist*New7)/HOWMANYNEWS. VARIABLE LABELS 'Habitual time for New'. EXECUTE. COMPUTE NewHT=(NewiniSD<0.166666667)*Newinimea+(NewiniSD>=0.166666667)*NewHT. EXECUTE. COMPUTE Newht2 = ((1-MISSING(New1))*New1dist*New1+(1-MISSING(New2))*New2dist *New2+(1-MISSING(New3))*New3dist*New3+(1-MISSING(New4))*New4dist*New4+(1 -MISSING(New5))*New5dist*New5+(1-MISSING(New6))*New6dist*New6+(1 -MISSING(New7)) *New7dist*New7) /HOWMANYNEWS . EXECUTE . COMPUTE Newht2=(NewiniSD<0.16666667) *Newinimea+(NewiniSD>=0.166666667) *Newht2 EXECUTE.

```
COMPUTE New1hit2 = (ABS(New1-Newht2)) <= 0.75 .
VARIABLE LABELS New1hit2 'Is New1 within 3/4 of an hour of the
habitual time for New?'
EXECUTE .
COMPUTE New2hit2 = (ABS(New2-Newht2)) <= 0.75 .
VARIABLE LABELS New2hit2 'Is New2 within 3/4 of an hour of the
habitual time for New?'
EXECUTE .
COMPUTE New3hit2 = (ABS(New3-Newht2)) <= 0.75 .
VARIABLE LABELS New3hit2 'Is New3 within 3/4 of an hour of the
habitual time for New?'
EXECUTE
COMPUTE New4hit2 = (ABS(New4-Newht2)) <= 0.75 .
VARIABLE LABELS New4hit2 'Is New4 within 3/4 of an hour of the
habitual time for New?'
EXECUTE .
COMPUTE New5hit2 = (ABS(New5-Newht2)) <= 0.75 .
VARIABLE LABELS New5hit2 'Is New5 within 3/4 of an hour of the
habitual time for New?'
EXECUTE .
COMPUTE New6hit2 = (ABS(New6-Newht2)) <= 0.75 .
VARIABLE LABELS New6hit2 'Is New6 within 3/4 of an hour of the
habitual time for New?'
EXECUTE .
COMPUTE New7hit2 = (ABS(New7-Newht2)) <= 0.75.
VARIABLE LABELS New7hit2 'Is New7 within 3/4 of an hour of the
habitual time for New?'
EXECUTE .
COUNT
 HOWMANYNEWhits2 = New1hit2 New2hit2 New3hit2 New4hit2 New5hit2
New6hit2
 New7hit2 (1) .
EXECUTE .
*** Watch another TV Programme Command line ***
COMPUTE tvinimea = MEAN(tv1,tv2,tv3,tv4,tv5,tv6,tv7) .
VARIABLE LABELS tvinimea 'Other TV initial mean'
EXECUTE .
COMPUTE tviniSD = SD(tv1, tv2, tv3, tv4, tv5, tv6, tv7).
VARIABLE LABELS tviniSD 'Other TV initial SD' .
EXECUTE .
COMPUTE tvissdlt10 = tviniSD<0.16666667 .
EXECUTE .
COMPUTE tvfinmea = (tvissdlt10) *tvinimea .
EXECUTE .
COMPUTE tvldist = (ABS(tvl-tvinimea)/tviniSD) <= 1.5 .
```

VARIABLE LABELS tvldist 'Is tvl no more than 1.5 SDs from the TV mean?'. EXECUTE . COMPUTE tv2dist = (ABS(tv2-tvinimea)/tviniSD) <= 1.5 . VARIABLE LABELS tv2dist 'Is tv2 no more than 1.5 SDs from the TV mean?'. EXECUTE . COMPUTE tv3dist = (ABS(tv3-tvinimea)/tviniSD) <= 1.5 . VARIABLE LABELS tv3dist 'Is tv3 no more than 1.5 SDs from the TV mean?'. EXECUTE . COMPUTE tv4dist = (ABS(tv4-tvinimea)/tviniSD) <= 1.5 . VARIABLE LABELS tv4dist 'Is tv4 no more than 1.5 SDs from the TV mean?'. EXECUTE . COMPUTE tv5dist = (ABS(tv5-tvinimea)/tviniSD) <= 1.5 . VARIABLE LABELS tv5dist 'Is tv5 no more than 1.5 SDs from the TV mean?'. EXECUTE . COMPUTE tv6dist = (ABS(tv6-tvinimea)/tviniSD) <= 1.5 . VARIABLE LABELS tv6dist 'Is tv6 no more than 1.5 SDs from the TV mean?'. EXECUTE . COMPUTE tv7dist = (ABS(tv7-tvinimea)/tviniSD) <= 1.5 . VARIABLE LABELS tv7dist 'Is tv7 no more than 1.5 SDs from the TV mean?'. EXECUTE . COUNT HOWMANYTVS = tv1dist tv2dist tv3dist tv4dist tv5dist tv6dist tv7dist (1) EXECUTE . COMPUTE TvHT=(Tv1dist*Tv1+Tv2dist*Tv2+Tv3dist*Tv3+Tv4dist*Tv4+Tv5dist*Tv5+Tv 6dist*Tv6+Tv7dist*Tv7)/HOWMANYTVS. VARIABLE LABELS 'Habitual time for Tv'. EXECUTE. COMPUTE TvHT=(TviniSD<0.166666667) *Tvinimea+(TviniSD>=0.166666667) *TvHT. EXECUTE. COMPUTE TVht2 = ((1-MISSING(Tv1))*Tv1dist*Tv1+(1-MISSING(Tv2)) *Tv2dist *Tv2+(1-MISSING(Tv3))*Tv3dist*Tv3+(1-MISSING(Tv4))*Tv4dist*Tv4+(1 -MISSING(Tv5)) *Tv5dist*Tv5+(1-MISSING(Tv6)) *Tv6dist*Tv6+(1 -MISSING(Tv7)) *Tv7dist*Tv7) /HOWMANYTVS . EXECUTE . COMPUTE TVht2=(TViniSD<0.16666667)*TVinimea+(TViniSD>=0.166666667)*TVht2. EXECUTE.

```
COMPUTE Tv1hit2 = (ABS(Tv1-Tvht2)) <= 0.75 .
VARIABLE LABELS Tv1hit2 'Is Tv1 within 3/4 of an hour of the
habitual time for Tv?'
EXECUTE .
COMPUTE Tv2hit2 = (ABS(Tv2-Tvht2)) <= 0.75 .
VARIABLE LABELS Tv2hit2 'Is Tv2 within 3/4 of an hour of the
habitual time for Tv?'
EXECUTE .
COMPUTE Tv3hit2 = (ABS(Tv3-Tvht2)) <= 0.75 .
VARIABLE LABELS Tv3hit2 'Is Tv3 within 3/4 of an hour of the
habitual time for Tv?'
EXECUTE .
COMPUTE Tv4hit2 = (ABS(Tv4-Tvht2)) <= 0.75 .
VARIABLE LABELS Tv4hit2 'Is Tv4 within 3/4 of an hour of the
habitual time for Tv?'
EXECUTE .
COMPUTE Tv5hit2 = (ABS(Tv5-Tvht2)) \leq 0.75.
VARIABLE LABELS Tv5hit2 'Is Tv5 within 3/4 of an hour of the
habitual time for Tv?'
EXECUTE .
COMPUTE Tv6hit2 = (ABS(Tv6-Tvht2)) <= 0.75 .
VARIABLE LABELS Tv6hit2 'Is Tv6 within 3/4 of an hour of the
habitual time for Tv?'
EXECUTE .
COMPUTE Tv7hit2 = (ABS(Tv7-Tvht2)) \leq 0.75.
VARIABLE LABELS Tv7hit2 'Is Tv7 within 3/4 of an hour of the
habitual time for Tv?'
EXECUTE .
COUNT
  HOWMANYTVhits2 = Tv1hit2 Tv2hit2 Tv3hit2 Tv4hit2 Tv5hit2 Tv6hit2
  Tv7hit2 (1) .
EXECUTE .
*** Activity A command line***
COMPUTE actainimea = MEAN (acta1, acta2, acta3, acta4, acta5, acta6, acta7)
VARIABLE LABELS actainimea 'Activity A initial mean'
EXECUTE .
COMPUTE actainiSD = SD(acta1,acta2,acta3,acta4,acta5,acta6,acta7) .
VARIABLE LABELS actainiSD 'Activity A initial SD' .
EXECUTE .
COMPUTE Actaissdlt10 = actainiSD<0.16666667 .
EXECUTE .
COMPUTE actafinmea = (Actaissdlt10) *actainimea .
EXECUTE .
COMPUTE actaldist = (ABS(actal-actainimea)/actainiSD) <= 1.5 .
```
VARIABLE LABELS actaldist 'Is actal no more than 1.5 SDs from the ActA mean?' . EXECUTE . COMPUTE acta2dist = (ABS(acta2-actainimea)/actainiSD) <= 1.5 . VARIABLE LABELS acta2dist 'Is acta2 no more than 1.5 SDs from the ActA mean?' . EXECUTE . COMPUTE acta3dist = (ABS(acta3-actainimea)/actainiSD) <= 1.5 . VARIABLE LABELS acta3dist 'Is acta3 no more than 1.5 SDs from the ActA mean?' . EXECUTE . COMPUTE acta4dist = (ABS(acta4-actainimea)/actainiSD) <= 1.5. VARIABLE LABELS acta4dist 'Is acta4 no more than 1.5 SDs from the ActA mean?' . EXECUTE . COMPUTE acta5dist = (ABS(acta5-actainimea)/actainiSD) <= 1.5 . VARIABLE LABELS acta5dist 'Is acta5 no more than 1.5 SDs from the ActA mean?' . EXECUTE . COMPUTE acta6dist = (ABS(acta6-actainimea)/actainiSD) <= 1.5 . VARIABLE LABELS acta6dist 'Is acta6 no more than 1.5 SDs from the ActA mean?' . EXECUTE . COMPUTE acta7dist = (ABS(acta7-actainimea)/actainiSD) <= 1.5 . VARIABLE LABELS acta7dist 'Is acta7 no more than 1.5 SDs from the ActA mean?' . EXECUTE . COUNT HOWMANYACTAS = actaldist acta2dist acta3dist acta4dist acta5dist acta6dist acta7dist (1) . EXECUTE . COMPUTE ActaHT=(Acta1dist*Acta1+Acta2dist*Acta2+Acta3dist*Acta3+Acta4dist*Ac ta4+Acta5dist*Acta5+Acta6dist*Acta6+Acta7dist*Acta7)/HOWMANYACTAS. VARIABLE LABELS 'Habitual time for Acta'. EXECUTE. COMPUTE ActaHT=(ActainiSD<0.16666667)*Actainimea+(ActainiSD>=0.166666667)*Act aHT. EXECUTE. COMPUTE actaht2 = ((1-MISSING(Acta1))*Actaldist*Actal+(1-MISSING(Acta2))*Acta2dist *Acta2+(1-MISSING(Acta3))*Acta3dist*Acta3+(1-MISSING(Acta4)) *Acta4dist*Acta4+(1 -MISSING(Acta5))*Acta5dist*Ret5+(1-MISSING(Acta6))*Acta6dist*Acta6+(1 -MISSING(Acta7))*Acta7dist*Acta7)/HOWMANYACTAS . EXECUTE .

COMPUTE Actaht2= (ActainiSD<0.16666667) *Actainimea+ (ActainiSD>=0.16666667) *Ac taht2. EXECUTE. COMPUTE Actalhit2 = (ABS(Actal-Actaht2)) <= 0.75 . VARIABLE LABELS Actalhit2 'Is Actal within 3/4 of an hour of the habitual time for Acta?' EXECUTE . COMPUTE Acta2hit2 = (ABS(Acta2-Actaht2)) <= 0.75 . VARIABLE LABELS Acta2hit2 'Is Acta2 within 3/4 of an hour of the habitual time for Acta?' EXECUTE COMPUTE Acta3hit2 = (ABS(Acta3-Actaht2)) <= 0.75 . VARIABLE LABELS Acta3hit2 'Is Acta3 within 3/4 of an hour of the habitual time for Acta?' EXECUTE . COMPUTE Acta4hit2 = (ABS(Acta4-Actaht2)) <= 0.75 . VARIABLE LABELS Acta4hit2 'Is Acta4 within 3/4 of an hour of the habitual time for Acta?' EXECUTE . COMPUTE Acta5hit2 = (ABS(Acta5-Actaht2)) <= 0.75 . VARIABLE LABELS Acta5hit2 'Is Acta5 within 3/4 of an hour of the habitual time for Acta?' EXECUTE . COMPUTE Acta6hit2 = (ABS(Acta6-Actaht2)) <= 0.75 . VARIABLE LABELS Acta6hit2 'Is Acta6 within 3/4 of an hour of the habitual time for Acta?' EXECUTE COMPUTE Acta7hit2 = (ABS(Acta7-Actaht2)) <= 0.75 . VARIABLE LABELS Acta7hit2 'Is Acta7 within 3/4 of an hour of the habitual time for Acta?' EXECUTE . COUNT HOWMANYACTAhits2 = Actalhit2 Acta2hit2 Acta3hit2 Acta4hit2 Acta5hit2 Acta6hit2 Acta7hit2 (1) . EXECUTE . *** Activity B command line *** COMPUTE actbinimea = MEAN(actb1,actb2,actb3,actb4,actb5,actb6,actb7) VARIABLE LABELS actbinimea 'Activity B initial mean' . EXECUTE . COMPUTE actbiniSD = SD(actb1,actb2,actb3,actb4,actb5,actb6,actb7) . VARIABLE LABELS actbiniSD 'Activity B initial SD' . EXECUTE . COMPUTE Actbissdlt10 = actbiniSD<0.16666667 . EXECUTE .

COMPUTE actbfinmea = (Actabissdlt10) *actbinimea . EXECUTE . COMPUTE actbldist = (ABS(actbl-actbinimea)/actbiniSD) <= 1.5 . VARIABLE LABELS actbldist 'Is actbl no more than 1.5 SDs from the ActB mean?' . EXECUTE . COMPUTE actb2dist = (ABS(actb2-actbinimea)/actbiniSD) <= 1.5 . VARIABLE LABELS actb2dist 'Is actb2 no more than 1.5 SDs from the ActB mean?' . EXECUTE COMPUTE actb3dist = (ABS(actb3-actbinimea)/actbiniSD) <= 1.5. VARIABLE LABELS actb3dist 'Is actb3 no more than 1.5 SDs from the ActB mean?' . EXECUTE . COMPUTE actb4dist = (ABS(actb4-actbinimea)/actbiniSD) <= 1.5 . VARIABLE LABELS actb4dist 'Is actb4 no more than 1.5 SDs from the ActB mean?' . EXECUTE . COMPUTE actb5dist = (ABS(actb5-actbinimea)/actbiniSD) <= 1.5 . VARIABLE LABELS actb5dist 'Is actb5 no more than 1.5 SDs from the ActB mean?' . EXECUTE . COMPUTE actb6dist = (ABS(actb6-actbinimea)/actbiniSD) <= 1.5 . VARIABLE LABELS actb6dist 'Is actb6 no more than 1.5 SDs from the ActB mean?' . EXECUTE . COMPUTE actb7dist = (ABS(actb7-actbinimea)/actbiniSD) <= 1.5 . VARIABLE LABELS actb7dist 'Is actb7 no more than 1.5 SDs from the ActB mean?' . EXECUTE . COUNT HOWMANYACTBS = actb1dist actb2dist actb3dist actb4dist actb5dist actb6dist actb7dist (1) . EXECUTE . COMPUTE ActbHT=(Actb1dist*Actb1+Actb2dist*Actb2+Actb3dist*Actb3+Actb4dist*Ac tb4+Actb5dist*Actb5+Actb6dist*Actb6+Actb7dist*Actb7)/HOWMANYACTBS. VARIABLE LABELS 'Habitual time for Actb'. EXECUTE. COMPUTE ActbHT=(ActbiniSD<0.16666667)*Actbinimea+(ActbiniSD>=0.166666667)*Act bHT. EXECUTE. COMPUTE Actbht2 = ((1-MISSING(Actb1))*Actbldist*Actb1+(1-MISSING(Actb2)) *Actb2dist *Actb2+(1-MISSING(Actb3))*Actb3dist*Actb3+(1-MISSING(Actb4))*Actb4dist*Actb4+(1

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-MISSING(Actb5))*Actb5dist*Actb5+(1-
MISSING(Actb6))*Actb6dist*Actb6+(1
 -MISSING(Actb7))*Actb7dist*Actb7)/HOWMANYACTBS .
EXECUTE .
COMPUTE
Actbht2= (ActbiniSD<0.16666667) *Actbinimea+ (ActbiniSD>=0.16666667) *Ac
tbht2.
EXECUTE.
COMPUTE Actblhit2 = (ABS(Actbl-Actbht2)) <= 0.75 .
VARIABLE LABELS Actb1hit2 'Is Actb1 within 3/4 of an hour of the
habitual time for Actb?'
EXECUTE .
COMPUTE Actb2hit2 = (ABS(Actb2-Actbht2)) <= 0.75 .
VARIABLE LABELS Actb2hit2 'Is Actb2 within 3/4 of an hour of the
habitual time for Actb?'
EXECUTE .
COMPUTE Actb3hit2 = (ABS(Actb3-Actbht2)) <= 0.75 .
VARIABLE LABELS Actb3hit2 'Is Actb3 within 3/4 of an hour of the
habitual time for Actb?'
EXECUTE .
COMPUTE Actb4hit2 = (ABS(Actb4-Actbht2)) <= 0.75 .
VARIABLE LABELS Actb4hit2 'Is Actb4 within 3/4 of an hour of the
habitual time for Actb?'
EXECUTE .
COMPUTE Actb5hit2 = (ABS(Actb5-Actbht2)) <= 0.75 .
VARIABLE LABELS Actb5hit2 'Is Actb5 within 3/4 of an hour of the
habitual time for Actb?'
EXECUTE .
COMPUTE Actb6hit2 = (ABS(Actb6-Actbht2)) <= 0.75 .
VARIABLE LABELS Actb6hit2 'Is Actb6 within 3/4 of an hour of the
habitual time for Actb?'
EXECUTE .
COMPUTE Actb7hit2 = (ABS(Actb7-Actbht2)) <= 0.75 .
VARIABLE LABELS Actb7hit2 'Is Actb7 within 3/4 of an hour of the
habitual time for Actb?'
EXECUTE .
COUNT
 HOWMANYACTBhits2 = Actb1hit2 Actb2hit2 Actb3hit2 Actb4hit2
Actb5hit2 Actb6hit2
 Actb7hit2 (1) .
EXECUTE .
*** Return Home Command line ***
*** this calculates the mean of the 7 return home times ***
COMPUTE retinimea = MEAN(ret1, ret2, ret3, ret4, ret5, ret6, ret7) .
VARIABLE LABELS retinimea 'Return home initial mean'
EXECUTE .
```

*** this calculates the SD of the 7 return home times *** COMPUTE retiniSD = SD(ret1, ret2, ret3, ret4, ret5, ret6, ret7) . VARIABLE LABELS retiniSD 'Return home initial SD' . EXECUTE . *** calculates a logical variable that has value 1 when SD is less than 10mins and 0 otherwise *** COMPUTE Retissdlt10 = retiniSD<0.16666667 . EXECUTE . *** might be unnecessary *** COMPUTE retfinmea = (Retissdlt10) * retinimea . EXECUTE . *** calculates logical variables that have value 1 when each return home time is no more than 1.5 SDs from the mean and 0 otherwise *** COMPUTE retldist = (ABS(ret1-retinimea)/retiniSD) <= 1.5 . VARIABLE LABELS retldist 'Is retl no more than 1.5 SDs from the Return to Home mean?' . EXECUTE . COMPUTE ret2dist = (ABS(ret2-retinimea)/retiniSD) <= 1.5 . VARIABLE LABELS ret2dist 'Is ret2 no more than 1.5 SDs from the Return to Home mean?' . EXECUTE . COMPUTE ret3dist = (ABS(ret3-retinimea)/retiniSD) <= 1.5 . VARIABLE LABELS ret3dist 'Is ret3 no more than 1.5 SDs from the Return to Home mean?' . EXECUTE . COMPUTE ret4dist = (ABS(ret4-retinimea)/retiniSD) <= 1.5 . VARIABLE LABELS ret4dist 'Is ret4 no more than 1.5 SDs from the Return to Home mean?' . EXECUTE . COMPUTE ret5dist = (ABS(ret5-retinimea)/retiniSD) <= 1.5 . VARIABLE LABELS ret5dist 'Is ret5 no more than 1.5 SDs from the Return to Home mean?' . EXECUTE . COMPUTE ret6dist = (ABS(ret6-retinimea)/retiniSD) <= 1.5 . VARIABLE LABELS ret6dist 'Is ret6 no more than 1.5 SDs from the Return to Home mean?' . EXECUTE . COMPUTE ret7dist = (ABS(ret7-retinimea)/retiniSD) <= 1.5 .</pre> VARIABLE LABELS ret7dist 'Is ret7 no more than 1.5 SDs from the Return to Home mean?' . EXECUTE . *** calculates how many times the return home time is no more than 1.5 SDs from the mean ***

COUNT

```
HOWMANYRETS = ret1dist ret2dist ret3dist ret4dist ret5dist
ret6dist
  ret7dist (1) .
EXECUTE .
*** calculates the habitual time - but this gives a missing value
when some times are missing which we don't want ***
COMPUTE
RetHT=(Ret1dist*Ret1+Ret2dist*Ret2+Ret3dist*Ret3+Ret4dist*Ret4+Ret5d
ist*Ret5+Ret6dist*Ret6+Ret7dist*Ret7)/HOWMANYRETS.
VARIABLE LABELS 'Habitual time for Ret'.
EXECUTE.
COMPLITE
RetHT=(RetiniSD<0.16666667)*Retinimea+(RetiniSD>=0.16666667)*RetHT.
EXECUTE.
*** revised calculation of habitual time - should give correct
habitual times when some times are missing ***
COMPUTE retht2 = ((1-MISSING(Ret1))*Ret1dist*Ret1+(1-
MISSING(Ret2))*Ret2dist
*Ret2+(1-MISSING(Ret3))*Ret3dist*Ret3+(1-
MISSING(Ret4))*Ret4dist*Ret4+(1
 -MISSING(Ret5))*Ret5dist*Ret5+(1-MISSING(Ret6))*Ret6dist*Ret6+(1
-MISSING(Ret7)) *Ret7dist*Ret7) /HOWMANYRETS .
EXECUTE .
*** this will overwrite the habitual time calculated above when the
SD is less than 10 minutes with the ordinary mean ***
COMPUTE
Retht2=(RetiniSD<0.16666667)*Retinimea+(RetiniSD>=0.166666667)*Retht2
EXECUTE.
* * *
*** these calculate whether a hit occurs on each occasion ****
COMPUTE Ret1hit2 = (ABS(Ret1-Retht2)) <= 0.75 .
EXECUTE .
COMPUTE Ret2hit2 = (ABS(Ret2-Retht2)) <= 0.75 .
VARIABLE LABELS Ret2hit2 'Is Ret2 within 3/4 of an hour of the
habitual time for Ret?'
EXECUTE .
COMPUTE Ret3hit2 = (ABS(Ret3-Retht2)) <= 0.75 .
VARIABLE LABELS Ret3hit2 'Is Ret3 within 3/4 of an hour of the
habitual time for Ret?'
EXECUTE .
COMPUTE Ret4hit2 = (ABS(Ret4-Retht2)) <= 0.75 .
```

VARIABLE LABELS Ret4hit2 'Is Ret4 within 3/4 of an hour of the habitual time for Ret?' EXECUTE . COMPUTE Ret5hit2 = (ABS(Ret5-Retht2)) <= 0.75 . VARIABLE LABELS Ret5hit2 'Is Ret5 within 3/4 of an hour of the habitual time for Ret?' EXECUTE . COMPUTE Ret6hit2 = (ABS(Ret6-Retht2)) <= 0.75 . VARIABLE LABELS Ret6hit2 'Is Ret6 within 3/4 of an hour of the habitual time for Ret?' EXECUTE . COMPUTE Ret7hit2 = (ABS(Ret7-Retht2)) <= 0.75 . VARIABLE LABELS Ret7hit2 'Is Ret7 within 3/4 of an hour of the habitual time for Ret?' EXECUTE . *** this calculates the number of hits *** COUNT HOWMANYREThits2 = Ret1hit2 Ret2hit2 Ret3hit2 Ret4hit2 Ret5hit2 Ret6hit2 Ret7hit2 (1) . EXECUTE . *** Go to Bed command line *** COMPUTE sleinimea = MEAN(sle1,sle2,sle3,sle4,sle5,sle6,sle7) . VARIABLE LABELS sleinimea 'Sleep initial mean' EXECUTE . COMPUTE sleiniSD = SD(sle1,sle2,sle3,sle4,sle5,sle6,sle7) . VARIABLE LABELS sleiniSD 'Sleep initial SD' . EXECUTE . COMPUTE Sleissdlt10 = sleiniSD<0.16666667 . EXECUTE . COMPUTE slefinmea = (Sleissdlt10)*sleinimea . EXECUTE . COMPUTE sle1dist = (ABS(sle1-sleinimea)/sleiniSD) <= 1.5 . VARIABLE LABELS sle1dist 'Is sle1 no more than 1.5 SDs from the Sleep mean?' . EXECUTE . COMPUTE sle2dist = (ABS(sle2-sleinimea)/sleiniSD) <= 1.5 . VARIABLE LABELS sle2dist 'Is sle2 no more than 1.5 SDs from the Sleep mean?' . EXECUTE . COMPUTE sle3dist = (ABS(sle3-sleinimea)/sleiniSD) <= 1.5 . VARIABLE LABELS sle3dist 'Is sle3 no more than 1.5 SDs from the Sleep mean?' . EXECUTE . COMPUTE sle4dist = (ABS(sle4-sleinimea)/sleiniSD) <= 1.5 .

```
VARIABLE LABELS sle4dist 'Is sle4 no more than 1.5 SDs from the
Sleep mean?'.
EXECUTE .
COMPUTE sle5dist = (ABS(sle5-sleinimea)/sleiniSD) <= 1.5 .
VARIABLE LABELS sle5dist 'Is sle5 no more than 1.5 SDs from the
Sleep mean?' .
EXECUTE .
COMPUTE sle6dist = (ABS(sle6-sleinimea)/sleiniSD) <= 1.5 .
VARIABLE LABELS sle6dist 'Is sle6 no more than 1.5 SDs from the
Sleep mean?' .
EXECUTE .
COMPUTE sle7dist = (ABS(sle7-sleinimea)/sleiniSD) <= 1.5 .
VARIABLE LABELS sle7dist 'Is sle7 no more than 1.5 SDs from the
Sleep mean?' .
EXECUTE .
COUNT
  HOWMANYSLEEPS = sle1dist sle2dist sle3dist sle4dist sle5dist
sle6dist
  sle7dist (1) .
EXECUTE .
COMPUTE
SleHT=(Sle1dist*Sle1+Sle2dist*Sle2+Sle3dist*Sle3+Sle4dist*Sle4+Sle5d
ist*Sle5+Sle6dist*Sle6+Sle7dist*Sle7)/HOWMANYSLEEPS.
VARIABLE LABELS 'Habitual time for Sle'.
EXECUTE.
COMPUTE
SleHT=(SleiniSD<0.16666667)*Sleinimea+(SleiniSD>=0.166666667)*SleHT.
EXECUTE.
COMPUTE sleht2 = ((1-MISSING(Sle1))*Sle1dist*Sle1+(1-
MISSING(Sle2))*Sle2dist
 *Sle2+(1-MISSING(Sle3))*Sle3dist*Sle3+(1-
MISSING(Sle4))*Sle4dist*Sle4+(1
 -MISSING(Sle5))*Sle5dist*Sle5+(1-MISSING(Sle6))*Sle6dist*Sle6+(1
 -MISSING(Sle7))*Sle7dist*Sle7)/HOWMANYSLEEPS .
EXECUTE .
COMPUTE
Sleht2=(SleiniSD<0.16666667)*Sleinimea+(SleiniSD>=0.16666667)*Sleht2
EXECUTE.
COMPUTE Sle1hit2 = (ABS(Sle1-Sleht2)) <= 0.75 .
VARIABLE LABELS Sle1hit2 'Is Sle1 within 3/4 of an hour of the
habitual time for Sle?'
EXECUTE .
COMPUTE Sle2hit2 = (ABS(Sle2-Sleht2)) <= 0.75 .
VARIABLE LABELS Sle2hit2 'Is Sle2 within 3/4 of an hour of the
habitual time for Sle?'
EXECUTE .
COMPUTE Sle3hit2 = (ABS(Sle3-Sleht2)) <= 0.75 .
```

VARIABLE LABELS Sle3hit2 'Is Sle3 within 3/4 of an hour of the habitual time for Sle?' EXECUTE . COMPUTE Sle4hit2 = (ABS(Sle4-Sleht2)) <= 0.75 . VARIABLE LABELS Sle4hit2 'Is Sle4 within 3/4 of an hour of the habitual time for Sle?' EXECUTE . COMPUTE Sle5hit2 = (ABS(Sle5-Sleht2)) <= 0.75 . VARIABLE LABELS Sle5hit2 'Is Sle5 within 3/4 of an hour of the habitual time for Sle?' EXECUTE . COMPUTE Sle6hit2 = (ABS(Sle6-Sleht2)) <= 0.75 . VARIABLE LABELS Sle6hit2 'Is Sle6 within 3/4 of an hour of the habitual time for Sle?' EXECUTE . COMPUTE Sle7hit2 = (ABS(Sle7-Sleht2)) <= 0.75 . VARIABLE LABELS Sle7hit2 'Is Sle7 within 3/4 of an hour of the habitual time for Sle?' EXECUTE . COUNT HOWMANYSLEhits2 = Sle1hit2 Sle2hit2 Sle3hit2 Sle4hit2 Sle5hit2 Sle6hit2 Sle7hit2 (1) . EXECUTE . *** This calculates the number of times a participant has taken part in an activity in a week *** COUNT bedcounts = Bed1 Bed2 Bed3 Bed4 Bed5 Bed6 Bed7 (0.1 thru 98) . VARIABLE LABELS bedcounts 'Bed activity count over week' . EXECUTE . COUNT concounts = Con1 Con2 Con3 Con4 Con5 Con6 Con7 (0.1 thru 98) . VARIABLE LABELS concounts 'Con activity count over week' . EXECUTE . COUNT bevcounts = Bev1 Bev2 Bev3 Bev4 Bev5 Bev6 Bev7 (0.1 thru 98) . VARIABLE LABELS bevcounts 'Bev activity count over week' . EXECUTE . COUNT brecounts = Bre1 Bre2 Bre3 Bre4 Bre5 Bre6 Bre7 (0.1 thru 98) . VARIABLE LABELS brecounts 'Bre activity count over week' . EXECUTE . COUNT outcounts = Out1 Out2 Out3 Out4 Out5 Out6 Out7 (0.1 thru 98) . VARIABLE LABELS outcounts 'Out activity count over week' .

EXECUTE .

COUNT workcounts = Work1 Work2 Work3 Work4 Work5 Work6 Work7 (0.1 thru 98) . VARIABLE LABELS workcounts 'Work activity count over week' . EXECUTE . COUNT luncounts = Lun1 Lun2 Lun3 Lun4 Lun5 Lun6 Lun7 (0.1 thru 98) . VARIABLE LABELS luncounts 'Lun activity count over week' . EXECUTE . COUNT napcounts = Nap1 Nap2 Nap3 Nap4 Nap5 Nap6 Nap7 (0.1 thru 98) . VARIABLE LABELS luncounts 'Nap activity count over week' . EXECUTE . COUNT dincounts = Din1 Din2 Din3 Din4 Din5 Din6 Din7 (0.1 thru 98) . VARIABLE LABELS Dincounts 'Din activity count over week' . EXECUTE . COUNT execounts = Exe1 Exe2 Exe3 Exe4 Exe5 Exe6 Exe7 (0.1 thru 98) . VARIABLE LABELS execounts 'Exe activity count over week' . EXECUTE . COUNT snacounts = Snal Sna2 Sna3 Sna4 Sna5 Sna6 Sna7 (0.1 thru 98) . VARIABLE LABELS Snacounts 'Sna activity count over week' . EXECUTE . COUNT newcounts = New1 New2 New3 New4 New5 New6 New7 (0.1 thru 98) . VARIABLE LABELS Newcounts 'New activity count over week' . EXECUTE . COUNT tvcounts = Tv1 Tv2 Tv3 Tv4 Tv5 Tv6 Tv7 (0.1 thru 98) . VARIABLE LABELS Tvcounts 'Tv activity count over week' . EXECUTE . COUNT actacounts = Acta1 Acta2 Acta3 Acta4 Acta5 Acta6 Acta7 (0.1 thru 98) VARIABLE LABELS Actacounts 'Acta activity count over week' . EXECUTE . COUNT actbcounts = Actb1 Actb2 Actb3 Actb4 Actb5 Actb6 Actb7 (0.1 thru 98) . VARIABLE LABELS Actbcounts 'Actb activity count over week' . EXECUTE . COUNT

retcounts = Ret1 Ret2 Ret3 Ret4 Ret5 Ret6 Ret7 (0.1 thru 98) . VARIABLE LABELS retcounts 'Ret activity count over week' . EXECUTE . COUNT slecounts = Sle1 Sle2 Sle3 Sle4 Sle5 Sle6 Sle7 (0.1 thru 98) . VARIABLE LABELS slecounts 'Lun activity count over week' . EXECUTE . *** This calculates whether number of activities in a week exceeds 3 or more *** COMPUTE bedyes = bedcounts \geq 3 . EXECUTE . COMPUTE conyes = concounts \geq 3 . EXECUTE . COMPUTE bevyes = bevcounts \geq 3 . EXECUTE . COMPUTE breyes = brecounts \geq 3 . EXECUTE . COMPUTE outyes = outcounts \geq 3 . EXECUTE . COMPUTE workyes = workcounts \geq 3 . EXECUTE . COMPUTE lunyes = luncounts >= 3 . EXECUTE . COMPUTE napyes = napcounts \geq 3 . EXECUTE . COMPUTE dinyes = dincounts \geq 3 . EXECUTE . COMPUTE exerces = execounts \geq 3 . EXECUTE . COMPUTE snayes = snacounts \geq 3 . EXECUTE . COMPUTE newyes = newcounts \geq 3 . EXECUTE . COMPUTE types = type >= 3 . EXECUTE . COMPUTE actayes = actacounts \geq 3 . EXECUTE .

COMPUTE actbyes = actbcounts \geq 3 . EXECUTE . COMPUTE retyes = retcounts \geq 3 . EXECUTE . COMPUTE sleyes = slecounts >= 3 . EXECUTE . *** this determines the number of final hits, but ONLY if taking part in an activity succeeds three or more times. Otherwise, value of 0 is recorded *** COMPUTE bedfinacthits = HOWMANYBEDhits2 * bedyes . EXECUTE . COMPUTE confinacthits = HOWMANYCONhits2 * conyes . EXECUTE . COMPUTE bevfinacthits = HOWMANYBEVhits2 * bevyes . EXECUTE . COMPUTE brefinacthits = HOWMANYBREhits2 * breyes . EXECUTE . COMPUTE outfinacthits = HOWMANYOUThits2 * outyes . EXECUTE . COMPUTE workfinacthits = HOWMANYWORKhits2 * workyes . EXECUTE . COMPUTE lunfinacthits = HOWMANYLUNhits2 * lunyes . EXECUTE . COMPUTE napfinacthits = HOWMANYNAPhits2 * napyes . EXECUTE . COMPUTE dinfinacthits = HOWMANYDINhits2 * dinyes . EXECUTE . COMPUTE exefinacthits = HOWMANYEXEhits2 * exeyes . EXECUTE . COMPUTE snafinacthits = HOWMANYSNAhits2 * snayes . EXECUTE . COMPUTE newfinacthits = HOWMANYNEWhits2 * newyes . EXECUTE . COMPUTE tvfinacthits = HOWMANYTVhits2 * tvyes . EXECUTE . COMPUTE actafinacthits = HOWMANYACTAhits2 * actayes . EXECUTE .

COMPUTE actbfinacthits = HOWMANYACTBhits2 * actbyes . EXECUTE . COMPUTE retfinacthits = HOWMANYREThits2 * retyes . EXECUTE . COMPUTE slefinacthits = HOWMANYSLEhits2 * sleyes . EXECUTE . *** This computes the total number of hits a participant has *** COMPUTE sumhits = SUM (bedfinacthits, confinacthits, bevfinacthits, brefinacthits ,outfinacthits,workfinacthits,lunfinacthits,napfinacthits,dinfinacth its , exefinacthits, snafinacthits, newfinacthits, tvfinacthits, actafinacthi ts ,actbfinacthits,retfinacthits,slefinacthits) . EXECUTE . *** This computes the number of activities (N) that a participant has taken part in *** COMPUTE sumincact = SUM (bedyes, conyes, bevyes, breyes, outyes, workyes, lunyes , napyes, dinyes, exeyes, snayes, newyes, tvyes, actayes, actbyes, retyes, sle yes) . EXECUTE . *** This computes the final SRM score *** COMPUTE finSRM = sumhits / sumincact . EXECUTE .

Appendix M: Reflective statement from the author on undertaking the research project

My choice of this project, CFS and the psychological issues of patients: were first influenced by supervisor suggestion that this was a pertinent area to explore, and secondly, by my own observations towards patients I have known personally before starting the Doctoral thesis. Once engaged in this subject area, I remembered a patient I knew personally who appeared to have extreme difficulties with communicating with others, becoming irritated quickly with many people they knew. These difficulties seemed to me to at least partly appear from, and being due to, the onset of the illness. They also could not manage, not only in maintaining a consistent working life, but also in their everyday home lives. These issues were able to prompt me in forming and exploring the questions I set out to address in this thesis.

My own attitudes towards CFS just prior to starting this project, perhaps partly from my experience with this patient, certainly included a feeling of CFS as appearing to be "real". This was "real" in the sense it did not appear to me to be solely a psychological syndrome (as has been inferred from both laypeople and some professionals) who may have labelled CFS as "all in the head". In psychology, labelling CFS in such a way might result in it being classified as a psychosomatic condition – which could potentially be particularly damaging to a patient in terms of their self-esteem. However, I was not then (and I remain after the conclusion of this research) similarly convinced that it is purely a biological syndrome either, as CFS has also been labelled. It appears to me to be a syndrome best described as made up of an interaction of both biological and psychosocial factors. Divorcing either one of these family of factors from the other I believe results in an impoverished understanding of CFS, that ultimately does not help a patient towards recovery.

I believe an interaction of both psychosocial and biological factors in recovery is present in just about any disorder one cares to name – there appears to me to be a consistently a psychosocial approach to recovering from any biological condition. I then saw and see no reason to exclude CFS from this, even it has been classified as only biological in the past on the basis of political interests, or on patient or medical profession interests to try and classify it as such. If psychosocial issues have been judged as relevant to most "pure biological" disorders such as cancer and diabetes, why should they suddenly stop being so in CFS? Should clinical psychology simply stop working with patients on a psychological basis: ignoring any psychological distress, on the basis of a label? It was on this understanding of the position of CFS, and clinical psychology's position to help and manage CFS, that I progressed with this research. I am happy to say my research findings appeared to support this interaction belief.

My view then of the interaction of both biological and psychosocial factors in CFS within a patient was something implicit within the research design, and in the invitation to take part in the research. This view seemed to be accepted by the majority of patients approached to take part. This may then be a hopeful sign that such an interactive approach is becoming more accepted in the CFS domain. However, a wider dominant socio-cultural context for CFS at the onset of this research appeared to be (and remains) that CFS is a mysterious, little understood condition, possibly one that is even "all in the mind", rather than having any biological component. It is disabling and paralysing, causing suffering, yet sufferers can (and even should) do little about it themselves. It might even be "their fault they have this".

The diagnosis of CFS appears to have been become somewhat legitimised in British culture at least in recent times. Yet, to a large extent, CFS still retains certain societal prejudices, and is a somewhat stigmatising condition for CFS patients to have. For example, in cancer, Parkinson's disease, heart disease or similar, typically many people often appear to assume that these are purely biological diseases, and that little if any psychological factors have contributed in any way to the illness, or of that illness worsening. If any psychological factors arise or are discovered, they seem to be frequently understand (and socially accepted) as the natural result of trying to cope with these illnesses. However, this still appeared largely not to be the case for CFS patients describing their experiences. Being depressed for example (observed as a major finding of this study in contributing to personal difficulties) often appears to be seen as a

"symptom" by some people that CFS must be psychological, and must reflect personal weakness on the part of the sufferer, and it is this which is responsible for their condition. Some patients, on the opposite end of the spectrum, appear likely to sometimes disregard their psychological difficulties, and externally attribute all their difficulties to CFS symptoms.

Perhaps it is no surprise then that those that work with CFS patients, and people CFS patients they come in to contact with, may feel frustration and exasperation with them, and struggle to understand their difficulties. Such thoughts like "how can a person be ill one moment, and seemingly alright the next? Isn't illness a constant? If a patient can be fine one minute, ill the next, and then fine again, then something MUST be mentally wrong with them". These sorts of questions, from asking my friends and family members about what they knew about CFS, seem to be fairly common in the non-clinical population with respect to CFS. They also appear to be irritating, misinformed and disheartening to patients, from the comments I received from patients in their interviews. Patients in my view can become equally as frustrated with other people not having CFS, and also mistrustful and suspicious of other people, for this kind of thinking.

My research with CFS patients, and contact with the service, provided me with some valuable insights into this culture surrounding CFS: seeing and hearing patient reactions to these types of attitudes towards their illness, and how they manage their illness on a day to day basis when considering these attitudes towards them. For example, I am reminded somewhat by the findings of my question into emotional expressivity by the "media" behaviour of politicians. Many politicians (to me at least) often try to continually appear positive, calm and unassuming in whatever social interactions they have with the public. Frequently, they do not express their true feelings, or else appear to convince themselves that suppressing or ignoring their own feelings about an issue is somehow appropriate. I am left considering whether CFS patients might do the same with people they know, and if such a method could actually "backfire" in the long term. If I can observe this type of approach with politicians, I unfortunately suspect that others might not respect CFS patients for doing something similar, for whatever reason.

I am also left reflecting upon whether patients, despite all the research developments towards CFS, and it being authorized as a legitimate condition, really may ever ascribe some type of meaning and purpose to their CFS condition. The ability to ascribe meaning to initially painful and distressing experiences, according to Victor Frankl (Frankl, 2000) can typically transform that experience into one in which personal growth and capacity to cope can develop. In people with lifelong disability, illness and paralysis in other conditions, this sometimes appears to happen, as people may gain new perspectives and direction to their lives. I am unsure of how prevalent finding such meaning is within CFS. From my observations, building this kind of meaning for CFS patients could be important, as well as in improving functioning by improving communication and behaviour, or routine, for patients' everyday lives.

Lastly, overall, I believe that I did fairly well in the design and execution of the research, and in my role as a positivist researcher. My attempt to use psychology in a constructive way with CFS patients, and communicating my intentions as such, rather be someone trying to diagnose or attach psychological or psychiatric labels to patients, appeared to be well understood . Inevitably, I probably did not succeed since not all patients took part who were contacted, but I received no complaints as to my conduct as a psychologist at any point during this project. Indeed I often received positive feedback as to my efforts, and to the relevance of my research focus.

I am happy that my efforts appeared to be appreciated, but this was feedback only from a small scale of the CFS community on my research. The dissemination of such research to the larger CFS community, with their response, as well as the response those who are not CFS patients, would be equally as important to me in giving this research context within a wider societal scope. I look forward to an opportunity to do this in due course.