Doctor of Clinical Psychology Degree

* **This volume was submitted in partial fulfillment of the degree of Doctor of Clinical Psychology**

AN INVESTIGATION OF SLEEP-ONSET COGNITIVE INTRUSIONS AND THEIR RELATIONSHIP TO OBJECTIVELY MEASURED SLEEP

AND RESEARCH PORTFOLIO

Submitted in partial fulfilment of the Degree of Doctor of Clinical Psychology within the Faculty of Medicine, University of Glasgow

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CHAPTER ONE

Major Research Literature Review

Sleep-onset insomnia and pre-sleep cognitive intrusions: a review of the literature

Major Research Literature Review

Sleep-Onset Insomnia and Pre-Sleep Cognitive Intrusions

A Review of the Literature

This literature review has been prepared in accordance with the instructions to contributors for the British Journal of Clinical Psychology (See Appendix 1.1)

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Major Research Literature Review

Sleep-Onset Insomnia and Pre-Sleep Cognitive Intrusions

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ABSTRACT

The literature on cognitive issues in insomnia is reviewed and the results discussed in terms of the relevance of cognitive factors in insomnia, the nature of pre-sleep cognitions, cognitive treatment for insomnia, methodological issues in previous research, and objective measurement of sleep. The aim of the review is to establish what research has been conducted, the results of this research, and to generate additional research questions. Recommendations for further research are made, involving the objective measurement of sleep using the wrist actigraph, and an alternative approach to existing measures of pre-sleep cognitive arousal is discussed.

Introduction

Insomnia, defined as difficulty in initiating or maintaining sleep (American Sleep Disorders Association, 1997) can be a debilitating and widespread complaint. It is the most prevalent sleep disorder, occurring in about 30% of the adult and older adult population occasionally, and in about 10-15% chronically (Gallup Organisation, 1991; Lichstein & Riedel, 1994). Difficulty in initiating sleep is defined as sleep-onset insomnia if the person experiences significant problems in falling asleep, with a minimum sleep onset latency of 30 minutes occurring on four out of seven nights, with or without disruption to other sleep variables (International Classification of Sleep Disorders, 1997). Cognitive intrusions and pre-sleep hyperarousal have been hypothesised to be causal factors in sleep-onset insomnia and there is a correspondingly large amount of research evidence which indicates that insomniacs are highly aroused cognitively.

What follows is a review of the literature on the relevance of cognitive factors in insomnia, the nature of pre-sleep cognitions, cognitive treatment for insomnia, methodological issues in previous research, and the objective measurement of sleep. The aim of this review is to establish what research has been conducted, the results of this research, and to generate additional research questions.

Cognitive Factors in Insomnia

Research on the aetiology of insomnia, investigating the relative influence of cognitive and physiological arousal, has found the former to be more strongly associated with sleep disruption. Lichstein and Rosenthal (1980) investigated cognitive factors in a survey of 296 insomniacs, and found that intrusive cognitions were far more prevalent

than somatic factors in creating insomnia. 55% of insomniacs felt that their difficulties arose primarily from cognitive arousal, whereas only 5% attributed their difficulties to somatic arousal. Some of the reported intrusive cognitions appeared to be related to high anxiety and depression; others represented worry about falling asleep. Nicassio, Mendlowitz, Fussell & Petras (1985) used a pre-sleep arousal scale to take questionnaire measures of pre-sleep cognitive and somatic arousal, and found that the former showed a significantly higher correlation with sleep onset latency. Both the cognitive and somatic subscales successfully discriminated insomniacs from normal sleepers, indicating an overall increase in arousal in the former group. In one study, having an overactive mind was the attribution of poor sleep rated most highly, both by insomniacs and non-insomniacs. Both groups also rated cognitive aspects of their pre-sleep state as being more difficult to control than somatic ones (Watts, East & Coyle, 1995).

Studies of pre-sleep cognitions also support the importance of cognitive factors. In a study by Van Egeren, Haynes, Franzen & Hamilton (1983), taped recordings were made of thoughts occurring immediately prior to a prompting tone during the pre-sleep periods of students complaining of sleep onset insomnia. They found that pre-sleep cognitions were significantly associated with subjective sleep onset latency as measured in the laboratory, but not with objective sleep onset latency. However, Broman & Hetta (1994) examined cognitive and somatic aspects of pre-sleep arousal in 2 groups of clinical patients with psychophysiologic insomnia and insomnia associated with affective disorders respectively. They found that in the former group, pre-sleep arousal was significantly associated with both EEG and subjective estimates of sleep latency. However, in the latter group, pre-sleep arousal was significantly associated with affective measures but not with sleep latency. They concluded that

pre-sleep arousal contributes to the persistence of sleeping difficulties of the psychophysiologic group whereas in the affective group it is linked to the underlying disorder, which would appear to suggest the importance of different kinds of cognitive treatment for insomnia (Watts, Coyle & East, 1994).

The role of cognitive factors in the perpetuation of insomnia has been suggested by Morin, Stone, Trinkle, Mercer & Remsberg (1993). They found that older adults with chronic insomnia endorse stronger dysfunctional beliefs and attitudes about sleep relative to self-defined good sleepers. The dysfunctional beliefs, which were related to the perceived consequences of insomnia, the fear of losing control, and the unpredictability of sleep, were the best discriminators between the two groups. Fleming (1993) concluded that a major concern for chronic insomniacs is the perceived loss of self-control over how and when they will sleep. Watts et al (1995) looked at how insomniacs and non-insomniacs use information about recent sleep patterns to predict the next night's sleep. If, for insomniacs, their sleep is variable and unpredictable this will contribute to their sense of being out of control. Their results suggest that the sleep of insomniacs is less subjectively predictable, as far as prediction from recent night's sleep is concerned. Insomniacs' problems of perceived lack of control focus particularly on sleep itself rather more than on pre-sleep states. Both insomniacs and normal sleepers saw poor sleep as being more a matter of stress and cognitive activity than of physical tension. They concluded that if cognitive activity is the more critical determinant of insomnia, it probably remains important to make it a major focus of self-regulation strategies in the treatment of insomnia.

Studies aimed at producing sleep disturbance through the induction of cognitive intrusions in the pre-sleep period have resulted in significantly longer latency to sleep onset and sleep maintenance difficulties (Hall, Buysse, Reynolds, Kupfer & Baum, 1996). Gross & Borkovec (1982) found that in good sleepers, experimental manipulations aimed at increasing cognitive intrusions in the pre-sleep period led to significantly longer latency to sleep onset according to EEG criteria. One study provides results contradictory to this. Haynes, Adams & Franzen (1981) exposed insomniacs and non-insomniacs to brief cognitive stressors, in the form of mental arithmetic tasks, to induce cognitive intrusions, and found a decrease in subjective and objective sleep onset latency among insomniacs on stress nights. They suggest a mental processing task which disrupts sleep-related cognitive events will, as a result, decrease sleep onset latency. This may have implications for the importance of the *nature* of the intrusive cognitions and the corresponding effect on sleep.

Nature of Pre-sleep Cognitions

Research examining pre-sleep cognitions of problem sleepers relative to good sleepers has led to the conclusion that a common mechanism of sleep onset disturbance is uncontrollable cognitive activity and worry. Insomniacs tend to have more negative thoughts than do good sleepers, especially at bedtime (Nicassio et al, 1985; Van Egeren et al, 1983). In a study designed to investigate how insomniacs' pre-sleep cognitions differ from those of normal sleepers, Kuisk, Bertelson & Walsh (1989) investigated thought content after lights out. Subjects were interviewed at intervals during the pre-sleep/sleep-onset period. Objective insomniacs (i.e. those where both self-report and EEG confirms sleep-onset difficulties) had more frequent cognitive activity than subjective insomniacs. Both insomnia groups reported more negative thoughts than the controls, supporting the finding of Borkovec, Lane &

VanOot (1981) that pre-sleep cognitions of insomniacs are significantly more worried and negative than those of normal sleepers. However, there was little evidence found of differences in the content of thoughts between the two groups.

Research has further suggested that the uncontrollable thoughts of insomniacs are actually centred around the problems they are having with their sleep. Relative to normal sleepers, insomnia sufferers report a greater number of intrusive thoughts about sleep in addition to being more worried and negative (Borkovec et al, 1981; Borkovec, 1982). Van Egeren et al (1983) found that pre-sleep cognitions concerning negative sleep related content (e.g. thoughts about not falling asleep, negative consequences of not sleeping), proprioceptive, and environmental cues, were significantly associated with laboratory-measured subjective sleep onset latency, but not with objective sleep onset latency. In a study examining the relationship between worry and insomnia, Watts et al (1994) found that much of the pre-sleep mental activity of insomniacs is trivial in content, and that this was particularly characteristic of worried insomniacs. In contrast, thoughts of non-worried insomniacs tended to focus on sleep itself, whereas the thoughts of worried non-insomniacs tended to revolve around work-related issues and general mental activity. In the same study, the content of sleep-interfering cognitions was investigated using a checklist of 20 possible types of nocturnal mentation, and 6 factors of night-time thoughts were identified: mental activity and rehearsal; thoughts about sleep; family and long-term concerns; positive plans and concerns; somatic preoccupations; and work and recent concerns. They concluded that the results fitted the pattern that insomnia is particularly associated with sleep-related thoughts while worry is associated with thoughts of a more general content.

Insomniacs tend to have more unrealistic expectations about their sleep requirements, stronger beliefs about the negative consequences of insomnia, and more external and unstable causal attributions of their sleep difficulties than normal controls. These dysfunctional cognitions are associated with both emotional distress and sleep disturbances and can be addressed by cognitive treatments for insomnia (Morin et al, 1993).

Cognitive Treatments for Insomnia

Further evidence of the importance of cognitive aspects in insomnia comes from studies of the psychological treatment of insomnia. Sanavio (1988) investigated the importance of differences in pre-sleep cognitive intrusions in the treatment of sleep-onset insomnia. Insomniacs scoring high or low on a questionnaire assessing pre-sleep cognitive intrusions were assigned to two treatment programmes: a cognitive modification program including paradoxical intention, thought stopping, and cognitive restructuring; and a psychophysiological treatment ie. EMG-biofeedback training. The results did not confirm their hypothesis that insomniacs who complain of a greater number of cognitive intrusions while falling asleep may show more improvement when treated with a method focusing on reduction of cognitive intrusions rather than on reduction of somatic arousal. Instead cognitive intrusions were dramatically reduced in both groups treated with the cognitive therapy method.

It has been suggested that the typical insomniac may not be mentally well prepared for bed and, in a recent review paper, Espie and Wicklow (1998) developed a cognitive model of insomnia postulating possible interactions between the nature of the insomniac's cognitive intrusions and his/her experience of insomnia. A wide range of cognitive interventions have thus been developed for insomnia including;

cognitive control (Espie & Lindsay, 1987), thought suppression (Levey, Aldaz, Watts & Coyle, 1991), cognitive restructuring (Morin, 1993), paradoxical intention (Espie & Lindsay, 1985), and sleep hygiene education (Hauri & Linde, 1990).

Levey et al (1991) employed the technique of articulatory suppression in comparison with other techniques in a single case experiment. In the articulatory suppression phase of treatment, the subject was instructed to control intrusive thoughts by repeating the syllable 'the' to him/herself, every three seconds. They found that articulatory suppression was more effective in reducing the duration of the first awakening, whereas cognitive control (Espie & Lindsay, 1987) was most effective in reducing sleep onset latency. In articulatory suppression no attempt is made to deal with the thought content, and therefore the presumed mechanism of action on thinking is that of *blocking* (Espie, 1991). They suggested that intrusions in the middle of the night are initially less coherent, and hence easier to control by suppression. On the other hand, cognitive control is primarily *pre-emptive*, in that it aims to reduce intrusive night-time thinking. The insomniac is instructed to set aside some time in the early evening to rehearse the day that has passed and to plan for the next day. It involves the anticipation and recording of potentially worrisome thoughts which, if not dealt with, may intrude into the sleep-onset period.

Morin, Culbert & Schwartz (1994) carried out a study designed to evaluate the clinical efficacy of a multifaceted intervention for outpatients presenting to a sleep disorders clinic with a chief complaint of insomnia. The treatment involved behavioural, cognitive, educational, and medication withdrawal (optional) components. The cognitive component consisted of cognitive restructuring techniques e.g.. reappraisal, reattribution, decatastrophizing, and was aimed at

altering dysfunctional beliefs and attitudes about sleep which Morin et al (1993) had previously identified. The results indicated that cognitive-behaviour therapy is an effective method for the management of sleep disturbances. Improvement rates ranging from 42% to 50% on the main target symptoms of sleep onset latency, wake after sleep onset, and early morning wakening are comparable to those previously reported with insomnia patients. However, it is unclear what therapy component was most effective for which patients.

Levey et al (1991) concluded that there is an important distinction to be made between:

1. Treatments having their major effect on attitudes to sleep, such as paradoxical intention and cognitive restructuring; and
2. Techniques aiming to control intrusive cognitions by methods such as cognitive control, forward planning, and articulatory suppression.

However, although there is as yet a lack of evidence to support tailoring treatment to the individual's presenting characteristics (Espie, Brooks & Lindsay, 1989), the content of intrusive thoughts experienced by insomniacs during the sleep-onset period needs to be directly assessed and measured in order to guide and evaluate further cognitive treatments for insomnia.

Methodological Issues in Previous Research

Previous studies have examined cognitive arousal in insomniacs using self-report questionnaire measures of cognitive intrusions or checklists of thought content. It is possible that these measures do not adequately assess intrusions because they limit responses to a predetermined set of items and are completed retrospectively the

following morning, the accuracy of which may be confounded by various factors. In addition, studies have compared these measures with subjective estimates of sleep parameters, again recorded the next morning on a sleep diary. Clearly, it is difficult to regard these measures as independent of each other, or even to know how the insomniac is actually sleeping. Patients with insomnia have been found to overestimate how long it takes them to fall asleep and the amount of time that they are awake over the course of the night when compared with objective assessments (Coates, Killen, George, Marchini, Hamilton & Thoresen, 1982; Coates, Killen, Silbeman, Marchini, Hamilton & Thoresen, 1983; Edinger & Fins, 1995). Studies that have involved objective measures of sleep, using PSG investigations, have mainly been carried out in sleep laboratories. As well as being expensive, this may introduce an experimental effect, in comparison to assessing sleep difficulties within the insomniac's own environment, where the problem typically occurs. An alternative method for objectively assessing sleep parameters, which is cost-effective, and minimally intrusive, so as not to cause arousal or distort sleep, is the wrist actigraph.

The actigraph is a small device attached to a strap that can be worn on the wrist or leg. Internal motion sensors record the wearer's movements over a pre-defined period and the movement data may then be downloaded to a PC for analysis. Although the actigraph can be used solely to measure activity, it is often used to identify sleep/wake periods, based on the amount of movement in the limb to which it is attached [see Sadeh, Hauri, Kripke & Lavie (1995) for review].

Actigraphic Studies

Measures derived from the wrist actigraph have been found to correlate highly with PSG measures of sleep (Kripke, Mullaney, Messin & Wyborney, 1978; Mullaney,

Kripke & Messin, 1980; Chambers, 1994) which supports the view that measures of sleep can be fairly accurately inferred from movement patterns. If in general, fewer limb movements occur during sleep than wakefulness, actigraphy can be used as an indirect measure of sleep.

Hauri and Wisbey (1992) used the actigraph and polysomnogram to estimate the sleep of 36 patients diagnosed with psychophysiologic insomnia, insomnia associated with a psychiatric condition or sleep state misperception. They found that compared to the polysomnogram, the actigraph consistently overestimated sleep in the psychophysiologic insomnia, and insomnia associated with a psychiatric illness but was either accurate or underestimated the sleep in those with sleep state misperception. However, actigraphic error was only about half as large as the error committed by sleep logs. They concluded that the actigraph is a reliable assessor of such issues as regularity of sleep times and naps during the day.

Brooks, Friedman, Bliwise & Yesavage (1993), in a study of insomnia in older adults, sought to investigate the sensitivity of the wrist actigraph to detect the effects of a behavioural treatment of insomnia. They also investigated the relationship between actigraph measures and sleep log measures. Nine subjects, aged between 60 and 79 years, were treated with sleep restriction therapy and monitored with wrist actigraphs for three days before and after the 4-week treatment period. Sleep measures derived from the actigraph were significantly improved, and it appeared to be sensitive to treatment effects. They found that if the degree of actigraphic overestimation or underestimation is constant for a given subject then the actigraph would be capable of allowing the detection of any changes in sleep for an individual.

Sadeh et al (1995), in a review of actigraphic studies, concluded that actigraphy is a cost-effective procedure for assessing the rest-activity patterns of insomniacs. Daily sleep logs provide essential information in addition to actigraphic data, such as removal of the watch, and important information on subjective sleep-related experiences. It can be used to distinguish between wakeful and sleep states, with wide margins of error for subjects lying awake motionless (Blood, Sack, Percy & Pen, 1997).

Summary

The literature on cognitive issues in insomnia has been reviewed. The results of this review have been discussed in terms of cognitive factors in insomnia, the nature of pre-sleep cognitions, cognitive treatments for insomnia, methodological issues in previous research, and objective measurement of sleep using the wrist actigraph. Recommendations for the objective measurement of sleep parameters using the wrist actigraph have been made in the main body of this review.

Despite the evidence supporting the importance of cognitive arousal in sleep disturbance, it is clear that the literature concerning the actual thought content of insomniacs during sleep onset is limited and further research would be beneficial to establish exactly what goes through poor sleepers' minds as they attempt to fall asleep. An alternative approach to existing measures of pre-sleep cognitive arousal would be to record intrusions, unique to each individual, as they arise i.e., as the insomniac is attempting to fall asleep. This would permit insomniacs to express themselves freely while improving on the retrospective nature of existing measures. Findings would highlight the nature and content of pre-sleep cognitions that poor

sleepers find troublesome and have implications in their relation to current psychological treatments for sleep disturbances.

REFERENCES

American Sleep Disorders Association (1997). *The International Classification of Sleep Disorders; Diagnostic and Coding Manual (Revised).* ASDA, Rochester, USA.

Blood, M.L., Sack, R.L., Percy, D.C. and Pen, J.C. (1997). A comparison of sleep detection by wrist actigraphy, behavioural response, and polysomnography. *Sleep*, **20**(6), 388-395.

Borkovec, T.D. (1982). Insomnia. *Journal of Consulting and Clinical Psychology*, **50**, 880-895.

Borkovec, T.D., Lane, T.W. & VanOot, P.H. (1981). Phenomenology of sleep among insomniacs and good sleepers: wakefulness experience when cortically asleep. *Journal of Abnormal Psychology*, **6**, 607-609.

Broman, J.E. and Hetta, J. (1994). Perceived pre-sleep arousal in patients with persistent psychophysiologic and psychiatric insomnia. *Nordic Journal of Psychiatry*, **48** (3) 203-207.

Brooks, J.O., Friedman, L., Bliwise, D.L. and Yesavage, J.A. (1993). Use of the wrist actigraph to study insomnia in older adults. *Sleep*, **16** (2) 151-155.

Chambers, M.J. (1994). Actigraphy and Insomnia: a closer look: part 1. *Sleep,* **17,** 405-408.

Coates, T., Killen, J., George, J., Marchini, E., Hamilton, S. & Thoresen, C. (1982). Estimating sleep parameters: a multitrait-multimethod analysis. *Journal of Consulting and Clinical Psychology,* **50**, 345-352.

Coates, T., Killen, J., Silbeman, S., Marchini, J., Hamilton, S. and Thoresen, C. (1983). Cognitive activity, sleep disturbance, and stage specific differences between recorded and reported sleep. *Psychophysiology,* **20,** 243.

Edinger, J.D. & Fins, A.I. (1995). The distribution and clinical significance of sleep time misperceptions among insomniacs. *Sleep*, **18** (4), 232-239.

Espie, C.A. & Lindsay, W.R. (1985). Paradoxical intention in the treatment of chronic insomnia: Six case studies illustrating variability in therapeutic response. *Behaviour Research and Therapy,* **23**, 703-709.

Espie, C.A. & Lindsay, W.R. (1987). Cognitive Strategies for the management of severe sleep-maintenance insomnia: a preliminary investigation. *Behaviour Psychotherapy,* **15**, 388-395.

Espie, C.A. & Wicklow, A. (1998). Cognitive Therapy for Insomnia. In Shapiro, C. & Sloan, E.P. (Eds.). *Sleep in Psychiatry.* Cambridge University Press.

Espie, C.A. (1991). The psychological treatment of insomnia. Chichester, United Kingdom: John Wiley.

Espie, C.A., Brooks, D.N., Lindsay, W.R. (1989). An evaluation of tailored psychological treatment of insomnia. *Journal of Behavioural Therapy and Experimental Psychiatry*, **20,** 143-153.

Fleming, J.A.E. (1993). The difficult to treat insomniac patient. *Journal of Psychosomatic Research,* **37**, 45-54.

Gallup Organization (1991). *Sleep in America.* Gallup, Princeton, NJ.

Gross, R.T. and Borkovec, T.D. (1982). Effects of a cognitive intrusion manipulation on the sleep-onset latency of good sleepers. *Behaviour Therapy,* **13,** 117-124.

Hall, M., Buysse, D.J., Reynolds, C.F., Kupfer, D.J. & Baum, A. (1996). Stress related intrusive thoughts disrupt sleep onset and continuity. *Sleep Research,* **25,** 163.

Hauri, P.J. & Linde, S. (1990). No more sleeplessness nights. John Wiley & Sons, New York.

Hauri, P.J. & Wisbey, J. (1994). Actigraphy and Insomnia: a closer look; part 2. *Sleep*, **17,** 408-410.

Haynes, S.N., Adams, A. & Franzen, M. (1981). The effects of presleep stress on sleep-onset insomnia. *Journal of Abnormal Psychology,* **90,** 601-606.

Kripke, D.F., Mullaney, D.J., Messin, S. and Wyborney, V.G. (1978). Wrist actigraphic measures of sleep and rhythms. *Journal of Clinical Neurophysiology,* **44** 674-676.

Kuisk, K.A., Bertelson, A.D. & Walsh, J.K. (1989). Presleep cognitive hyperarousal and affect as factors in objective and subjective insomnia. *Perceptual and Motor Skills,* **69**, 1219-1225.

Levey, A.B., Aldaz, J.A., Watts, F.N. & Coyle, K. (1991). Articulatory suppression and the treatment of insomnia. *Behaviour Research and Therapy,* **29**, 85-89.

Lichstein, K.L. & Riedel, B.W. (1994). Behavioural Assessment and Treatment of Insomnia: a review with an emphasis on clinical application. *Behaviour Therapy,* **25,** 659-688.

Lichstein, K.L. & Rosenthal, T.L. (1979). Insomniacs' perceptions of cognitive versus somatic determinants of sleep disturbance. *Journal of Abnormal Psychology,* **89**, 105-107.

Morin, C.M. (1993). Insomnia: Psychological Assessment and Management. New York: Guildford.

Morin, C.M., Stone, J., McDonald, K. & Jones, S. (1994). Psychological management of insomnia: a clinical replication series with 100 patients. *Behaviour Therapy*, **25**, 291-309.

Morin, C.M., Stone, J., Trinkle, D., Mercer, J. & Remsberg, S. (1993). Dysfunctional beliefs and attitudes about sleep among older adults with and without insomnia complaints. *Psychology and Aging*, **8**, 463-467.

Mullaney, D.J., Kripke, D.F. and Messin, S. (1980). Wrist actigraphic estimation of sleep time. *Sleep,* **3,** 83-92.

Nicassio, P.M., Mendlowitz, D.R., Fussell, J.J. and Petras, L. (1985). The phenomenology of the pre-sleep state: the development of the pre-sleep arousal scale. *Behaviour Research and Therapy* , **23** (3), 263-271.

Sadeh, A., Hauri, P.J., Kripke, D.F. & Lavie, P. (1995). The role of actigraphy in the evaluation of sleep disorders. *Sleep*, **18,** 288-302.

Sanavio, E. (1988). Pre-sleep cognitive intrusions and treatment of onset-insomnia. *Behaviour Research and Therapy,* **26**, 451-459.

Van Egeren, L., Haynes, S.N., Franzen, M. & Hamilton, J. (1983). Presleep cognitions and attributions in sleep-onset insomnia. *Journal of Behavioural Medicine*, **6**, 217-232.

Watts, F.N., Coyle, K. & East, M.P. (1994). The contribution of worry to insomnia. *British Journal of Clinical Psychology,* **33**, 211-220.

Watts, F.N., East, M.P. & Coyle, K. (1995). Insomniacs' perceived lack of control over sleep. *Psychology and Health,* **10,** 81-95.

APPENDIX 1.1

NOTES TO CONTRIBUTORS

1. The *British Journal of Clinical Psychology* publishes original contributions to scientific knowledge in clinical and health psychology. Topics covered reflect the broad role of clinical psychologists and include descriptive studies as well as studies of the aetiology, assessment and amelioration of disorders of all kinds, in all settings and amongst all age groups. Empirical investigations from any theoretical perspective of the relation of intrapersonal and interpersonal processes to disorder are welcome, as are studies of the delivery of health care in hospital or community settings. Relevant populations include people with psychiatric and neuropsychological disorders, and people with learning difficulties/mental retardation. Studies with samples not currently experiencing any disorder may be considered if they bear directly on clinical theory or practice.

The Health Psychology Section of the Journal will be launched in 1996 as a separate journal—*British Journal of Health Psychology*—in recognition of the growing importance of the applications of psychology outside the traditional psychiatric domain. Submissions are encouraged of clinical and experimental research on the development and management of medical conditions. Empirical research into psychosocial responses to illness, and the behaviours that put health at risk, is also welcome.

2. The following types of paper are invited:

(*a*) Papers reporting original empirical investigations.

(*b*) Theoretical papers, provided that these are sufficiently related to empirical data

(*c*) Review articles which need not be exhaustive, but which should give an interpretation of the state of the research in a given field and, where appropriate, identify its clinical implications.

(*d*) Brief Reports and Comments (see paragraph 6).

Case studies are normally published only as Brief Reports. Papers are evaluated in terms of their theoretical importance, contributions to knowledge, relevance to the concerns of practising clinical psychologists, and readability. Papers generally appear in order of acceptance, except for the priority given to Brief Reports and Comments.

3. The circulation of the Journal is worldwide, and papers are reviewed by colleagues in many countries. There is no restriction to British authors, and papers are invited from authors throughout the world.

4. The Code of Conduct of The British Psychological Society requires psychologists 'Not to allow their professional responsibilities or standards of practice to be diminished by considerations of religion, sex, race, age, nationality, party politics, social standing, class or other extraneous factors'. The Society resolves to avoid all links with psychologists and psychological organizations and their formal representatives that do not affirm and adhere to the principles in the clause of its Code of Conduct. In cases of doubt the Journals Office asks authors to sign a document confirming their adherence to these principles.

5. Papers should be prepared in accordance with The British Psychological Society's *Style Guide*, available at £3.50 per copy from The British Psychological Society, St Andrews House, 48 Princess Road East, Leicester LE1 7DR, England. Contributions should be kept as concise as clarity permits, and illustrations kept as few as possible. Papers should not normally exceed 5000 words. A summary of up to 200 words should be provided, but a shorter abstract with shorter papers. The title should indicate exactly but as briefly as possible the subject of the article, bearing in mind its use in abstracting and indexing systems.

(*a*) Contributions should be typed in double spacing with wide margins and only on one side of each sheet. Sheets should be numbered. The top copy and at least three good duplicates should be submitted and a copy should be retained by the author.

(*b*) The Journal operates blind review; authors are required to eliminate clues to their identity. Information revealing authorship (such as authors' names and institutional affiliations, and personal acknowledgements) must be confined to a removable front page, and the text must be free of such clues as identifiable self-citations ('In our earlier work…') and the names of localities or institutions. The paper's title should appear at the top of the first page of text.

(*c*) Tables should be typed in double spacing on separate sheets. Each should have a self-explanatory title and should be comprehensible without reference to the text. They should be referred to in the text by arabic numerals. Data given should be checked for accuracy and must agree with mentions in the text.

(*d*) Figures, i.e. diagrams, graphs or other illustrations, should be on separate sheets numbered sequentially 'Fig. 1', etc., and each identified on the back with the title of the paper. They should be carefully drawn, larger than their intended size, suitable for photographic reproduction and clear when reduced in size. Special care is needed with symbols: correction at proof stage may not be possible. Lettering must not be put on the original drawing but upon a copy to guide the printer. Captions should be listed on a separate sheet.

(*e*) Bibliographical references in the text should quote the authors name and the date of the publication thus; Hunt (1993). They should be listed alphabetically by author at the end of the article according to the following format:

Moore, R. G. & Blackburn, I.-M. (1993). Sociotropy, autonomy and personal memories in depression. *British Journal of Clinical Psychology*, **32**, 460–462.

Steptoe, A. & Wardle, J. Cognitive predictors of health behaviour in contrasting regions of Europe. In C. R. Brewin, A. Steptoe & J. Wardle (Eds), *European Perspectives in Clinical and Health Psychology*, pp. 101–118. Leicester: The British Psychological Society.

Particular care should be taken to ensure that references are accurate and complete. Give all journal titles in full.

(*f*) SI units must be used for all measurements, rounded off to practical values if appropriate, with the Imperial equivalent in parentheses (see BPS *Style Guide*).

(*g*) Authors are required to avoid the use of sexist language.

(*h*) Supplementary data too extensive for publication may be deposited with the British Library Document Supply Centre. Such material includes numerical data, computer programs, fuller details of case studies and experimental techniques. The materials should be submitted to the Editor together with the article, for simultaneous refereeing.

6. Brief Reports and Comments are limited to two printed pages. These are subject to an accelerated review process to afford rapid publication of research studies, and theoretical, critical or review comments whose essential contribution can be made within a small space. They also include research studies whose importance or breadth of interest is insufficient to warrant publication as full articles, and case reports making a distinctive contribution to theory or method. Authors are encouraged to append an extended report to assist in the evaluation of the submission and to be made available to interested readers on request to the author. To ensure that the two-page limit is not exceeded, set typewriter margins to 66 characters maximum per line and limit the text, including references and a 100 word abstract, to 150 lines. Figures and tables should be avoided. Title, author name and address for reprints and data of receipt are not included in the allowance. However deduct three lines from the text each and every time any of the following occur:

(*a*) title longer than 70 characters,

(*b*) author names longer than 70 characters,

(*c*) each address after the first address,

(*d*) each text heading (these should normally be avoided).

A character is a letter or space. A punctuation mark counts as two characters (character plus space) and a space must be allowed on each side of a mathematical operator.

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CHAPTER TWO

Major Research Proposal

An investigation of sleep-onset cognitive intrusions and their relationship to objectively measured sleep

Major Research Project Proposal

An Investigation Of Sleep-Onset Cognitive Intrusions And Their Relationship To Objectively Measured Sleep

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Title of proposed study

An investigation of sleep-onset cognitive intrusions and their relationship to objectively measured sleep.

Summary

Cognitive intrusions and pre-sleep hyperarousal have been hypothesised to be causal factors in sleep-onset insomnia and there is a correspondingly large amount of research evidence which indicates that insomniacs are highly aroused cognitively. The proposed study aims to investigate the nature of these pre-sleep cognitive intrusions among a sample of volunteers, recruited via a University newsletter

advertisement, who complain of significant problems in getting to sleep, and to determine if such intrusive thoughts might relate to objective and subjective sleep measures. The study will be carried out in Glasgow, based at the University Department of Psychological Medicine and data will be collected in the subjects' own homes. Findings will have implications for psychological interventions aimed at reducing levels of pre-sleep arousal.

Introduction

Insomnia, defined as difficulty in initiating or maintaining sleep (American Sleep Disorders Association, 1997) can be a debilitating and widespread complaint. It is the most prevalent sleep disorder, occurring in about 30% of the adult and older adult population occasionally, and in about 10-15% chronically (Gallup Organisation, 1991; Lichstein & Riedel, 1994). Research on the aetiology of insomnia, investigating the relative influence of cognitive and physiological arousal, has found the former to be more strongly associated with sleep disruption (Lichstein & Rosenthal, 1980; Nicassio, Mendlowitz, Fussell & Petras, 1985; Broman & Hetta, 1994). Indeed, in one study, having an overactive mind was the attribution of poor sleep rated most highly, both by insomniacs and non-insomniacs. Both groups also rated cognitive aspects of their pre-sleep state as being more difficult to control than somatic ones (Watts, East & Coyle, 1995).

Cognitive Arousal and Insomnia

Cognitive intrusions and pre-sleep hyperarousal have been hypothesised to be causal factors in sleep-onset insomnia and there is a correspondingly large amount of research evidence which indicates that insomniacs are highly aroused cognitively.

Van Egeren, Haynes, Franzen & Hamilton (1983) took taped recordings of thoughts occurring during the pre-sleep period and found that pre-sleep cognitions were significantly associated with subjective sleep onset latency. Further studies have also demonstrated an association between pre-sleep cognitive arousal and sleep latency (Nicassio et al, 1985; Kuisk, Bertelson & Walsh, 1989; Broman & Hetta, 1994).

Studies aimed at producing sleep disturbance through the induction of cognitive intrusions in the pre-sleep period have resulted in significantly longer latency to sleep onset and sleep maintenance difficulties (Gross & Borkovec, 1982; Hall, Buysse, Reynolds, Kupfer & Baum, 1996). One study provides results contradictory to this. Haynes, Adams & Franzen (1981) exposed insomniacs and non-insomniacs to brief cognitive stressors to induce cognitive intrusions, and found a decrease in subjective and objective sleep onset latency among insomniacs on stress nights. They suggest a mental processing task which disrupts sleep-related cognitive events will, as a result, decrease sleep onset latency. This has implications for the importance of the nature of the intrusive cognitions and the corresponding effect on sleep.

Nature of Pre-sleep Cognitions

Research examining pre-sleep cognitions of problem sleepers relative to good sleepers has led to the conclusion that a common mechanism of sleep onset disturbance is indeed uncontrollable cognitive activity and worry. Insomniacs tend to have more negative thoughts than do good sleepers, especially at bedtime (Kuisk et al, 1989; Nicassio et al, 1985; Van Egeren et al, 1983).

Research has further suggested that the uncontrollable thoughts of insomniacs are actually centred around the problems they are having with their sleep. Relative to normal sleepers, insomnia sufferers report a greater number of intrusive thoughts about sleep and report pre-sleep cognitions as more worried and negative (Borkovec, Lane & VanOot, 1981; Borkovec, 1982). In a study examining the relationship between worry and insomnia, Watts, Coyle & East (1994) found that much of the pre-sleep mental activity of insomniacs is trivial in content, and that this was particularly characteristic of worried insomniacs. In contrast, thoughts of non-worried insomniacs tended to focus on sleep itself, whereas the thoughts of worried non-insomniacs tended to revolve around work-related issues and general mental activity. In the same study, the content of sleep-interfering cognitions was investigated, and 6 factors of night-time thoughts were identified: mental activity and rehearsal; thoughts about sleep; family and long-term concerns; positive plans and concerns; somatic preoccupations; and work and recent concerns. However, despite the evidence supporting the importance of cognitive arousal in sleep disturbance, it is clear that the literature concerning the actual thought content of insomniacs during sleep onset is limited.

Methodological Issues in Previous Research

Many previous studies examining cognitive arousal in insomniacs have used self-report questionnaire measures of cognitive intrusions or checklists of thought content. It is possible that these measures do not adequately assess intrusions because they limit responses to a predetermined set of items and are completed retrospectively the following morning, the accuracy of which may be confounded by various factors. Therefore, a more accurate approach may be to record intrusions,

unique to each individual, as they arise i.e., as the insomniac is attempting to fall asleep.

In addition, many studies focus on the comparison of these measures of cognitive intrusions with subjective measures of sleep parameters. Subjective measures of sleep variables provide valuable information. However, due to their subjectivity, it is difficult for these measures to be independent of each other, and to know how the insomniac is actually sleeping. Patients with insomnia tend to overestimate how long it takes them to fall asleep and the amount of time that they are awake over the course of the night when compared with objective assessments (Coates, Killen, George, Marchini, Hamilton & Thoresen, 1982; Coates, Killen, Silbeman, Marchini, Hamilton & Thoresen, 1983; Edinger & Fins, 1995). Studies that have involved objective measures of sleep, using polysomnographic (PSG) investigations, have mainly been carried out in sleep laboratories. As well as being expensive, this may introduce an experimental effect, in comparison to assessing sleep difficulties within the insomniac's own environment, where the problem typically occurs. An alternative method for objectively assessing sleep parameters, which is cost-effective, and minimally intrusive, so as not to cause arousal or distort sleep, is the wrist actigraph.

The actigraph is a small device attached to a strap that can be worn on the wrist or leg. Internal motion sensors record the wearer's movements over a certain period and the movement data may then be transferred to a computer for analysis. Although the actigraph can be used solely to measure activity, it is often used to identify sleep/wake periods, based on the amount of movement in the limb to which

it is attached [see Sadeh, Hauri, Kripke & Lavie (1995) for review]. Measures derived from the wrist actigraph have been found to correlate highly with PSG measures of sleep (Kripke, Mullaney, Messin & Wyborney, 1978; Mullaney, Kripke & Messin, 1980). If in general fewer limb movements occur during sleep than wakefulness, actigraphy can be used as an indirect measure of sleep. However, to the authors' knowledge, there are no published studies examining whether people who are mentally alert are also more unsettled while in bed. If movement is a reliable objective marker for cognitive arousal, then this would aid in the assessment process, since it is not otherwise possible to verify thoughts.

The purpose of the proposed study is to determine the nature and content of pre-sleep cognitions using a method devised for the direct monitoring of thoughts. It is considered that this method will permit subjects to express themselves freely while improving on the retrospective nature of existing measures. Objective measures of sleep will be obtained using the wrist actigraph. It is considered that data collection by these methods will be less intrusive, more clinically relevant if carried out in the subject's own environment, and self-administered which will cut down on experimental influences on sleep. Findings will highlight the nature of cognitive intrusions that poor sleepers find troublesome and have implications in their relation to current psychological treatments for sleep disturbances.

AIM

To investigate the nature and content of pre-sleep cognitive intrusions, and their relationship with subjective and objective measures of sleep.

This study raises three hypotheses, which primarily set out to confirm previous research findings, and five research questions, where specific hypotheses cannot be made at this stage.

Hypotheses

1. There will be a correlation between pre-sleep cognitive intrusions and sleep-onset latency.

2. There will be a discrepancy between subjective estimates of sleep variables as obtained in retrospect and objective measures of sleep variables obtained on actigraphic recordings.

3. There will be a discrepancy between the level of cognitive arousal reported by 'poor' and 'normal' sleepers.

The study aims to answer the following specific research questions:

1. What are the nature and content of pre-sleep cognitions within a group of poor sleepers?

2. What is the relationship between pre-sleep cognitive intrusions and sleep variables measured objectively by wrist actigraphy?

3. What is the relationship between pre-sleep cognitive intrusions and sleep variables assessed subjectively by sleep diary?

4. Is there a correlation between an existing questionnaire measure of cognitive arousal and the measure used in this study?

5. Is there a relationship between the amount of movement in bed, as measured by the actiwatch, and pre-sleep cognitions?

Subjects

Recruitment

20-30 volunteers will be recruited through an advertisement in a University staff newsletter and notices placed in the University Department of Psychology. Based on previous research, it is anticipated that a minimum of 30 replies will be received.

Inclusion Criteria

Volunteers will be included in the study if they are aged between 16 and 65 years; and if they complain of significant problems in falling asleep, with a minimum sleep onset latency of 30 minutes occurring on four out of seven nights with or without disruption to other sleep variables.

Exclusion Criteria

Volunteers will be excluded if they meet any of the following criteria:

1. If they are receiving active psychological treatment for their sleep difficulties;
2. If they are suffering from interfering chronic medical conditions known to have an impact on sleep;
3. If they are suffering from a psychopathological disorder;
4. If they suffer intermittent wakenings without a difficulty in getting to sleep.

Control Sample

A small control sample of 4-5 normal sleepers will be recruited from within the University to investigate their level of cognitive intrusion.

Measures

Screening and Intake Measures

1. Telephone interview to verbally ascertain the nature of the sleep problem, and to determine eligibility for inclusion.
2. Sleep History Questionnaire (Morin, 1993) to be completed and returned prior to investigation.

3. Pittsburgh Sleep Quality Index (PSQI) (Buysse, Reynolds, Monk, Berman & Kupfer, 1989) to assess current sleep quality.

Assessment of sleep patterns

1. An objective measurement of sleep variables will be obtained using actigraphic recordings. The actiwatch (Model AW2, Cambridge Neurotechnology Ltd., Sleepwatch Software) is an activity monitoring system which is attached to the wrist of the subject and differentiates between sleep and wake periods based on the amount of movement of the limb. This model of actiwatch also has an event marker which, when depressed, marks the date and time.
2. The subjective assessment of sleep will be obtained using the Sleep Diary, which is a well-documented, retrospective, self report measure and is completed upon rising (Espie, 1991). This provides a summary record of parameters from the preceding night's sleep.

Assessment of Cognitions

1. The cognitive sub-scale of the Pre-Sleep Arousal Scale (Nicassio et al, 1985) is a self-administered 8 item questionnaire completed on each morning following each night of investigation. This will provide a description of the subject's state of cognitive arousal as they fall asleep. Subjects rate on a five point scale (not at all – extremely) how intensely they experienced each of the symptoms as they attempted to fall asleep.
2. A voice activated recorder or Checklist (to be piloted) placed at the subject's bedside on each night of investigation will provide a 'live' measure of the content and nature of intrusive thoughts.

Design

The proposed study will have mainly a within subjects design. Two subgroups will be formed within the sample on the basis of sleep onset latency values, and used in a between group comparison. The control group will be used for a small between subjects design to investigate any differences in pre-sleep cognitive intrusions between 'poor' and 'normal' sleepers. From these investigations, it will be possible to derive answers to the proposed research questions.

Procedure

A procedure for the direct monitoring of intrusive thoughts will be developed by piloting the use of a 'live' bedside checklist or voice activated recorder on a small group of volunteers from within the University. Those replying to the advertisement will firstly undergo a telephone interview. Thereafter, they will receive an information leaflet on the proposed study to which an informed consent slip will be attached (Appendix 2.1), along with the intake questionnaires for them to complete and return to the investigator. Subjects will then be supplied with an actiwatch and instructed to wear it continuously for approximately 72 hours. If the actiwatch has to be removed, for example in wet activities, then a record of this must be kept. They will also be provided with a sleep diary and a pre-sleep arousal scale which they must complete on rising after each night of investigation. Subjects will be instructed to go to bed as normal, and if intrusive thoughts and worries are experienced as they attempt to fall asleep, the precise nature and content should be described using the supplied tape recorder or bedside checklist. The actiwatch should be removed on completion of 72 hours' wear and returned to the investigator along with the completed forms.

Data Analysis

Depending on the outcome of the pilot, data from the checklist or voice activated recorder will be analysed according to the method appropriate for the chosen measure. Sleep variables derived from the actiwatch and sleep diary will be downloaded onto a PC along with data from the questionnaire measure of cognitive arousal and demographic information. Statistical analyses will involve difference testing, and correlational and regressional analyses.

Practical Applications

This study will increase awareness of the nature of intrusive thoughts experienced by those who have difficulties in getting to sleep, and how these thoughts may relate to how they actually sleep, independent of their own subjective perception. This will have implications for current psychological interventions aimed at reducing levels of pre-sleep arousal.

Timescales

The proposed starting date of the project is September 1997. Data collection will take approximately 4 months, and the coding, scoring, and analysis will take approximately 2 months.

Ethical Approval

This proposal will be submitted to the Trust Ethics Committee for approval.

REFERENCES

ASDA Report. (1995). Practice parameters for the use of actigraphy in the clinical assessment of sleep disorders. *Sleep, 18(4),* 285-287.

Borkovec, T.D., Lane, T.W. & VanOot, P.H. (1981). Phenomenology of sleep among insomniacs and good sleepers: Wakefulness experience when cortically asleep. *Journal of Abnormal Psychology, 6,* 607-609.

Borkovec, , T.D. (1982). Insomnia. *Journal of Consulting and Clinical Psychology, 50,* 880-895.

Broman, J.E. & Hetta, J. (1994). Perceived pre-sleep arousal in patients with persistent psychophysiologic and psychiatric insomnia. *Nordic Journal of Psychiatry, 48 (3),* 203-207.

Buysse, D.J., Reynolds, C.F., Monk, T.H., Berman, S.R. & Kupfer, D.J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Research, 28,* 193-213.

Coates, T., Killen, J., George, J., Marchini, E., Hamilton, S. & Thoresen, C. (1982). Estimating sleep parameters: a multitrait-multimethod analysis. *Journal of Consulting and Clinical Psychology, 50,* 345-352.

Coates, T., Killen, J., Silbeman, S., Marchini, J., Hamilton, S. and Thoresen, C. (1983). Cognitive activity, sleep disturbance, and stage specific differences between recorded and reported sleep. *Psychophysiology, 20,* 243.

Edinger, J.D. & Fins, A.I. (1995). The distribution and clinical significance of sleep time misperceptions among insomniacs. *Sleep, 18 (4),* 232-239.

Gallup Organization (1991). *Sleep in America.* Gallup, Princeton, NJ.

Gross, R.T. & Borkovec, T.D. (1982). Effects of a Cognitive Intrusion Manipulation on the Sleep-Onset Latency of Good Sleepers. *Behaviour Therapy, 13,* 117-124.

Hall, M., Buysse, D.J., Reynolds, C.F., Kupfer, D.J. & Baum, A. (1996). Stress related intrusive thoughts disrupt sleep onset and continuity. *Sleep Research, 25,* 163.

Haynes, S.N., Adams, A. & Franzen, M. (1981). The effects of presleep stress on sleep-onset insomnia. *Journal of Abnormal Psychology, 90,* 601-606.

Kripke, D.F., Mullaney, D.J., Messin, S. & Wyborney, V.G. (1978). Wrist actigraphic measures of sleep and rhythms. *Journal of Clinical Neurophysiology, 44,* 674-676.

Kuisk, K.A., Bertelson, A.D. & Walsh, J.K. (1989). Presleep cognitive hyperarousal and affect as factors in objective and subjective insomnia. *Perceptual and Motor Skills, 69,* 1219-1225.

Lichstein, K.L. & Riedel, B.W. (1994). Behavioural Assessment and Treatment of Insomnia: A review with an emphasis on clinical application. *Behaviour Therapy, 25,* 659-688.

Lichstein, K.L. & Rosenthal, T.L. (1980). Insomniacs' perceptions of cognitive versus somatic determinants of sleep disturbance. *Journal of Abnormal Psychology, 89,* 105-107.

Morin, C.M. (1993). *Insomnia: psychological assessment and management. pp 195-197,* Guildford Press, New York.

Mullaney, D.J., Kripke, D.F. & Messin, S. (1980). Wrist actigraphic estimation of sleep time. *Sleep, 3,* 83-92.

Nicassio, P.M., Mendlowitz, D.R., Fussell, J.J. and Petras, L. (1985). The phenomenology of the pre-sleep state: the development of the pre-sleep arousal scale. *Behaviour Research and Therapy, 23 (3),* 263-271.

Sadeh, A., Hauri, P.J., Kripke, D.F. & Lavie, P. (1995). The role of actigraphy in the evaluation of sleep disorders. *Sleep, 18,* 288-302.

Van Egeren, L., Haynes, S.N., Franzen, M. & Hamilton, J. (1983). Presleep cognitions and attributions in sleep-onset insomnia. *Journal of Behavioural Medicine, 6,* 217-232.

Watts, F.N., Coyle, K. & East, M.P. (1994). The contribution of worry to insomnia. *British Journal of Clinical Psychology, 33,* 211-220.

Watts, F.N., East, M.P. & Coyle, K. (1995). Insomniacs' perceived lack of control over sleep. *Psychology and Health, 10,* 81-95.

APPENDIX 2.1

INFORMATION LEAFLET ON SLEEP STUDY AND CONSENT FORM

Dear

I am presently a Doctoral Student at the University of Glasgow, training as a Clinical Psychologist. As part of my work I am carrying out a study to help us learn more about appropriate treatment for insomnia. This study is concerned with looking at the kinds of thoughts that people complain of while they are trying to fall asleep.

Taking part would firstly involve speaking with me on the telephone to discuss the difficulties you are having with your sleep, and then completing some forms for general information. After this, if you are willing, you would meet with me on a convenient date and time when I would supply you with a watch-like device to wear for 3 nights at the most. This is called an actiwatch and simply records your movements continuously while you are wearing it. Over the same 3 nights you would record the things that go through your mind while you are trying to fall asleep on a voice activated recorder and then complete forms detailing certain aspects of your sleep on each subsequent morning. Once the 3 nights have passed, we would then meet up again so you could return the actiwatch and your completed forms.

You are free to decide whether you would like to participate and you may withdraw at any time if you wish. Doing so would in no way affect any treatment you may receive

in the future from the NHS or otherwise. I wish to stress that the information given is strictly confidential. Data will be used for research purposes only. I have given you an informed consent slip to complete if you wish to take part.

Many thanks for your time.

Amanda A Wicklow

Clinical Psychologist in Training

.....

I,....., have read the information leaflet on the sleep study being undertaken by Amanda Wicklow, Clinical Psychologist in Training, and hereby give my consent to be included as a volunteer in this research.

Signature.....

Date.....

CHAPTER THREE

Major Research Paper

An investigation of sleep-onset cognitive intrusions and their relationship to objectively measured sleep

An Investigation Of Sleep-Onset Cognitive Intrusions And Their Relationship To Objectively Measured Sleep

Prepared in accordance with the instructions to contributors for the Journal of Consulting and Clinical Psychology (See Appendix 3.1)

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An Investigation Of Sleep-Onset Cognitive Intrusions And Their Relationship To Objectively Measured Sleep

Prepared in accordance with the instructions to contributors for the Journal of Consulting and Clinical Psychology (See Appendix 3.1)

ABSTRACT

Cognitive intrusions and pre-sleep hyperarousal have been hypothesised to be causal factors in sleep-onset insomnia and there is research evidence which indicates that insomniacs are highly aroused cognitively. This study investigates the content of intrusive pre-sleep cognitions, using live-recordings of spontaneous thoughts, and evaluates their relationship with objectively monitored sleep, using the wrist actigraph, over several nights. 21 subjects with sleep-onset disturbance were recruited through advertisements, and data were obtained for 63 subject nights. This study yields important results concerning the content and quantity of intrusive thoughts which may be associated with sleep-onset difficulties. Implications for cognitively-based treatments for insomnia are discussed.

INTRODUCTION

Insomnia, defined as difficulty in initiating or maintaining sleep (American Sleep Disorders Association, 1997) can be a debilitating and widespread complaint. It is the most prevalent sleep disorder, occurring in about 30% of the adult and older adult population occasionally, and in about 10-15% chronically (Gallup Organisation, 1991; Lichstein & Riedel, 1994). Research on the aetiology of insomnia, investigating the relative influence of cognitive and physiological arousal, has found the former to be more strongly associated with sleep disruption (Lichstein & Rosenthal, 1980; Nicassio, Mendlowitz, Fussell & Petras, 1985; Broman & Hetta, 1994). Indeed, in one study, having an overactive mind was the attribution of poor sleep rated most highly, both by insomniacs and non-insomniacs. Both groups also rated cognitive aspects of their pre-sleep state as being more difficult to control than somatic ones (Watts, East & Coyle, 1995).

Cognitive Arousal and Insomnia

Cognitive intrusions and pre-sleep hyperarousal have been hypothesised to be causal factors in sleep-onset insomnia and there is research evidence which indicates that insomniacs are highly aroused cognitively. Van Egeren, Haynes, Franzen & Hamilton (1983) took taped recordings of thoughts occurring during the pre-sleep period and found that pre-sleep cognitions were significantly associated with subjective sleep onset latency. Further studies have also demonstrated an association between pre-sleep cognitive arousal and sleep latency (Nicassio et al, 1985; Kuisk, Bertelson & Walsh, 1989; Broman & Hetta, 1994).

Studies aimed at producing sleep disturbance through the induction of cognitive intrusions in the pre-sleep period have resulted in significantly longer latency to sleep onset and sleep maintenance difficulties (Gross & Borkovec, 1982; Hall, Buysse, Reynolds, Kupfer & Baum, 1996). One study provides results contradictory to this. Haynes, Adams & Franzen (1981) exposed insomniacs and non-insomniacs to brief cognitive stressors to induce cognitive intrusions, and found a decrease in subjective and objective sleep onset latency among insomniacs on stress nights. They suggest a mental processing task which disrupts sleep-related cognitive events will, as a result, decrease sleep onset latency. This may have implications for the importance of the *nature* of the intrusive cognitions and the corresponding effect on sleep.

Nature of Pre-sleep Cognitions

Research examining pre-sleep cognitions of problem sleepers relative to good sleepers has led to the conclusion that a common mechanism of sleep onset disturbance is indeed uncontrollable cognitive activity and worry. Insomniacs tend to have more negative thoughts than do good sleepers, especially at bedtime (Kuisk et al, 1989; Nicassio et al, 1985; Van Egeren et al, 1983).

Research has further suggested that the uncontrollable thoughts of insomniacs are actually centred around the problems they are having with their sleep. Relative to normal sleepers, insomnia sufferers report a greater number of intrusive thoughts about sleep and report pre-sleep cognitions as more worried and negative (Borkovec, Lane & VanOot, 1981; Borkovec, 1982). In a study examining the relationship between worry

and insomnia, Watts, Coyle & East (1994) found that much of the pre-sleep mental activity of insomniacs is trivial in content, and that this was particularly characteristic of worried insomniacs. In contrast, thoughts of non-worried insomniacs tended to focus on sleep itself, whereas the thoughts of worried non-insomniacs tended to revolve around work-related issues and general mental activity. In the same study, the content of sleep-interfering cognitions was investigated, and 6 factors of night-time thoughts were identified: mental activity and rehearsal; thoughts about sleep; family and long-term concerns; positive plans and concerns; somatic preoccupations; and work and recent concerns. In a recent review paper, Espie and Wicklow (1998) developed a cognitive model of insomnia postulating possible interactions between the nature of the insomniac's cognitive intrusions and his/her experience of insomnia. However, despite the evidence supporting the importance of cognitive arousal in sleep disturbance, it is clear that the literature concerning the actual thought content of insomniacs during sleep onset is limited.

Methodological Issues in Previous Research

Previous studies have examined cognitive arousal in insomniacs using self-report questionnaire measures of cognitive intrusions or checklists of thought content. It is possible that these measures do not adequately assess intrusions because they limit responses to a predetermined set of items and are completed retrospectively the following morning, the accuracy of which may be confounded by various factors. An alternative approach would be to record intrusions, unique to each individual, as they arise i.e., as the insomniac is attempting to fall asleep. In addition, studies have compared these measures with subjective estimates of sleep parameters, again recorded

the next morning on a sleep diary. Clearly, it is difficult to regard these measures as independent of each other, or even to know how the insomniac is actually sleeping. Studies that have involved objective measures of sleep, using PSG investigations, have mainly been carried out in sleep laboratories. As well as being expensive, this may introduce an experimental effect, in comparison to assessing sleep difficulties within the insomniac's own environment, where the problem typically occurs. An alternative method for objectively assessing sleep parameters, which is cost-effective, and minimally intrusive, so as not to cause arousal or distort sleep, is the wrist actigraph.

The actigraph is a small device attached to a strap that can be worn on the wrist or leg. Internal motion sensors record the wearer's movements over a pre-defined period and the movement data may then be downloaded to a PC for analysis. Although the actigraph can be used solely to measure activity, it is often used to identify sleep/wake periods, based on the amount of movement in the limb to which it is attached [see Sadeh, Hauri, Kripke & Lavie (1995) for review]. Measures derived from the wrist actigraph have been found to correlate highly with PSG measures of sleep (Kripke, Mullaney, Messin & Wyborney, 1978; Mullaney, Kripke & Messin, 1980).

In this study, cognitions were tape-recorded as they arose, thus permitting subjects to express themselves freely while improving on the retrospective nature of existing measures, and sleep variables were measured objectively using the wrist actigraph. It was considered that data collection by these methods would be less intrusive, more clinically relevant if carried out in the subject's own environment, and self-administered which would cut down on experimental influences on sleep.

The Present Study

The purpose of the present study was firstly, to determine the nature and content of pre-sleep cognitions reported by people who complain of significant disturbance in falling asleep, using a method devised for the direct monitoring of thoughts, and secondly, to investigate their effect on subjective and objective measures of sleep. Based on previous research findings, it was hypothesised that sleep latency would be positively correlated with frequency of reported thoughts. A related aim was to examine the relationship between the different categories of thoughts (from the descriptive analysis) and latency to sleep onset. Patients with insomnia tend to overestimate how long it takes them to fall asleep and the amount of time that they are awake over the course of the night when compared with objective assessments (Coates, Killen, George, Marchini, Hamilton & Thoresen, 1982; Coates, Killen, Silbeman, Marchini, Hamilton & Thoresen, 1983; Edinger & Fins, 1995). In light of this evidence, it was hypothesised that there would be a discrepancy between subjective and objective measures of sleep variables. In addition, the possibility of a relationship between amount of movement in bed (measured by the actiwatch) and cognitive arousal was examined.

METHOD

Subjects

A total of 21 subjects was recruited through an advertisement in a University staff newsletter, and notices placed in the University Department of Psychological Medicine. Demographic characteristics of the sample are reported in Table 1. Subjects were included in the study if they were aged between 16 and 65 years, and if they complained

of significant problems in falling asleep, with a minimum sleep onset latency of 30 minutes occurring on four out of seven nights, with or without disruption to other sleep variables (International Classification of Sleep Disorders, 1997). Subjects were excluded if they met any of the following criteria: if they were receiving active psychological treatment for their sleep difficulties; if they were suffering from interfering chronic medical conditions known to have an impact on sleep; if they were suffering from a psychopathological disorder; or if they suffered intermittent awakenings without a difficulty in getting to sleep. Subjects initially underwent a telephone interview to verbally ascertain the nature of the sleep problem, and to determine eligibility for inclusion. Prior to investigation, subjects received an information leaflet on the study to which an informed consent slip was attached, and several intake questionnaires for them to complete and return. These included a sleep history questionnaire (Morin, 1993) (Appendix 3.2) and the Pittsburgh Sleep Quality Index (PSQI) (Buysse et al, 1989) (Appendix 3.3). A score in excess of 5 on this index has been claimed to identify insomniacs with 90% diagnostic sensitivity.

INSERT TABLE 1 HERE

Measures

Four main measures were used in this study:-

1. The subjective assessment of sleep consisted of a Sleep Diary (Appendix 3.4), which is a well-documented, retrospective, self report measure and is completed upon rising (Espie, 1991). This provides a summary record of parameters from the preceding night's sleep.

2. An objective measure of sleep was obtained using actigraphic recordings. The actiwatch (Model AW2, Cambridge Neurotechnology Ltd., Sleepwatch software) is an activity monitoring system which is attached to the wrist of the subject and differentiates between sleep and wake periods based on the amount of movement of the limb. The period of time the watch will accumulate activity counts before saving the sample and resetting the counter to zero is referred to as the epoch length. In this case the epoch length chosen was 1 minute (for sleep analysis, an interval of 1 minute or less is recommended). A recording epoch is scored as 'sleep' or 'wakefulness' according to certain criteria determined by the programme's algorithm. This model of actiwatch also has an event marker which, when depressed, marks the date and time.

3. The cognitive sub-scale of the Pre-Sleep Arousal Scale (Nicassio et al, 1985) (Appendix 3.5) is a self-administered 8 item questionnaire completed on each morning following each night of investigation. This provides a description of the subject's state of cognitive arousal as they fall asleep. Subjects rate on a five point scale (not at all – extremely) how intensely they experienced each of the symptoms as they attempted to fall asleep.

4. A voice activated recorder (Sony Cassette Recorder TCS-580V) placed at the subject's bedside on each night of investigation, to provide a 'live' measure of the content and nature of intrusive thoughts experienced as the subject is attempting to fall asleep.

Procedure

The procedure for the direct monitoring of intrusive thoughts was developed by piloting the use both of a bedside checklist and a voice activated dictaphone on a small group of volunteers from within the University. The latter was found to be less intrusive and was therefore subsequently used in the study. Once it was set up to record, subjects were instructed to leave it at their bedside while they attempted to fall asleep. When they felt they were having difficulty in falling asleep, they were instructed to say out loud whatever was going through their mind. There were no directive guidelines given on what should be recorded in order to allow the subjects to express themselves freely. Subjects were supplied with an actiwatch and instructed to wear it continuously for 3 nights. If the actiwatch had to be removed, for example in wet activities, then a record of this was kept using the event marker button, which was also used to record 'lights out' and 'rising time'. The sleep diary and pre-sleep arousal scale were to be completed on rising after each night of investigation. Subjects were instructed to go to bed as normal, and if intrusive thoughts were experienced as they attempted to fall asleep, then they should be described using the supplied voice activated recorder. The actiwatch was removed on completion of 3 nights' wear and returned to the investigator along with the completed forms.

RESULTS

Subjective Data

The tape-recorded material was transcribed and the following strategy adopted and carried out by the first and second authors to allow for analysis:

- The first step was to identify common themes in subjects' responses and to label these according to their content. For example, the statement "my heart's beginning to beat quite fast" was labeled as a thought about "somatic symptoms".

- The second step was to group themes that shared a common content into categories, and then into subcategories. For example, the above thought about "somatic symptoms" was grouped into the category "somatic" and then into the subcategory "autonomic". A set of coding categories was then identified to adequately describe the data collected, according to a "3 systems model" of arousal, based on cognitive and somatic arousal, and environmental stimulation (Espie, 1991). A detailed description of the categories of thoughts (with abbreviations) is shown in Table 2, and criteria for the coding of segments is included in Appendix 3.6.

- The transcripts were segmented into a series of single ideas or statements, consisting of a phrase that could stand alone. Definitions for the use of each code were prepared, and each segment then encoded by the coder. The reliability of coding was assessed using a sample of 4 transcripts (19%) and was found to be satisfactory, with 93% agreement between two independent raters. Agreement did not differ substantially between different categories.

- The number of thoughts assigned to each category for each subject night was then counted.

- In addition, a numerical rating of emotion was assigned to each subject night according to the emotion expressed on the tape, taking into account the tone and content of speech. A 10 point Likert scale ranging from –5 (extremely unpleasant) through 0 (neutral) to +5 (extremely pleasant) was used. Reliability was assessed using a sample of 4 tapes (19%) and agreement occurred if numerical ratings were independently assigned that were either the same or within one integer of one another. Concordance correlation between raters = 0.8.

INSERT TABLE 2 HERE

Table 3 contains means and standard deviations for each category of thought, and Figure 1 provides a profile of the frequencies of each category of thought. As can be seen the most commonly reported thoughts were those belonging to the category labelled 'cognitive', and within that, the subcategory incorporating problem-solving/rehearsing/planning. A Friedman two-way analysis of variance for related samples was used to test for systematic variations across nights. This showed that there was no significant difference between nights, and therefore data from each night could be included in subsequent analyses.

INSERT TABLE 3 AND FIGURE 1 HERE

Objective Data

Actigraphic data were obtained from the 21 subjects for a total of 63 nights, from which the following measures were included in analysis: sleep efficiency (the percentage of time spent actually asleep during time in bed); sleep onset latency; sleep fragmentation index (a percentage of immobile phases of one minute); total sleep time; wake time after sleep onset. Table 4 contains means and standard deviations for actigraphic and sleep diary data, and the results of two-tailed t-tests for paired samples. Pearson correlation coefficients were computed to evaluate the relationships between variables (see Table 5 for correlational matrix). These tests demonstrated that, although correlated, their means differed significantly, therefore both types of measurement were used in the analyses.

INSERT TABLES 4 AND 5 HERE

Relationship between sleep and cognitions

As can be seen in Table 5, correlations between reported thoughts and sleep measures demonstrated that amount of thinking was correlated with sleep latency. 'Cognitive' and 'Total' thoughts were both highly correlated with actiwatch (AW) and diary measures (DA) of latency. 'Somatic' thoughts were negatively correlated with sleep efficiency (DA) and sleep time (DA) ($r=-0.36$, $p<0.005$ and $r=-0.288$, $p<0.05$ respectively). However, it did not follow that increased cognitive arousal would result in increased movement in bed, as measured by the fragmentation index, as these measures were not correlated with measures of intrusive thoughts.

There were several significant correlations between Cognitive Arousal Scale (CAS) scores and reported thoughts, as demonstrated in Table 5. 'Cognitive', 'somatic', and 'total' thoughts were all positively correlated with CAS scores. Within the sleep measures, CAS was negatively correlated with sleep efficiency (DA) ($r=-0.495$, $p<0.001$), and sleep time (DA) ($r=-0.332$, $p<0.01$), and positively correlated with latency (DA) ($r=0.424$, $p<0.005$).

Relationship between sleep, cognitions and emotionality

As can be seen in Table 5, ratings of emotion were correlated with 'cognitive' and 'environmental' categories of thoughts ($r=-0.334$, $p<0.01$ and $r=-0.335$, $p<0.01$ respectively) and total thoughts ($r=-0.373$, $p<0.005$). Actiwatch measures of latency and CAS scores were also correlated with emotion ($r=-0.293$, $p<0.05$ and $r=-0.301$, $p<0.05$).

Relationship between objective and subjective measures of sleep parameters

In general, the correlations between actiwatch and diary measures were relatively high (Table 5). However, two-tailed t-tests for paired samples, shown in Table 4, demonstrate that the means differed significantly. As was hypothesised, there was a tendency to subjectively overestimate sleep latency, and to underestimate total sleep time.

High versus Low Sleep Onset Latency

The data were divided into 2 groups split at the median of the actiwatch measure of latency in order to investigate differences in cognitive intrusions between nights of high

and low sleep onset. Figure 2 represents a profile of the number of reported thoughts from each category in these two groups. A two-tailed t-test for independent samples revealed that nights with longer sleep latency resulted in a significantly higher number of total thoughts, 'cognitive' thoughts, and 'somatic' thoughts (t=-4.227, p=0.000, t=-4.112, p=0.000, t=-2.954, p=0.004 respectively).

INSERT FIGURE 2 HERE

Interrelationships between Thought Categories

To develop an explanatory model, a principal component analyses was performed (Table 6). This yielded a three-factor solution following varimax rotation, explaining 63% of variance. Variables derived from this method were identified and designated as: 1) rehearsal/planning/problem-solving and attention to arousal status; 2) thoughts about sleep, autonomic symptoms, and nature of cognitions; and 3) thoughts about environmental stimulation. For each factor, the scores of the thought categories belonging to that factor were summed and used in regression analyses.

INSERT TABLE 6 HERE

Regression Analyses

Two models were tested with the data in order to select relevant predictors of sleep-onset difficulties. Firstly, to test the statistically derived model from the principal components analysis, regression analyses were conducted using latency measures as the dependent variables, entering Factors 1, 2, and 3 stepwise into the equation. The results

indicated that Factor 1 contributed significantly to sleep onset latency (AW) (adjusted R^2 =0.087, beta=0.319, p=0.011). Effects for all other predictors were not significant.

Secondly, to test the three systems model (cognitive, somatic, and environmental thoughts), regression analyses were conducted using actigraph and diary latency measures as the dependent variables. Total 'cognitive' thoughts explained a significant amount of variance (adjusted R^2=0.108, beta=0.350, p=0.005 and adjusted R^2=0.059, beta=0.273, p=0.03 respectively). No other variable added significance to the regression equation. Using wake time after sleep onset (DA) as the dependent measure, only total 'somatic' thoughts was a predictor (adjusted R^2=0.129, beta=0.378, p=0.002).

DISCUSSION

The results indicate that volume and content of thinking are related to latency to sleep onset. The content of the thoughts had an important effect on sleep, namely those in the 'cognitive' category. Thus, it seems that thoughts about sleep itself, rehearsal/planning/problem-solving, and thoughts about the quality of thinking, are more likely to intrude into the sleep onset period. Thoughts in the 'somatic' category were negatively correlated with subjective assessment of total sleep time. This finding suggests that somatic preoccupations may have a bearing on how the insomniac evaluates sleep time. 'Environmental' thoughts were not related to any sleep variables, which supports the suggestion made by Watts et al (1995) that insomniacs may be biased towards internally generated information and away from external sensory information. There was no significant relationship between fragmentation and intrusive

thoughts, therefore it does not follow that cognitive arousal results in increased movement for the insomniac.

An existing measure of cognitive arousal, the CAS, was highly correlated with the measures of cognitions derived from this study. However, although it was correlated with subjective assessment of latency, it did not correlate with objective measures, a discrepancy which may be explained by the retrospective nature of the subjective assessments.

Overall emotionality ratings were correlated with 'cognitive' and 'environmental' categories of thoughts, total number of thoughts, and latency (AW). It may be that the insomniac who is considering important matters and thinking about the consequences of not sleeping, will probably experience an increase in arousal and emotional response. Likewise, if external stimulation is being attended to, this may be associated with some frustration. Objective and subjective measures of sleep parameters were highly correlated in general. However, there was a tendency to subjectively overestimate sleep latency and underestimate sleep time, as predicted.

In the regression analysis, a significant effect was obtained for Factor 1, indicating that those who had more thoughts about rehearsal/planning/problem-solving and attention to arousal status displayed longer objective latency to sleep onset. Support for the effects of this thought content on sleep-onset latency emerges most clearly from considering that latency was predicted by this factor only. Using the 3 systems model, total 'cognitive' thoughts explained a significant amount of variance on both measures of latency. Total

'somatic' thoughts was a significant predictor in subjective assessment of wake time after sleep onset. This may indicate that subjective assessment of wakenings is related to attention to somatic arousal.

It was originally intended to recruit a small control sample of 4-5 normal sleepers to investigate their level of cognitive intrusion. However, this did not yield sufficient data due to the lack of intrusive thoughts reported by the sample. It may be that differences in awareness of cognitive arousal and how sleep onset is monitored in insomniacs and non-insomniacs are important factors. When awakened from polysomnographically verified sleep, insomniacs reported more frequently that they had been awake (Borkovec et al, 1981; Coates et al, 1983; Mendelson, James, Garnett, Sack & Rosenthal, 1986). This implies that continuing mental activity, even in stage 2 sleep, is interpreted as wakefulness by insomniacs.

Implications for cognitively-based treatments of insomnia

Cognitive treatments for insomnia have been shown to achieve their effects on the main target symptoms, such as sleep onset latency, wake time after sleep onset, and early morning wakening [see Espie (1991) for review]. However, it seems important to assess their influence on cognitive processes. To achieve this, it is necessary to develop a measure to directly assess cognitions occurring during sleep onset. The cognitive measure used in this study highlights the thought content during sleep onset that may be related to insomnia. In general, the results demonstrated that sleep onset difficulties are particularly associated with thoughts concerning rehearsing, problem-solving, and planning, and thoughts about sleep itself. Thought content of this type may be

demanding of attention, depending on the meaning attached to it by the individual, and difficult to disregard. Psychological treatment which interrupts this perseverative cognitive activity and reduces information processing is therefore likely to be helpful in promoting sleep (Espie & Wicklow, 1998).

Rehearsal, planning, and problem-solving thoughts may be best dealt with pre-emptively by cognitive control procedures (Espie & Lindsay, 1987). Intrusive thoughts concerning the consequences of not sleeping implies that performance anxiety may play a role, which will make sleep less likely to occur. In this case treatment with paradoxical intention (Espie & Lindsay, 1985) or cognitive restructuring (Morin, 1993) would be of relevance.

Articulatory suppression is a cognitive technique which prevents focal attention given to thoughts interfering with sleep onset, in effect, blocking the thought (Levey, Aldaz, Watts & Coyle, 1991). Given that thought content is often associated with worry (Watts et al, 1994) and in this study, was linked to ratings of emotion, then this technique would not deal with the affective quality. Therefore, attention to the emotional response is necessary. However, although there is as yet a lack of evidence to support tailoring treatment to the individual's presenting characteristics, the content of intrusive thoughts experienced by insomniacs during the sleep-onset period needs to be directly assessed and measured in order to guide and evaluate further cognitive treatments for insomnia.

Methodological Remarks

In interpreting these results it is noted that data obtained through recruited and compliant samples may reflect some selection bias and may not generalise well to clinically presenting samples. In addition, self-monitoring of thoughts may have had a reactive effect on their intrusiveness, although there was no evidence of a first night effect in this sample.

This is the first study systematically to evaluate the relationship between live-recordings of spontaneous thoughts and objectively monitored sleep over several nights. It has yielded important results concerning the development of an instrument measuring the content and quantity of intrusive thoughts, which will require further refinement and validation on clinic-presenting populations.

REFERENCES

American Sleep Disorders Association (1997). *The International Classification of Sleep Disorders; Diagnostic and Coding Manual (Revised).* ASDA, Rochester, USA.

ASDA Report. (1995). Practice parameters for the use of actigraphy in the clinical assessment of sleep disorders. Sleep, 18(4), 285-287.

Borkovec, T.D., Lane, T.W. & VanOot, P.H. (1981). Phenomenology of sleep among insomniacs and good sleepers: Wakefulness experience when cortically asleep. *Journal of Abnormal Psychology, 6,* 607-609.

Borkovec, , T.D. (1982). Insomnia. *Journal of Consulting and Clinical Psychology, 50,* 880-895.

Broman, J.E. & Hetta, J. (1994). Perceived pre-sleep arousal in patients with persistent psychophysiologic and psychiatric insomnia. *Nordic Journal of Psychiatry , 48 (3),* 203-207.

Buysse, D.J., Reynolds, C.F., Monk, T.H., Berman, S.R. & Kupfer, D.J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Research, 28,* 193-213.

Coates, T., Killen, J., George, J., Marchini, E., Hamilton, S. & Thoresen, C. (1982). Estimating sleep parameters: a multitrait-multimethod analysis. *Journal of Consulting and Clinical Psychology, 50,* 345-352.

Coates, T., Killen, J., Silbeman, S., Marchini, J., Hamilton, S. and Thoresen, C. (1983). Cognitive activity, sleep disturbance, and stage specific differences between recorded and reported sleep. *Psychophysiology, 20,* 243.

Coyle, K. & Watts, F.N. (1991). The factorial structure of sleep dissatisfaction. *Behaviour Research and Therapy, 29,* 513-520.

Edinger, J.D. & Fins, A.I. (1995). The distribution and clinical significance of sleep time misperceptions among insomniacs. *Sleep, 18 (4),* 232-239.

Espie, C.A. & Lindsay, W.R. (1985). Paradoxical intention in the treatment of chronic insomnia: six case studies illustrating variability in therapeutic response. *Behaviour Research and Therapy, 23,* 703-709.

Espie, C.A. & Lindsay, W.R. (1987). Cognitive strategies for the management of severe sleep-maintenance insomnia: A preliminary investigation. *Behaviour Psychotherapy, 15,* 388-395.

Espie, C.A. (1991). *The psychological treatment of insomnia.* Chichester: Wiley.

Espie, C.A. & Wicklow, A. (1998). Cognitive Therapy for Insomnia. In Shapiro, C. & Sloan, E.P. (Eds.). *Sleep in Psychiatry*. Cambridge University Press.

Gallup Organization (1991). *Sleep in America*. Gallup, Princeton, NJ.

Gross, R.T. & Borkovec, T.D. (1982). Effects of a Cognitive Intrusion Manipulation on the Sleep-Onset Latency of Good Sleepers. *Behaviour Therapy, 13,* 117-124.

Hall, M., Buysse, D.J., Reynolds, C.F., Kupfer, D.J. & Baum, A. (1996). Stress related intrusive thoughts disrupt sleep onset and continuity. *Sleep Research, 25,* 163.

Haynes, S.N., Adams, A. & Franzen, M. (1981). The effects of presleep stress on sleep-onset insomnia. *Journal of Abnormal Psychology, 90,* 601-606.

Kripke, D.F., Mullaney, D.J., Messin, S. & Wyborney, V.G. (1978). Wrist actigraphic measures of sleep and rhythms. *Journal of Clinical Neurophysiology, 44,* 674-676.

Kuisk, K.A., Bertelson, A.D. & Walsh, J.K. (1989). Presleep cognitive hyperarousal and affect as factors in objective and subjective insomnia. *Perceptual and Motor Skills, 69,* 1219-1225.

Levey, A.B., Aldaz, J.A., Watts, F.N. & Coyle, K. (1991). Articulatory suppression and the treatment of insomnia. *Behaviour Research and Therapy, 29,* 85-89.

Lichstein, K.L. & Riedel, B.W. (1994). Behavioural Assessment and Treatment of Insomnia: A review with an emphasis on clinical application. *Behaviour Therapy, 25,* 659-688.

Lichstein, K.L. & Rosenthal, T.L. (1980). Insomniacs' perceptions of cognitive versus somatic determinants of sleep disturbance. *Journal of Abnormal Psychology, 89,* 105-107.

Mendelson, W., James, S., Garnett, D., Sack, D. & Rosenthal, N. (1986). A psychophysiological study of insomnia. *Psychiatry Research, 19,* 267-284.

Morin, C.M. (1993). *Insomnia: psychological assessment and management. pp 195-197,* Guildford Press, New York.

Mullaney, D.J., Kripke, D.F. & Messin, S. (1980). Wrist actigraphic estimation of sleep time. *Sleep, 3,* 83-92.

Nicassio, P.M., Mendlowitz, D.R., Fussell, J.J. and Petras, L. (1985) The phenomenology of the pre-sleep state: the development of the pre-sleep arousal scale. *Behaviour Research and Therapy, 23 (3),* 263-271.

Sadeh, A., Hauri, P.J., Kripke, D.F. & Lavie, P. (1995). The role of actigraphy in the evaluation of sleep disorders. *Sleep, 18,* 288-302.

Van Egeren, L., Haynes, S.N., Franzen, M. & Hamilton, J. (1983). Presleep cognitions and attributions in sleep-onset insomnia. *Journal of Behavioural Medicine, 6,* 217-232.

Watts, F.N., Coyle, K. & East, M.P. (1994). The contribution of worry to insomnia. *British Journal of Clinical Psychology, 33,* 211-220.

Watts, F.N., East, M.P. & Coyle, K. (1995). Insomniacs' perceived lack of control over sleep. *Psychology and Health, 10,* 81-95.

Table 1 Demographic information on sample, and duration of sleep problem

	%		
Sex			
Male (n=7)	33.3		
Female (n=14)	66.7		
Marital Status			
Married (n=8)	38.1		
Single (n=10)	47.6		
Divorced (n=3)	14.3		
Bed Partner	47.7		
Occupational Situation			
Working	85.7		
Student	14.3		
	Mean	**Range**	**S.D.**
Age (Years)	36	19 - 60	10.8
Duration of sleep problem (Years)	10	1 - 40	8.2

Table 2. Categories of thoughts (with abbreviations) derived from tape-recorded material, based on a 'three systems model' of environmental stimulation, and somatic and cognitive arousal. Examples for each coding category are shown below.

Environmental (Stimulation)	
EN = Noise	Thinking about the wind, wood creaking, traffic, clock, telephone ringing
EP = Procedural	Thinking about procedure of the research itself, i.e., need to press actiwatch, thinking about speaking into dictaphone
EV = Visual	Thinking about getting up and putting the light on
Somatic Symptoms	
SAU = Autonomic	Thinking about heart rate, headache, tension, can't stop fingers moving, feeling cold, hot feet, breathless, itching, restlessness
SAS = Arousal Status	Thinking about feeling exhausted, sleepiness, tiredness*
Cognitive Symptoms	
CS = Sleep	Thinking about the need/desire to sleep, efforts to fall asleep, latency to fall asleep, expectancy to fall asleep quickly/or not, importance of sleep, consequences of not sleeping, mental alertness/tiredness*, the subject's own sleep problem, ease/difficulty of falling asleep, past experience of sleep
CRPP = Rehearsing/ Problem-Solving/ Planning	Thinking about the past day/rehearsal, past experiences, next day, things to do/ planning, forthcoming events, work-related issues, social/friends
CQ = Reflection on quality of thoughts	Thinking about quality of the thoughts or 'thinking about thinking', e.g., mind buzzing, thoughts rushing, darting thoughts, visual imagery, random, dream-like, reference to own type of thinking, controllability, unpleasantness.

* When it was clear that the subject was making a reference to a feeling of mental alertness/tiredness, then this was coded as cognitive. When it was clear that the subject was referring to a feeling of physical tiredness then this was coded as somatic.

Table 3. Ranges, means, and standard deviations for each category of thought

Category of Thought	Minimum	Maximum	Mean	S.D.
EN	0	12	1.09	1.98
EP	0	7	0.56	1.09
EV	0	2	0.24	0.49
SAS	0	4	1.48	1.24
SAU	0	6	1.06	1.40
CQ	0	10	2.05	2.00
CRPP	0	33	7.38	6.39
CS	0	9	3.44	2.31

For abbreviated category meanings see Table 2

Table 4. Ranges, means, and standard deviations for actigraphic and sleep diary data with results of two-tailed t-tests for paired samples

	Minimum	Maximum	Mean	S.D.	Minimum	Maximum	Mean	S.D.	T-test results
Actiwatch Data					*Sleep Diary Data*				
Sleep Onset Latency (mins.)	0	157	29.6	34.49	0	240	57.69	48.55	t=-4.801 p=0.000
Sleep Efficiency (%)	55.1	95.4	76.59	9.38	38.3	96	71.82	12.25	t=2.719 p=0.008
Total Sleep Time (mins.	278	539	383.17	55.42	180	540	359.71	69.19	t=3.010 p=0.004
Wake after Sleep Onset (mins.)	19	183	79.49	39.52	0	240	70.22	53.41	t=1.416 p=0.162
Fragmentation Index	12	110	42.76	23.14					

Table 5. Correlations between Objective and Subjective Measures of Sleep Parameters and Cognitions

	TOT_C	TOT_E	TOT_S	TOT_TH	WASO_AW	WASO_DA	SPTI_AW	SPEF_AW	SPEF_DA	SPTI_DA	LAT_AW	LAT_DA	FRAG_AW	CAS	EM
TOT_C		0.405	0.562	0.968	-0.103	0.052	-0.020	-0.086	-0.128	-0.112	0.350	0.273	0.015	0.332	-0.334
		0.001	*0.000*	*0.000*	*0.422*	*0.686*	*0.878*	*0.503*	*0.318*	*0.383*	*0.005*	*0.030*	*0.908*	*0.008*	*0.008*
TOT_E			0.155	0.578	0.067	0.079	-0.041	-0.053	-0.003	-0.002	0.110	0.055	0.030	0.193	-0.335
			0.226	*0.000*	*0.604*	*0.540*	*0.751*	*0.678*	*0.982*	*0.986*	*0.389*	*0.671*	*0.816*	*0.129*	*0.007*
TOT_S				0.648	-0.022	0.378	-0.034	-0.090	-0.360	-0.288	0.211	0.208	0.194	0.272	-0.202
				0.000	*0.867*	*0.002*	*0.793*	*0.483*	*0.004*	*0.022*	*0.097*	*0.101*	*0.127*	*0.031*	*0.112*
TOT_TH					-0.068	0.126	-0.031	-0.095	-0.163	-0.138	0.334	0.261	0.053	0.351	-0.373
					0.599	*0.326*	*0.810*	*0.459*	*0.202*	*0.281*	*0.007*	*0.039*	*0.680*	*0.005*	*0.003*
WASO_AW						0.406	-0.306	-0.706	-0.064	0.101	0.122	0.033	0.622	-0.087	0.144
						0.001	*0.015*	*0.000*	*0.617*	*0.430*	*0.340*	*0.800*	*0.000*	*0.500*	*0.260*
WASO_DA							-0.078	-0.303	-0.584	-0.388	0.096	0.275	0.314	0.232	-0.033
							0.543	*0.016*	*0.000*	*0.002*	*0.455*	*0.029*	*0.012*	*0.067*	*0.799*
SPTI_AW								0.558	0.059	0.526	-0.148	0.034	-0.262	0.015	0.014
								0.000	*0.647*	*0.000*	*0.247*	*0.794*	*0.038*	*0.904*	*0.915*
SPEF_AW									0.194	0.088	-0.601	-0.140	-0.595	-0.049	0.019
									0.128	*0.492*	*0.000*	*0.275*	*0.000*	*0.706*	*0.884*
SPEF_DA										0.729	-0.170	-0.537	-0.070	-0.495	0.047
										0.000	*0.182*	*0.000*	*0.584*	*0.000*	*0.714*
SPTI_DA											-0.018	-0.381	0.015	-0.332	0.054
											0.891	*0.002*	*0.909*	*0.008*	*0.673*
LAT_AW												0.415	0.308	0.173	-0.293
												0.001	*0.014*	*0.175*	*0.020*
LAT_DA													0.146	0.424	-0.193
													0.252	*0.001*	*0.130*
FRAG_AW														-0.021	0.002
														0.868	*0.990*
CAS															-0.301
															0.016
EM															

p values are shown in italics

Table 6. Results of Principal Components Analyses comprising derived factors, and factor loadings (significant values in bold)

	Eigenvalue	% of variance	Cumulative %	% Explained Variance
Factor 1	2.636	32.95	32.95	52.22
Factor 2	1.386	17.33	50.28	27.47
Factor 3	1.025	12.81	63.09	20.31

Rotated Factor Matrix	**Factor 1**	**Factor 2**	**Factor 3**
CQ	0.462	**0.545**	0.270
CRPP	**0.760**	0.340	0.106
CS	0.111	**0.743**	0.134
EN	0.036	0.224	**0.785**
EP	**0.821**	-0.223	0.141
EV	0.147	-0.179	**0.845**
SAS	**0.608**	0.390	-0.039
SAU	0.044	**0.676**	-0.128

Factor Lables

Factor 1 Rehearsal/planning/problem-solving and attention to arousal status

Factor 2 Thoughts about sleep, autonomic symptoms, and nature of cognitions

Factor 3 Thoughts about environmental stimulation

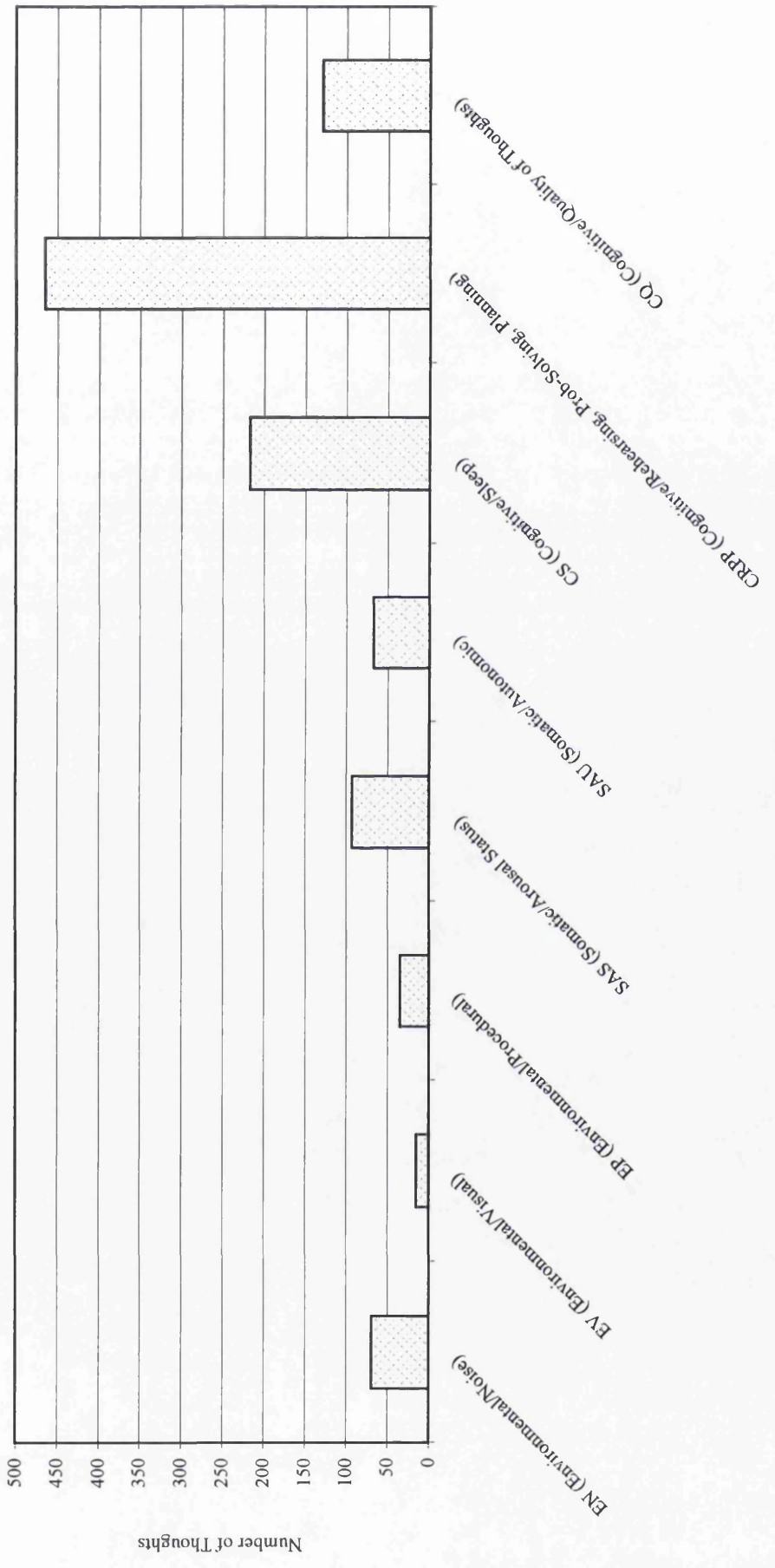

Figure 1. Frequency of each category of thoughts for 63 subject nights

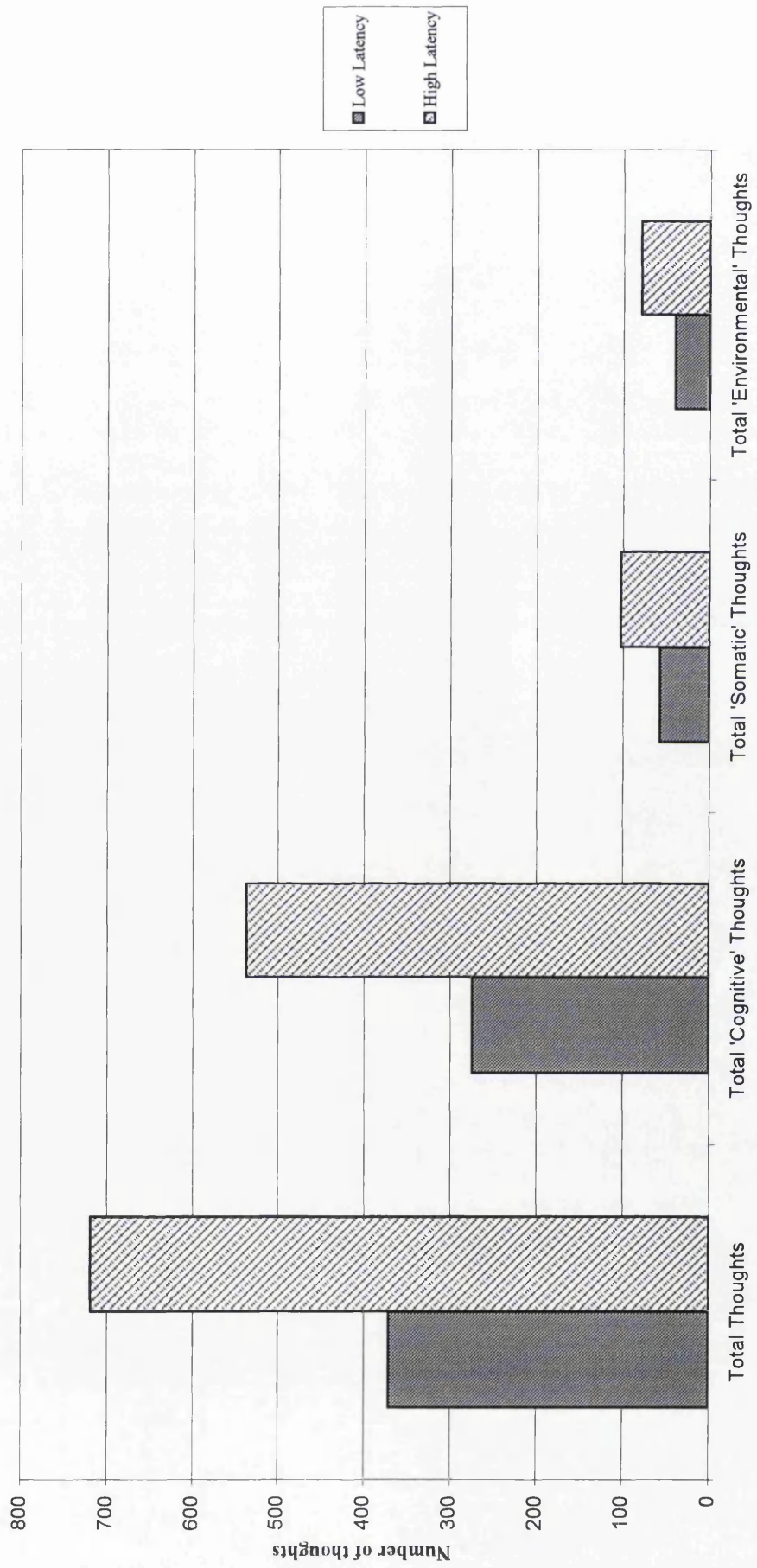

Figure 2. Number of thoughts by latency group

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APPENDIX 3.2

Name: Date of Birth:

Address: Marital Status:

Occupation:

Phone No:

1. Nature of Sleep-Wake Problem

Do you have a problem with falling asleep?	No	Mild	Moderate	Severe
Do you have a problem with staying asleep?	No	Mild	Moderate	Severe
Do you have a problem with waking up too early in the morning?	No	Mild	Moderate	Severe
Do you have a problem with staying awake during the day?	No	Mild	Moderate	Severe

2. Current Sleep-Wake Schedule

What is your usual bedtime on weekdays? _____ o'clock

At what time do you last awaken in the morning? _____ o'clock

What is your usual rising time on weekdays? _____ o'clock

Do you have the same sleep-wake schedule on weekends? Yes No

How often do you take naps (including unintentional naps)? _____ days/week

Do you ever fall asleep at inappropriate times/places? Yes No

How many nights/week do you have a problem with falling/staying asleep? _____ nights

On a typical night (past month), how long does it take you to fall asleep after you go to bed and turn the lights off? _____ hours _____minutes

On a typical night (past month), how many times do you wake up during the middle of the night? _____ times

What wakes you up at night?(circle any that apply) Pain Noise Child Spontaneous

On a typical night, how long do you spend awake in the middle of the night (total no. of minutes/hours for all awakenings)? _____ hours _____minutes

How many hours of sleep per night do you usually get? _____ hours _____minutes

3. Sleeping Aids

In the past 4 weeks have you used sleeping pills? Yes No

Which drugs?

What dosage?

How many nights/week?

If no, have you ever? Yes No

When did you first use sleep medication?

When did you last use sleep medication?

In the past 4 weeks, have you used alcohol as a sleep aid? Yes No

If no, have you ever? Yes No

4. History of Sleep Problem (onset, course, duration)

How long have you been suffering from insomnia? _____ years _____months

Were there any stressful life events related to its onset (e.g. death of a loved one, divorce, retirement, medical or emotional problems, etc.)?

Gradual or sudden onset?

What has been the course of your insomnia problem since its onset (e.g. persistent, episodic, seasonal, etc.)?

5. Bedroom Environment

Are you sleeping with a bed partner? Yes No

Do you have a TV, radio, or phone in your bedroom? Yes No

Is there a desk with paperwork to be done in the room? Yes No

Do you read in bed before bedtime? Yes No
What is your room temperature at night? Hot Warm Cool Cold

6. Lifestyle

How many times per week do you exercise? _____ times per week

Do you sometimes exercise prior to bedtime? Yes No

How many caffeinated drinks do you drink per day? _____ per day
How many cigarettes per day do you smoke? _____ per day
How many units of alcohol per day do you drink? _____ per day

7. General

What is your prebedtime routine like?

What do you when you can't fall asleep, or return to sleep?

Is your sleep better/worse/same when you go away from home?

Is your sleep better/worse/same on weekends?

What types of factors exacerbate your sleep problem (e.g. stress at work, travel plan, etc.)?

What types of factors improve your sleep?

How concerned are you about sleep/insomnia?

What impact does insomnia have on your life (e.g. mood, alertness, performance)?

How do you cope with these daytime sequelae?

Have you received treatment in the past other than sleeping aids?

8. If you would like to add any further information that you think would be relevant, then please do so in the space provided below.

Thank you for answering these questions. Can you now please return the forms in the enclosed stamped, addressed envelope.

APPENDIX 3.3

PITTSBURGH SLEEP QUALITY INDEX

Name_____ ID_____ Date_____ Age_____

Instructions:

The following questions relate to your usual sleep habits during the past month *only*. Your answers should indicate the most accurate reply for the *majority* of days and nights in the past month. Please answer all questions.

1. During the past month, when have you usually gone to bed at night ?

   USUAL BED TIME_____

2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night ?

   NUMBER OF MINUTES_____

3. During the past month, when have you usually gotten up in the morning ?

   USUAL GETTING UP TIME_____

4. During the past month, how many hours of *actual* sleep did you get at night ? (This may be different than the number of hours you spend in bed.)

   HOURS OF SLEEP PER NIGHT_____

For each of the remaining questions, check the one best response. Please answer *all* questions.

5. During the past month, how often have you had trouble sleeping because you.....

(a) Cannot get to sleep within 30 minutes

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

(b)Wake up in the middle of the night or early morning

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

(c) Have to get up to use the bathroom

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

(d) Cannot breathe comfortably

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

(e) Cough or snore loudly

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

(f) Feel too cold

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

(g) Feel too hot

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

(h) Had bad dreams

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

(i) Have pain

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

(j) Other reason(s), please describe_____

_____

How often during the past month have you had trouble sleeping because of this ?

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

6. During the past month, how would you rate your sleep quality overall ?

Very good_____
Fairly good_____
Fairly bad_____
Very bad_____

7. During the past month, how often have you taken medicine (prescribed or 'over the counter') to help you sleep ?

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity ?

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done ?

No problem at all _____
Only a very slight problem _____
Somewhat of a problem _____
A very big problem _____

10. Do you have a bed partner or roommate ?

No bed partner or roommate _____
Partner/roommate in other room _____
Partner in same room, but not same bed _____
Partner in same bed _____

If you have a roommate or bed partner, ask him/her how often in the past month you have had.....

(a) Loud snoring

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

(b) Long pauses between breaths while asleep

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

(c) Legs twitching or jerking while you sleep

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

(d) Episodes of disorientation or confusion during sleep

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

(e) Other restlessness while you sleep; please describe_____

_____

Not during the past month____	Less than once a week____	Once or twice a week____	Three or more times a week____

APPENDIX 3.4

SLEEP DIARY

Name_____ Dates of investigation_____

	Day 1	Day 2	Day 3
At what time did you get up this morning ?	_____	_____	_____
At what time did you go to your bed last night ?	_____	_____	_____
How long did it take you to fall asleep (minutes) ?	_____	_____	_____
How many times did you waken up during the night ?	_____	_____	_____
How many times were you awake for longer than 10 minutes ?	_____	_____	_____
How long were you awake during the night (in total) ?	_____	_____	_____
About how long did you sleep altogether (hours/minutes) ?	_____	_____	_____

APPENDIX 3.5

PRE-SLEEP AROUSAL SCALE

COGNITIVE SUBSCALE

Please describe how intensely you experienced each of the symptoms mentioned below as you attempted to fall asleep in your own bedroom.

	Not at all	**Slightly**	**Moderately**	**A lot**	**Extremely**
Worry about falling asleep	1	2	3	4	5
Review or ponder the events of the day	1	2	3	4	5
Depressing or anxious thoughts	1	2	3	4	5
Worry about problems other than sleep	1	2	3	4	5
Being mentally alert, active	1	2	3	4	5
Can't shut off your thoughts	1	2	3	4	5
Thoughts keep running through your head	1	2	3	4	5
Being distracted by sounds, noise in the environment	1	2	3	4	5

APPENDIX 3.6

Criteria for Coding Scripts

For each marked segment on the script, code the segment according to what the subject reports they are thinking about. Examples are listed below:-

Environmental (Stimulation)	Noise = EN
	Procedural = EP
	Visual = EV
Somatic Symptoms	Autonomic = SAU
	Arousal Status = SAS
Cognitive Symptoms	Sleep = CS
	Rehearsing/Problem-Solving/Planning = CRPP
	Reflection on quality of thoughts = CQ

Examples for coding

Environmental (Stimulation)

EN Thinking about the wind, wood creaking, traffic, clock, telephone ringing

EV Thinking about getting up and putting the light on

EP Thinking about procedure of the research itself, i.e., need to press actiwatch, thinking about speaking into dictaphone

Somatic symptoms

SAU Thinking about heart rate, headache, tension, can't stop fingers moving, feeling cold, hot feet, breathless, itching, restlessness

SAS Thinking about feeling exhausted, sleepiness, tiredness*

Cognitive symptoms

CS Thinking about the need/desire to sleep, efforts to fall asleep, latency to fall asleep, expectancy to fall asleep quickly/or not, importance of sleep, consequences of not sleeping, mental alertness/tiredness*, the subject's own sleep problem, ease/difficulty of falling asleep, past experience of sleep

CRPP Thinking about the past day/rehearsal, past experiences, next day, things to do/ planning, forthcoming events, work-related issues, social/friends

CQ Thinking about quality of the thoughts or 'thinking about thinking', e.g., mind buzzing, thoughts rushing, darting thoughts, random, disjointed, dream-like, reference to own type of thinking

* When it is clear that the subject is making a reference to a feeling of mental alertness/tiredness, then code this as cognitive. When it is clear that the subject is referring to a feeling of physical tiredness then code this as somatic.

CHAPTER FOUR

Small Scale Service Related Research Paper

An investigation into non-attendance and discontinuation of Clinical Psychology adult out-patient appointments

An Investigation into Non-Attendance and Discontinuation of Clinical Psychology Adult Out-Patient Appointments

Prepared in accordance with the instructions to contributors for the Clinical Psychology Forum (See Appendix 4.1)

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An Investigation into Non-Attendance and Discontinuation of Clinical Psychology Adult Out-Patient Appointments

Prepared in accordance with the instructions to contributors for the Clinical Psychology Forum (See Appendix 4.1)

INTRODUCTION

When patients fail to attend first appointments, or discontinue contact once into therapy, various important considerations arise. For example, it is an inefficient use of time, it delays availability of the service for others, the therapist's work may not have a neat conclusion, it may be downheartening for the therapist, and may result in rereferrals either back to Clinical Psychology or to other mental health professionals. Blaekeland and Lundwall (1975) reported that 21 to 46 % of non-attenders seek treatment elsewhere within the first year.

The extent of non-attendance is considerable: in a study by Weighill et al (1983) approximately 20% of appointments were cancelled or broken. Markman and Beeney (1990) reported a 25% drop out rate in their study of out patients, and Trepka et al (1986) found that 21.6% of patients discontinued treatment before their third appointment with the majority of those discontinuing after only one appointment. Blaekeland and Lundwall (1975) found the extent of the problem so considerable that they stated "it is the drop out rather than the remainder who in the long run seems to be the typical patient."

Of the studies that have attempted to identify various characteristics of non-attenders and discontinuers, Trepka et al (1986) found that lower social class and unemployment characterised those discontinuing before the third appointment. Non-attendance was also related to lower social class in a study by Weighill et al (1983). Garfield (1986) stated that discontinuation appeared to be related to demographic variables such as lower socioeconomic status and less formal education. However, although there has been a substantial amount of research investigating characteristics

of non-attenders, it is difficult to know exactly how these affect attendance, and how much this information can be used to prevent the phenomenon.

Previous studies looking at possible explanations for non-attendance/discontinuation have mainly been based on third party opinions. Gerhand and Blakey (1994) investigated reasons for discontinuation given by the patient's GP and the Psychologist involved. Reasons given by the patients themselves may carry more practicable implications for reducing non-attendance rates. Munro and Blakey (1988) investigated initial non-attendance based on postal questionnaires, but relatively few studies have attempted to investigate reasons for not coming given by the patient in a discursive format. This method has unique advantages in obtaining qualitative information, and allowing the patient to raise their own issues. Hughes (1995) carried out structured interviews with a sample of discontinuers and concluded that attendance was not determined by a small number of factors, but involved a complex weighing of costs and benefits.

The purpose of the present study was to identify the extent of both initial non-attendance and discontinuation for Clinical Psychology out-patient appointments in the Dumfries and Galloway region, and possible factors associated with it. For the purposes of this study, discontinuers were taken to be patients who had attended for one or more appointments but who had subsequently missed an appointment and been discharged, and completers were taken to be those cases where discharge was mutually agreed between therapist and patient. It was assumed that there would be different issues surrounding these two groups. It is important to gain some insight into patients' individual reasons for their non-attendance/discontinuation, which might inform continuing endeavours to minimise the phenomenon. To achieve this, a direct

telephone conversation with a sample from the most recent patients to not attend of the above 2 groups was undertaken to explore patients' own experiences of the Clinical Psychology service and their reasons for not attending/discontinuing.

Specific aims were:-

1) To assess the extent of a) initial non-attendance and b) discontinuation in the adult out-patient service.

2) To identify differences in service and patient factors between initial non-attenders and attenders.

3) To identify differences in service and patient factors between discontinuers and those who have completed therapy.

4) To develop an understanding of some individual patients' views of the Clinical Psychology service and their idiosyncratic reasons for non-attendance.

METHODS

Sample

545 cases from adult primary care, referred in the period 1st April 1995 - 31st March 1996 were used for the statistical analysis. 16 of the most recent to DNA were then selected for the individual discussion.

Procedure

Data routinely collected on a 'client coding form' were analysed, identifying the overall rates for a) initial non-attendance and b) discontinuation of therapy. Comparisons were made between non-attenders and attenders, and completers and discontinuers across sex, age, marital status, social class, employment status, contact with Psychiatry, waiting time, way of working (2+ or conventional), presenting

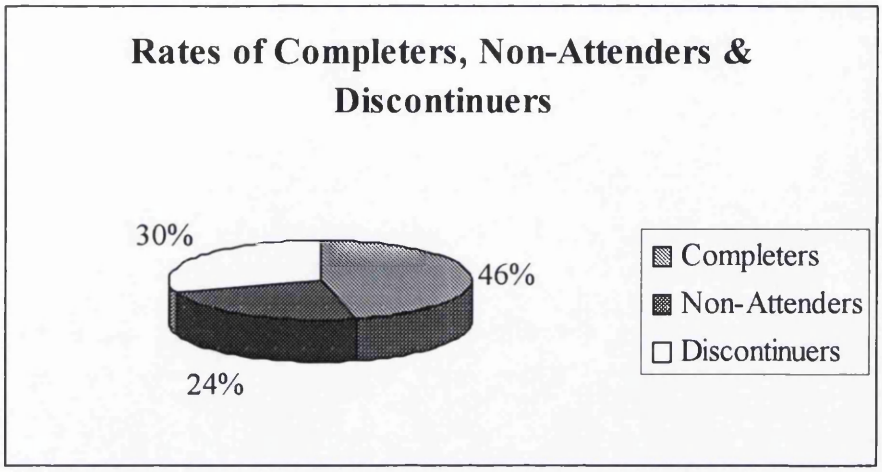
problem, case status (whether referred patient or other), and previous referrals to Psychology. Statistical analyses involved the Chi square test for use with nominal data, using SPSS for Windows.

For the individual discussion, a letter was sent to a sample of 16; 6 of whom had not attended their initial appointment, and 10 of whom were discontinuers (See Appendix 4.2). It asked their permission to telephone them in order to discuss their reasons and requested a convenient date and time to speak together. They were given the opportunity to specifically opt-out, and reassured that not participating would in no way affect any future contact they might have with the Clinical Psychology service. Those that replied, were contacted by telephone. The conversation was centred around a semistructured interview, exploring the patient's view and idiosyncratic reasons for not turning up. Questions asked were guided by preliminary ideas about what was of interest, and where possible were open-ended to obtain a wide range of answers and allow the patient to raise their own concerns.

The discussion lasted between 10 - 15 minutes and covered the following areas: the patient's expectations (of therapy, of the therapist, and of the service); the patient's satisfaction (with the service, and with perceived improvement in therapy); communication issues (with the referral agent concerning the referral, and feeling able to relate to the therapist); cultural and environmental issues (stigmatization, their culture's expectations about Clinical Psychology); and reasons for non-attendance/discontinuation.

RESULTS

From the diagram below, it can be seen that the DNA rate of 545 appointments is considerable.



Attenders /Non-attenders

No significant differences were found between initial non-attenders and attenders in sex, age, marital status, case status, presenting problem, contact with Psychiatry, or previous referrals to Psychology.

Patients were more likely to attend if they were of social class groups 1 and 2 than those identified as belonging to the lower social classes (Chi ^{2}=4.12, d.f.=1, $p<0.05$). A significant association was found between employment status and attendance (Chi^2=5.11, d.f =1, $p<0.05$) with patients in employment being more likely to attend than those who were not employed. Waiting time was significantly associated with attendance, with those waiting four weeks or above less likely to attend (Chi ^{2}=5.24, d.f.=1, $p<0.05$). A significant association was found between way of working and attendance, with those in the 2+ system more likely to fail to attend than those in the conventional system (Chi ^{2}=14.29, d.f.=1, $p<0.01$).

A higher number of patients whose presenting problem was depression were less likely to attend, although this was not significant.

Discontinuers /Completers

No significant differences were found between discontinuers and completers on sex, case status, previous contact with Psychology, marital status, social class, employment status, contact with Psychiatry, waiting time, or presenting problem.

A significant association was found between total times seen and discontinuation, with those seen between 9 and 12 times more likely to discontinue than those who had been seen either on fewer or a greater number of occasions ($Chi^2=11.52$, d.f =1, $p<0.01$). Patients in the conventional system of working were more likely to discontinue therapy than those allocated to the 2+ system ($Chi^2=6.46$, d.f.=1, $p<0.05$).

Individual discussion

The overall response rate was disappointing and limits the extent to which generalizations can be made from the results obtained. Six patients were contacted: 2 of whom were initial non-attenders; and the remaining 4 had discontinued after 1, 2, 2, and 4 appointments respectively. Although it is not possible to give a full account of the information elicited from the conversations here, the most salient points have been selected for reporting.

Expectations

Generally those who had attended said that, in retrospect, they had been expecting too much from the therapist and the therapy. One patient admitted that she was "looking for a magic wand." One reported wanting "someone to cast an opinion, rather than someone to sit and listen."

Communication Issues

All those who had discontinued were positive about their ability to relate to the therapist. They reported feeling "listened to." The non-attenders felt satisfied with information they received from the referral agent. However, those who had attended, expressed dissatisfaction with this information. Most expressed a desire to know more about the Clinical Psychology service and the procedures involved in initiating a referral.

Satisfaction

It was generally stated that the waiting time for an initial appointment was too long but, following that, the frequency of contact was satisfactory. A common theme was the feeling of not making any progress in therapy. One lady reported "going round and round in circles, bringing up things I'd rather forget, and spending an hour when I could be doing something else." Consequently, concern at wasting the therapist's time was expressed. They reported feeling uncomfortable telling a stranger their difficulties, and commented that they would have preferred the appointment to take place in a familiar environment, such as the GP surgery.

Cultural/Environmental

Three patients mentioned stigmatization as being a problem, and there appeared to be an inhibiting aspect concerning attending the Crichton Royal Hospital. One patient, who stated that she would not let anyone know she was seeing a Psychologist, held the opinion that "you only go to see one if something is wrong with you, if you're not the full shilling." Practical obstacles to attending included time off work, finding the time for an hour's appointment in the midst of a hectic life, child care, and transport.

Reasons for not coming

A common theme seemed to be that the patients were put off by an appointment taking one hour, and some felt that they simply could not manage the time. School holidays and the need for child care were difficulties faced by some of the patients.

One patient felt that she was wasting the Psychologist's time, stating, "a pal could sit and listen to everything I told the Psychologist."

Of the 2 patients who never attended, a fear of others knowing, and resolution of the problem were given as reasons for not attending.

DISCUSSION

The results indicate that the extent of initial non-attendance and subsequent discontinuation from the Clinical Psychology service is considerable. There were several significant differences found between attenders and non-attenders in that patients were more likely to attend if they were of social class groups 1 and 2, and if they were in employment. Waiting time was a significant factor in attendance, in that patients who had been waiting between 4 weeks or more were less likely to attend. This may suggest that problems can be resolved without any professional

intervention. Those in the 2+ system were less likely to attend. However, of those who had attended, those in the conventional system were more likely to discontinue therapy. This suggests that although some people may initially respond better to the content of the appointment letter sent by therapists working in the conventional way, once they commence they may be less likely to follow through.

There would appear to be little difference between completers and discontinuers on most of the factors involved, with the exception of total times seen and way of working. Patients who were seen between 9 - 12 times were more likely to discontinue. This may suggest a discrepancy between the therapist's and the patient's expectations of number of appointments required, a lack of anticipated benefit, or improvements in the patient's situation not being conveyed to, or picked up, by the therapist.

In the individual discussion, although the sample size was small, it yielded information that might otherwise have been difficult to obtain. Differing expectations of the service was a general theme, which would imply that a discussion of what to expect should be undertaken with the referral agent. This would be in line with a study by Munro and Blakey (1988), who found that whoever suggested the referral and how many times it was discussed was a relevant factor in initial non-attendance. Webster (1992) also reported that information had a positive effect on expectations and satisfaction. The process of communication in primary care would need to be investigated, and advice given to referral agents regarding relevant referrals. This would also cover the dissatisfaction generally felt with information received about Clinical Psychology from the referral agent.

Those who had attended were positive about their ability to relate to the therapist, but reported difficulties in speaking with a stranger in an unfamiliar place. The location of the appointment was an inhibiting aspect, related to the stigma associated with the hospital among those in the community.

In terms of their actual reasons for not attending/discontinuing, it is difficult to draw any conclusions. The length of the appointment and practical obstacles such as child care seemed to be common reasons. Lack of progress in therapy was also reported.

Organizing shorter appointments if they are preferable should be considered. In the possibility of patients feeling worse after an appointment, the impact of therapy should be discussed. Expectations should be clarified at the initial appointment, and an explicit agreement made to convey interpretations of progress. The location of appointment should be reconsidered, and a possible move to GP surgeries undertaken, if accommodation permits. As discussed earlier, increasing information given to the patient at the time of referral needs to be considered.

Methodological problems may limit the conclusions that can be drawn from the survey. In the statistical analyses, problems regarding the consistency of the definition and categorization of data on the client coding sheets across the Clinical Psychologists are acknowledged. In the individual discussion survey, the low response rate limits any conclusion. However, this was designed to be an exploratory exercise, and in this respect it has identified areas of interest concerning some users' views of the Clinical Psychology service, and possible avenues for improvement. It is recommended that this be used as a pilot study for a larger scale qualitative research project in the future.

CONCLUSION

This study has achieved its aims of investigating differences between non-attenders and attenders, and differences between discontinuers and completers. It has highlighted areas which need to be considered in the continuing endeavours to minimise missed appointments. The study has also been useful in raising awareness of perceptions of the Clinical Psychology service held by some individual users.

REFERENCES

Baekeland, F., and Lundwall, L. (1975) Dropping out of treatment: a critical review. **Psychological Bulletin, 82,** 5, 738-83

Garfield, S. L. (1986) Research on client variables in psychotherapy. In S. L. Garfield and A. E. Bergin (Eds) **Handbook of psychotherapy and behaviour change**. New York: Wiley

Gerhand, S., and Blakey, R. (1994) An investigation into early discontinuation of clinical psychology contact by clients. **Clinical Psychology Forum, 74,** 26-30

Hughes, I. (1995) Why do they stop coming ? Reasons for therapy termination by adult clinical psychology clients. **Clinical Psychology Forum, 81,** 7-11

Munro, J., and Blakey, R. (1988) A study of non-attendance in first appointments with clinical psychologists. **Clinical Psychology Forum, 17,** 10-14

Trepka, C. (1986) Attrition from an out-patient psychology clinic. **British Journal of Medical Psychology, 59,** 181-6

Webster, A. (1992) The effect of pre-assessment information on clients' satisfaction, expectations and attendance at a mental health day centre. **British Journal of Medical Psychology, 65,** 89-93

Weighill, V. E., Hodge, J., and Peck, D. F. (1983) Keeping appointments with clinical psychologists. **British Journal of Clinical Psychology, 22,** 143-4.

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News of Branches and Special Groups is especially welcome.

Language: contributors are asked to use language which is psychologically descriptive rather than medical and to avoid using devaluing terminology; i.e. avoid clustering terminology like "the elderly" or medical jargon like "schizophrenic".

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APPENDIX 4.2

Dear

You may remember some time ago that you didn't come along for an appointment with a Clinical Psychologist. I appreciate that this could have been for many good reasons.

I am carrying out some research to try and understand why people don't come along for appointments, and your opinion would be greatly valued.

I would like to ask if it would be possible to speak with you on the telephone. This would involve a brief conversation, when I would ask you about reasons for not coming along. Your comments may help us to improve the way we do things here.

I would be grateful if you could reply in one of the following ways:-

1. Telephone the Department on (01387) 244111, indicating whether or not you are willing to participate. If you are, then please leave a contact number and several times when it is most suitable for me to ring you. I intend to phone in the fortnight beginning 25th July.

OR

2. Complete the cut-off slip below, and return it to the Department, using the enclosed stamped, addressed envelope.

Not participating will in no way affect any future contact you may have with the Clinical Psychology service.

Thank you for your time.

Yours sincerely

AMANDA A BARRIE
Psychologist

.....

NAME:

ADDRESS:

TEL. NO:

- I am willing/not willing to participate in the study.
- Times most suitable to be contacted at telephone number above in fortnight beginning 25th July

.....

APPENDIX I

Single Case Research (1)

Cognitive-behavioural treatment of chronic fatigue syndrome: a clinical treatment case study

ABSTRACT

Chronic Fatigue Syndrome (CFS) is a disorder characterized by medically unexplained, disabling fatigue of at least 6 months' duration, with impairment of physical and mental activities. Cognitive behaviour therapy is an approach to managing and rehabilitating patients with CFS. It is based on a psychological maintenance model of the condition that distinguishes between precipitating and perpetuating factors, and has been associated with clinical improvement. A case is presented of a 52 year old woman fulfilling diagnostic criteria for CFS. Therapeutic intervention, involving a cognitive behavioural approach to the syndrome, with attention to behavioural avoidance and cognitive distortions, resulted in a measurable improvement in psychological distress and frequency and intensity of symptoms.

Keywords: Cognitive-behaviour therapy, chronic fatigue syndrome

APPENDIX II

Single Case Research (2)

An assessment of current abilities in an older client with Down's syndrome: the need for creative approaches

ABSTRACT

This case report presents an assessment process with a 53 year old woman with Down's syndrome for whom there was no available evidence as to her previous level of abilities and no observation that the presenting problems were representative of a decline in functioning. Therefore, existing skills were investigated in order to determine her current capabilities and to provide a basis for evaluating subsequent changes. The importance of considering alternative explanations for presenting difficulties when working with an older person with Down's syndrome is demonstrated.

Keywords: Down's syndrome, dementia, ageing, assessment

APPENDIX III

Single Case Research (3)

Post-traumatic stress disorder following myocardial infarction: a clinical treatment case study

ABSTRACT

Acute myocardial infarction (MI), which involves the death of a piece of heart muscle due to the reduction of blood supply, can be an extremely frightening experience, involving immediate threat to life. It has been suggested that it can be considered a traumatic event that constitutes a stressor of high enough magnitude to qualify for a diagnosis of post-traumatic stress disorder (PTSD). This paper provides a case report of a 42 year old woman who presented for psychological treatment following an MI. Her presentation was conceptualised as an acute PTSD following a cardiac event, and intervention adapted accordingly to address her post-traumatic symptomatology. Attention to the symptoms of PTSD resulted in a reduction of these difficulties, and allowed for subsequent involvement in rehabilitation. Current interventions for cardiac rehabilitation may fail to account for the whole spectrum of possible reactions, including PTSD, which can have a direct influence on the course of recovery.

Keywords: Post-traumatic stress disorder, myocardial infarction