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**AN EXAMINATION OF THE RELATIONSHIP BETWEEN THE COMPETENCE
OF THE DREAM EGO AND WAKING CHANGES IN
MOOD FROM EVENING TO MORNING**

by

Craig Manley

**A thesis submitted to
the Faculty of Graduate Studies and Research
in partial fulfilment of
the requirements for the degree of
Master of Arts**

**Department of Psychology
Carleton University
Ottawa, Ontario
May 7, 1998**

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The undersigned recommend to the Faculty of Graduate Studies

and Research acceptance of the thesis

submitted by

Craig L. Manley

in partial fulfilment of the requirements for

the degree of

Master of Arts

Chair, Department of Psychology

Thesis Supervisor

Thesis Supervisor

External Examiner

Abstract

Past research examining the possible functions of dreams has focused on examining how different waking stimuli and situations affect the content of subsequent dreams. Results examining a possible adaptive function of dreams in dealing with presenting issues have yielded contradictory findings. Some studies suggest that a relationship exists between dream content and the degree to which a subject is able to adapt to a stimulus the following morning. With comparable methodologies some studies suggest that *dreaming about* a stressful stimulus leads to better subsequent adaptation, while other studies have provided results suggesting that *not dreaming about* a stressful stimuli leads to better subsequent adaptation.

More recent research has begun to focus on the *process* of dreaming or how the dreamer interacts within the dream milieu, in addition to dream content variables. This research has provided support that a dreamer's competence or ability to demonstrate intentional behavior that is effortful and efficacious may vary from dream to dream, and can be enhanced through attention and waking entrainment (Purcell, 1987).

The purposes of the present study were to extend upon past research attempting to enhance subject competence within their dreams (dream control), as well as to examine changes in Evening to Morning mood within a framework where changes in mood could be examined in relation to differences in dream control (DC). Thirty-nine subjects were randomly assigned to three groups (Schema, Attention and Baseline) designed to differentially focus and educate subjects about their abilities to act on behavioral options within a dream. All subjects were also instructed to complete mood questionnaires each

Evening and Morning such that changes in mood could be correlated with the subjects' dream control scores.

Results replicated Purcell's (1987) work in that dream control was enhanced through waking entrainment in the predicted fashion. Moreover, mood was found to systematically change from Evening to Morning, whereby 4 of the 6 mood scales, Friendliness, Depression, Aggression and Sleepiness, decreased from pre-sleep to post-sleep on average (with Friendliness decreasing significantly), while 2 scales demonstrated significant increases from Evening to Morning (Clear Thinking and Jittery). However, neither DC pooled across Weeks nor daily correlations (DC vs. residual mood change) were found to be significantly correlated with changes in the mood scales. Correlations between DC and Mood change when performed on a daily basis, did not attain significance when Bonferonni corrections were utilized. However, the mean correlation coefficients of the daily analysis indicated a stronger relation between DC and a number of mood scales versus the comparable across Weeks correlation, suggesting that the Dream Control exercised within a given nights' dream may, in part, contribute to the change in the subjects' waking mood.

The hypothesized adaptive function of dreaming is partially supported as positive changes in mood from pre-sleep to post-sleep were found which may impact on an individual's ability to better function during waking. While the overall mood to DC relationship did not attain significance, trends in the present results, and past research maintain that differences in the dream ego's ability to deal with issues within the dream milieu, may impact on waking mood and function. Future studies should re-examine

dream competency while including instruments to assess the varying degrees of perceived salience of the dream events to the dreamer, in order to determine if the dreamer's attributions of the relative importance of the dream, may mediate mood change and better explain the proposed adaptive theory of dreaming. Future studies may also wish to examine waking cognitive coping styles in order to see if these attributional styles transcend the sleep/wake boundary, and if they relate to the variability in mood changes from evening to morning.

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TABLE OF CONTENTS

Abstract	i
Acknowledgements	iv
Table of Contents	v
List of Tables	vii
List of Figures	ix
 INTRODUCTION	 1
 CHAPTER 1: Literature Review	 7
1.1. Deficiency views of dreaming	7
1.2. Challenges to the singlemindedness of dreams	9
1.3. The continuum of dream ego functioning	12
1.4. Developing the construct of dream control	14
1.5. Relevance of self-regulatory functions to dream research	19
1.6. Transfer effects: Evidence of dream adaptation.....	22
1.7. The mood regulation hypothesis	29
1.8. The relationship between mood change and dream content	34
1.9. Dream problem solving: A mechanism for mood change	36
1.10. An alternate interpretation of problem solving in dreams	38
1.11. Mood change relating to self-regulation within the dream	40
 CHAPTER 2: Hypotheses	 46
 CHAPTER 3: Methods	
3.1. Participants	47
3.2. Materials	48
3.3. Procedure	50
3.3.1. Group specific instructions	52
3.3.2. Scoring of dream protocols	54
3.4. Statistical analyses	54
 CHAPTER 4: Results	
4.1. Scoring Reliability	55
4.2. Scale Properties	56
4.3. Examination of extraneous variables: Word count and dream recall rates.....	57
4.3.1. Relations between word count and dream control	57
4.3.2. Word count by treatment relations	60
4.3.3. Word count by gender and weeks.....	61
4.3.4. Dream recall and independent variables	62
4.3.5. The relation of dream control and dream recall rates	65

4.4.	Test of hypotheses	65
4.4.1	Hypothesis one: Treatment effects on dream control	66
4.4.1.1.	Dream control over exposure time (weeks)	67
4.4.1.2.	Relation of dream control to gender and weeks	71
4.4.2.	Hypothesis two: Mood change from evening to morning	73
4.4.2.1	Examination of initial differences in mood scores for treatment conditions and gender	73
4.4.2.2	Analysis of mood change from evening to morning	74
4.4.2.3.	Mood change over time	75
4.4.2.4.	Mood change by treatment condition	77
4.4.2.5.	Mood change by gender	78
4.4.3.	Hypothesis three: Examination of mood change and dream control.....	79
4.4.3.1.	Relation of evening to morning mood	82
4.4.3.2.	Statistical removal of initial effects.....	83
4.4.3.3.	Dream control and residual change scores	84
4.4.3.4.	Examination of daily mood changes and dream control scores.....	87

CHAPTER 5: Discussion

5.0.	Discussion	96
5.1.	Self-regulation during dreaming	98
5.1.1.	Treatment Condition effects on dream control	102
5.1.2.	The impact of exposure time (Weeks) on gender and dream control.....	105
5.1.3.	Gender and dream control	107
5.1.4.	Dream control and word count.....	109
5.2.	Mood change from evening to morning	111
5.3.	Dream control and mood change.....	117
5.4.	Evaluating the hypothesized adaptive function of dreaming	122

CHAPTER 6: Implications	126

References	129

Appendix A	Baseline group package	136
Appendix B	Attention group package	138
Appendix C	Schema group package	140
Appendix D	Group treatments	142
Appendix E	Study forms	148
Appendix F	Dream intentionality scale and manual	152
Appendix G	Clyde mood scale manual	164

LIST OF TABLES

TABLE	DESCRIPTION	PAGE
Table 1.	Means and standard deviations for dependent measures for each treatment condition for hypothesis 1	68
Table 2.	Evening and morning means and standard deviations for aggression, clear thinking and depression mood scales for treatment conditions and gender	80
Table 3.	Evening and morning means and standard deviations for friendliness, jittery and sleepy mood scales for treatment conditions and gender.....	81
Table 4.	Paired sample correlations and significance levels for mean evening and mean morning mood for each mood subscale.....	83
Table 5.	Correlational and significance levels of mean DC and mean residual mood scores for each of the 6 mood scales.....	86
Table 6.	Daily correlations between DC and residual mood change for Aggression.....	88
Table 7.	Daily correlations between DC and residual mood change for Clear Thinking	89
Table 8.	Daily correlations between DC and residual mood change for Depression	90
Table 9.	Daily correlations between DC and residual mood change for Friendliness	91
Table 10.	Daily correlations between DC and residual mood change for Jittery	92
Table 11.	Daily correlations between DC and residual mood change for Sleepiness	93
Table 12.	Means of the correlation coefficients of 6 mood scales across the 21 days and correlation coefficients between mean DC and mean residual mood scores.....	95

LIST OF FIGURES

FIGURE	DESCRIPTION	PAGE
Figure 1.	Distribution of dreams across dream control scale categories.....	58
Figure 2.	Distribution of dreams across dream control scale categories for each treatment condition	59
Figure 3.	Mean dream control scores and standard deviations for each treatment condition	69
Figure 4.	Weekly means on dream control for each treatment condition	70
Figure 5.	Mean dream control and standard deviations for male and female subjects in each treatment condition	72
Figure 6.	Mean evening and morning scores and standard deviations on six mood subscales	76

INTRODUCTION

Over centuries and across a myriad of different cultures, all manner of ideas concerning the purpose or function of dreams have been postulated. Throughout this time and up until the present, a predominant view has been that the sleep/wake boundary may be described as a magic curtain across which lies information about the future, insight into our unconscious, or access to another world (Purcell, Moffitt & Hoffmann, 1993).

With the advent of the sleep lab in 1953 and the discovery of REM sleep as a state often accompanied by dreams, more systematic methodologies to study dreaming became prominent. These studies provided a more detailed approach to dreaming and revealed that people dream about that which they are most concerned; about those people who share their lives and about activities that they commonly engage in (Hall, 1966).

Despite the methodological advance in examining dreams, many researchers have continued to study dreams in terms of how dreaming thought and experience are deficient to that of waking consciousness. Specifically, dreaming has been viewed as a time when the dreamer lacks the capacity to reflect on his or her situation or to exercise volition to make conscious choices (Freud, 1900; Rechtschaffen, 1978).

An alternate view has recently been suggested by a number of researchers (Kahan, 1994; Purcell, 1987, Purcell et al., 1986, 1993). This view suggests that self-regulatory functions such as intentionality by the dream ego, or the individuals' self representation during dreaming (LaBerge, 1985, p. 105) vary depending on the particular dream. The most relevant literature in examining variability of self-regulatory functions within dreams,

consists of a number of experiments performed by Purcell and her colleagues at Carleton University (Purcell, 1987; Purcell, Mullington, Hoffmann, & Pigeau, 1986; Purcell et al., 1993). Within these studies it was demonstrated that dream self-reflectiveness and dream intentionality (control) were more accurately described in terms of continuous variables as opposed to a present or absent dichotomy. The researchers suggested that self-regulatory functions in dreams vary from the common "singlemindedness" of ego functioning often described by deficiency theorists, to a number of levels of more intentional action of the dream ego, up to and including total "control in" and "control over" the dream (Purcell, 1987). Similarly, it was found that dreams range in their degree of reflective awareness, from a lack of awareness where the dreamer is totally caught up within the dream milieu, to forms of multiple awareness and lucidity (Purcell et al., 1993). The present research is interested in determining if variability in dream ego intentionality may be related to changes in the individual upon awakening, such as differences in evening to morning mood.

The present study built upon past work by Kramer and his colleagues. Using the Clyde Mood Scale, Kramer's group found that certain aspects of mood systematically decrease from evening to morning (Kramer & Roth, 1973; Kramer & Roth, 1980; Lysaght, Kramer, & Roth, 1979). Furthermore, some sub-scales of mood appeared to be related to sleep indices, while other aspects, most notably the mood measure of "Depression" seems to be related to changes in dream content (Kramer & Roth, 1980).

Therefore, the primary purpose of the present study was to determine if there is a relationship between the degree of intentionality or control displayed by the dream ego

and subsequent changes in subjects' mood from evening to morning. It was hypothesised that the greater the degree of dream intentionality demonstrated by subjects, the more likely they would be to wake in a more positive mood. This hypothesis was examined by attempting to replicate Purcell's et al. (1993) work showing that there is variability of dream ego intentionality (DC) across dreams and that the degree of dream intentionality can be manipulated through the use of meta-cognitive training. Furthermore, this study attempted to replicate Kramer's (1993) findings that mood typically improves from evening to morning.

Although Purcell (1987) used an omnibus approach whereby both dream self-reflectiveness and dream intentionality were subject to experimental manipulation and measurement, due to the lack of available resources the present study provided a more limited focus. This study's focus was designed to manipulate dream intentionality and to determine if changes in dream intentionality (control) are related to corresponding changes in mood.

The results from the examination of dream intentionality scores and mood change were to be used to evaluate a postulated adaptive function of dreams. The adaptive function of dreams suggests that dreams may be a time when emotional issues are "worked through" thus helping the dreamer to be better prepared to deal with subsequent issues upon waking (Cartwright, 1992; Dallet, 1973; Koulack, 1992). Past research has suggested that positive changes in mood from evening to morning may indicate that adaptation has taken place (Cohen & Cox, 1974; Koulack, 1992; Koulack & De Koninck, 1985). The present study was designed to determine if there is a relationship between the

degree of successful adaptation (which was measured by positive changes in mood from evening to morning) and the degree to which the dream ego successfully dealt with the presenting issues within the dream milieu (higher dream control scores).

Therefore, to examine if there is a relationship between mood and dream control, three groups of subjects were asked to complete the Clyde Mood scale for three weeks. Subjects were divided into a baseline group (B), a detailed attention reporting group (A) and a dream intentionality group (Sc). Past research has demonstrated that the dimension of dream control/intentionality can be significantly increased with subjects undergoing meta-cognitive training during waking (Purcell, 1987). Thus, the dream intentionality group were taught strategies to increase their level of dream intentionality within the dream milieu. The other groups served as a baseline group and an experimental control group. All groups were asked to complete Clyde Mood Scale sheets each evening and morning. In addition, all subjects were asked to complete a dream log form for each dream that they recalled in the morning. Mood scores and dream intentionality scores were then analyzed and correlated to answer questions relating to the following purposes of this study:

1. To assess whether systematic changes in evening to morning mood are related to the degree of dream control/intentionality demonstrated in subjects' spontaneously recalled dreams.
2. To assess whether the adaptive theory of dreaming may be better described in terms of changes in dream process (degree of intentionality) to account for positive changes in mood.

3. To attempt to replicate the systematic decrease in various aspects of evening to morning mood observed by Kramer and Roth (1973; 1980), using a methodology based on spontaneously recalled dreams (at home).
4. To demonstrate that dream control/intentionality can be enhanced by learning meta-cognitive strategies relating to recognizing opportunities to act and affect the dream milieu (Purcell, 1987; Purcell et al., 1993).
5. To attempt to replicate the variability in dream control/intentionality demonstrated by dreamers (Purcell 1987).

Thus, the primary hypothesis of this study posited that changes from evening to morning mood may be related to how effectively the dream ego interacted within the dream milieu, as measured on the dream intentionality scale.

In order to examine the background involving dream intentionality, mood regulation and the adaptive properties of dreaming, the genesis of each component are considered separately. Following completion of the background for each area, contributions from nightmare therapy and waking coping styles are considered which presented a cogent argument that changes from evening to morning mood may be related to the degree of intentionality exhibited by the dream ego.

If the hypothesized relationship is supported, this conception may provide some insight into past seemingly disparate findings in the literature concerning the hypothesized adaptive function of dreams. Specifically, positive correlations between dream intentionality and positive mood change may suggest that the process of dreaming is a

factor in determining the efficacy of a night's dreaming and not only dream content as suggested by a number of current theorists (Cohen & Cox, 1975; Koulack, 1993).

CHAPTER 1: Literature Review

1.1. Deficiency views of dreaming

A common conception throughout most of the twentieth century dream work has been to describe dreaming in terms of how it is inferior or deficient to, as well as dichotomous from, waking consciousness (Freud, 1900, 1952; Hartmann, 1973; Koukkou & Lehmann, 1993; Rechtschaffen, 1978). As early as 1900, Freud had produced theories differentiating between the "unconsciousness" of sleep (lack of ego), and the "consciousness" (presence of ego) of the waking state. Even in considering that the "unconscious" could still be functioning while a person was consciously aware while awake, the idea that these two constructs could function concurrently while a person slept, was deemed to be very unlikely (Freud, 1952).

While many of Freud's theories have been disregarded or altered based on the wealth of subsequent findings, Freud's view that waking and dreaming thought are separate and essentially mutually exclusive from one another has continued to be pervasive throughout this century. In accordance with this view, Hartmann (1973) illustrates this dichotomy by asserting that, while waking consciousness serves to provide us with an interactive self-guidance system associated with maintaining our sense of self over time, such a system is totally absent during dreaming. Moreover, Rechtschaffen (1978) defines normative dreaming as a period of single-mindedness characterized by "massive non-reflectiveness", where the dreamer slavishly attends to the dream story in an uncritical and unquestioning manner. To explain this differential between waking and dreaming thought, Rechtschaffen suggests that dreaming is independent from self-regulating systems of

consciousness.

Crick and Mitchison's (1983) hypothesis also supports the deficiency view of dreaming. Their theory, which originated from assumptions based on neural net theories derived from artificial intelligence frameworks, argues that waking consciousness is when information is processed and organized in a precise and efficient manner. Sleep and dreams then, are the mind's attempt to rid the "system" of unimportant information and hence, be rid of the system's noise. According to these researchers, recalling dreams or being conscious during this "emptying of the trash" would be quite dysfunctional.

In a similar vein, Koukkou and Lehmann (1983) have proposed a state-shift, physiological model of dreaming. Their model suggests that dreaming represents a cognitive-developmental regression. This hypothesis is based around their observations that EEG patterns are the fastest in vigilant adult brains. Moreover, EEG patterns are slower in children. They interpret that the decrease in EEG-related vigilance from waking consciousness to sleep demonstrates a decrease in functional complexity of the information being processed relative to waking thought. Koukkou and Lehmann (1983) use this developmental regression hypothesis to account for the large degree of "massive non-reflectiveness" that Rechtschaffen (1978) asserts typifies dream activity. Since waking consciousness is associated with the greatest functional complexity of thought (and EEG vigilance), it is incompatible that conscious thoughts could occur during a deficient (and thus less vigilant) time period, such as REM sleep (Bradley et al., 1992; Kahan, 1994; Purcell et al., 1986, 1993).

While deficiency theories vary considerably in explaining the possible functions of

dreams and accounting for their "dream-like" qualities, the view that dreaming is a cognitively inferior state to waking pervades much of the dream literature. This view has recently been challenged directly by a number of researchers (Bradley, Hollifield & Foulkes, 1992; Kahan, 1994; Purcell, 1987; Purcell, Mullington, Moffitt, Hoffmann & Pigeau, 1986; Purcell, Moffitt, & Hoffmann, 1993) and indirectly by a number of studies examining the experience of lucid dreaming (Green, 1968; LaBerge, 1985).

1.2. Challenges to the single mindedness of dreams

A lucid dream is a dream where the person realizes and is conscious of the fact that he or she is dreaming while in the dream (LaBerge, 1985). Lucid dreaming may also allow the dreamer to consciously influence their course of action. Often lucid dreamers can remember details of their waking lives as well as being aware that they are asleep in bed, while still witnessing with conscious clarity the dream world. LaBerge (1985) provides an example of this conscious clarity during dreaming as follows:

As I wandered through a high-vaulted corridor deep within a mighty citadel, I paused to admire the magnificent architecture. Somehow the contemplation of these majestic surroundings stimulated the realization that I was dreaming!... Every element of this enchanting spectacle seemed real-in spite of the fact that I remained perfectly aware it was all a dream!

Fantastic as it may sound, I was in full possession of my waking faculties while dreaming and soundly asleep: I could think as clearly as ever, freely remember details of my waking life, and act deliberately upon conscious reflection. Yet none of this diminished the vividness of my dream. Paradox or no, I was awake in my dream! (p. 1).

Lucid dreaming as defined by Green (1968), philosophically presents a major challenge to those attempting to define dreaming as a state of massive non-reflectiveness

(Rechtschaffen, 1978), or as a time when self-regulatory functions are absent (Freud, 1900; Hartmann, 1973). Green's seminal book "Lucid Dreams" served as the first comprehensive, historical review of much of the known lucid dreaming literature up until that time.

Since Green's work, other researchers have made many contributions to the study of dream lucidity (Gackenbach, 1978; LaBerge, 1985; Moffitt, Hoffmann, Mullington, Purcell, Pigeau, & Wells, 1988; Ogilvie, Hunt, Tyson, Lunescue & Jeakins, 1982; Tart, 1979). However, despite the recent proliferation of experimental and anecdotal support for lucid dreaming, the existence of this type of conscious awareness during dreams has not been accepted by the scientific community as a whole.

One of the greatest obstacles to lucid dreaming being recognized as a distinct and real phenomenon, has been the conceptual models used by certain researchers. Until recently, most researchers' models have not been capable of accepting data that suggested dreaming was possible with a large degree of self-reflectiveness or self-control (Hartmann, 1973; Rechtschaffen, 1978). Without acknowledgement of these characteristics within dreams, the concept of lucidity was viewed as an impossibility (Crick & Mitchison, 1983; Hartmann, 1973; Koukkou & Lehmann, 1983; Rechtschaffen, 1978).

Within this deficiency framework, lucid dream research came under considerable scrutiny. Researchers who did not support the idea of conscious awareness during dream sleep attempted to account for the described "lucid dream" phenomenon with alternative suggestions. These suggestions included ideas that "lucid dreams" may actually be mini-arousals, awakenings, fantasy, or that these dreams should be considered as anomalous

events (Breger, 1967; Hartmann, 1973; Rechtschaffen, 1978).

Thus, despite the considerable evidence available about lucid dreams, researchers had a difficult time attempting to unequivocally "prove" that the experience of lucidity did occur. Furthermore, in respect of those individuals who doubted the phenomenon of lucidity, lucid dream researchers had the responsibility of demonstrating that lucid dreams occurred during sleep and were not some type of fantasy or mini-arousal. These issues were addressed through the aid of the sleep lab.

Within the lab, frequent lucid dreamers could be awakened within REM sleep and then subsequently report their dreams. Through this method, further support that lucid dreaming does occur during sleep (specifically REM) could then be gathered based on the subjects' EEG records. However, although this method provided support that subjects did have lucid dreams during REM sleep, the methodology still relied on the dreamer's subjective perception of the "supposedly" lucid dream. Thus, lucid dreaming was not unequivocally demonstrated until research by LaBerge, Nagel, Dement, and Zarcone (1981) and concurrent research by Hearne (1978, 1982) revealed subjects who were independently able to verify that they were having a lucid dream **while** the dream was occurring. This method of signalling the experimenter when lucid, consisted of performing a prearranged pattern of eye and/or arm movements when lucidity occurred.

In order to perform this sequence of movements, the dreamer would be required to first recall the pre-arranged pattern **while asleep** and then consciously perform the pattern. This study, and many research studies since then, have included this "signalling" to indicate lucidity and as such, have validated the lucid experience and lucid dream research

(Hearne, 1978; LaBerge et al., 1981).

With the rich history of anecdotal accounts of lucid dreamers and the proven ability of some lucid dreamers to signal the onset of lucidity, it seemed apparent that deficiency theories are inadequate in that they cannot account for this observable experience. In response to this lack of an appropriate model, an increasing number of studies have been done examining dreaming as one point on a continuum of consciousness, as opposed to the discrete and dichotomous states of consciousness popularized by deficiency theorists.

1.3. The continuum of dream ego functioning

Based on the research involving dream lucidity, Purcell (1987) hypothesized that the dream ego could experience a variety of levels of self-regulatory functions while dreaming. While there was little literature examining this hypothesis, Adelson (1959) found that the dreams of women who were deemed high in literary creativity had dreams that were characterized by more detachment, reflectiveness, multiple perspectives, bizarreness, dream control and self-transformations than less creative women. The latter's dreams were described as being characterized by banality, single mindedness and brevity. This research was used to illustrate an individual difference variable in dreaming. The authors concluded that dreaming is not deficient from waking, but is instead a function of individual differences based on creativity. Moreover, the results also suggested a range of differences in dream content, from a high degree of dream ego involvement, to the massive non-reflective and non-involved dream ego suggested by Rechtschaffen (1978). Similar results have been found by Domino (1976), Snyder (1970) and Green (1968).

In attempting to measure dream self-reflectiveness (SR) or the meta-cognitive ability of self to think about self, Purcell et al. (1986) sought to develop a scale based on the assumption that the degree of self-reflectiveness and dream intentionality demonstrated by the dream ego can be better defined in terms of continuous variables. Existing scales were deemed to be inappropriate to measure self-regulating functions as continuous variables (Gackenbach & Bosveld, 1989; Tart, 1979; Winget & Kramer, 1979), thus Purcell designed her self-reflectiveness scale based on Rossi's (1972) clinical phenomenological approach to working with dreams. While Rossi's work was designed to be used in clinical practice, the different stages he discussed could be transferred into a psychometric range.

From Rossi's work, Purcell et al. (1986) developed a scale to measure the degree and range of self-reflectiveness. This scale was used to measure the self-reflectiveness of subjects in a number of groups. In support of the hypothesis that self-regulatory functions can be viewed as a continuous variable, Purcell's results demonstrated that a range of SR scores occurred from dream to dream within and across subjects. Furthermore, Purcell demonstrated that various waking conditions, including increasing the attention paid to dreams through the use of post-hypnotic suggestion and through the use of cognitive schemata (Clerc, 1983), led to significant increases in the level of self-reflectiveness in the dreams of subjects in these groups.

The authors concluded that dreaming is much more self-reflective than generally thought and that the dreaming experience cannot be broadly characterized as a period of

massive non-reflectiveness or as a time when self-regulatory functions are lacking (Purcell et al., 1993).

1.4. Developing the construct of dream control

Purcell (1987) extended upon her work to examine whether the degree of intentionality demonstrated by the dream ego might also be viewed as a quasi-continuous variable, as opposed to the conception of dream intentionality being either present or absent in a given dream (Purcell, 1987; Purcell et al., 1993).

The definition of dream control or dream ego intentionality is adapted from Wallin's (1977) work on intentional dreaming. In recent publications dream control has been defined as the "extent to which the dreamer's intentionality is operative in determining dream events" (Purcell et al., 1993, p. 214). More clearly, the dream control scale is interested in "determining the degree to which the dreamer comes to respond to the dream-generated events and situations by perceiving behavioral options and acting to bring about an outcome that suits the dreamer" (Purcell et al., 1993, p. 214).

Ogilvie (1982) constructed a scale examining non-lucid, pre-lucid and lucid dreams in terms of whether control was present or absent. However, Purcell and her colleagues (1987, 1993) assumed that dream intentionality represented a much larger theoretical range than that represented by a present or absent dichotomy. Other scales examining dream control in terms of ego style (Brenneis, 1970), activity levels (Hall & Van de Castle, 1966) and expressiveness (Corrierer et al., 1980), were examined but deemed to be too restrictive to adequately define the concept.

According to Purcell (1987), dream intentionality should represent a number of

empirically-related dream behaviors that would be determined by the underlying factor of volition-intentionality of the dream ego. The factors of centrality-involvement, activity level, effort and expressiveness were thought to be related to the amount of dream control demonstrated by the dream ego. Therefore, Purcell's (1987) dream intentionality scale was adapted from existing scales where the construct of dream intentionality would be measured by the degree of expressiveness (Corrierer et al., 1980), the amount of activity (Hall & Van de Castle, 1966) and the degree of centrality-involvement demonstrated by the dream ego (Brenneis, 1970).

Feeling-expressiveness within dreams relates to the impact that the dreamer has in his dream environment. It is the description of the dream that is suggestive of the importance of the dream events to the dreamer (Corrierer et al., 1980; Purcell, 1987). The activity level within the dream intentionality scale involves reflective activities such as talking, feeling, thinking and empathizing. This scale also examines how central or peripheral and how successful or unsuccessful these activities are to the dream.

Centrality-involvement refers to the relative importance of the dreamer's role in the dream. This category ranges from when the dreamer is an observer of events, to other dreams where the dreamer is the central character.

Using the constructed scale dream intentionality and dream self-reflectiveness were examined by having subjects divided into a number of groups (Purcell, 1987). The groups consisted of a Baseline group, an Attention Control group and a Schema group. The subjects in the Baseline group were asked to report their dreams for a three-week period, meeting with the experimenter weekly to drop off their dreams and collect more dream log

forms. The Attention Control group subjects were asked to meet with the experimenter for one hour each week to discuss dreams and strategies to increase people's abilities to attend to details in the dream. The Schema group participants met the experimenter on a weekly basis for one hour. During these sessions, subjects were introduced to the concepts of lucid and intentional dreaming. As well, they were asked to wear a leather bracelet throughout the experimental period which served as a cue to rehearse the schemata they learned throughout the experiment. Each time the subjects noticed the bracelet they were to ask themselves a series of questions concerning their present state of consciousness, and to assert to themselves that these same types of questions could be asked during a dream.

Dream reports were collected and evaluated by judges who were blind to the designated group from which the subjects' dream reports came. Results indicated that dream control was significantly higher for the Schema subjects (mean = 5.23) than either the Attention Control (mean = 4.88) or Baseline (mean = 4.83) groups' control scores. Moreover, Purcell (1987) found that high dream recallers demonstrated significantly more dream control (mean = 5.12) than low recallers (mean = 4.79). Furthermore, correlations were performed between self-reflectiveness scores (SR) and dream control (DC) scores. The results indicated that while these constructs are related, these scales served as independent measures from one another.

The results of this study indicate that both the degree of self-reflectiveness and dream intentionality vary considerably across dreams, subjects and nights. As well, the use of meta-cognitive waking manipulations demonstrated a significant effect on the

participants' scores on both SR and DC scales, providing further support for the notion of examining dreams and cognition in terms of a sleep/wake paradigm.

Recent work by Kahan (1994) provided further support for the hypothesis that self-regulatory characteristics occur in a variety of degrees during dreaming. In fact, in reviewing Purcell, Mullington, Moffitt, Hoffmann and Pigeau (1986) where the self-reflectiveness scale was first utilized, as well as subsequent work (Purcell, 1987; Purcell et al., 1993) demonstrating that self-reflectiveness can be increased through the practice of waking meta-cognitive strategies, Kahan argues that the degree of self-reflectiveness in these studies may be underestimated. This assertion is based around the fact that the self-reflectiveness scale designed by Purcell et al. (1986) is rated by a third party judge. Kahan (1994) contends that the nature of how a dream report is described by utilizing the narrative style which dictates that the dream will be recalled in a manner similar to "where was I", "what was I doing", "who was I with", "what happened next", "how the dream ended", indicates cues necessary for a third party rater to adequately evaluate self-reflectiveness may not be written in the dream report. Thus, a dreamer may be occupied with describing the narrative structure of what happened in the dream as opposed to mentioning how she felt, or what perspective she had about the situations that were happening.

To evaluate this hypothesis, Kahan (1994) performed a study where subjects reported their dreams. The dreams were then rated on the Self-Reflectiveness scale. In addition, after participants sealed their dream record sheets, they were then asked to bring their dream experience to mind as clearly as possible. Following this they were asked to

complete a packet of eight Dream Rating Scales which were designed to ask questions regarding the dream experience on a subjective level.

The Dream Rating Scales were designed to evaluate the subjects' memory characteristics of sensory and perceptual detail, complexity and bizarreness of the story line, thoughts and feelings associated with reporting the dream, and the personal relevance of the event. The scales differ from the Self-Reflectiveness scale designed by Purcell et al. (1986) in that the Dream Rating Scale consists of Likert-type scales involving rating the dream experience on a number of dimensions. Included in these are Sensory and Affective Qualities, Organization, Awareness of Dreaming (lucidity), and Awareness of Controlling Dream Events (intentional self-regulation). Further questions involved measuring different types of Dream Control (over self, over others, or over the situation) and Cognitive Processes (thinking, remembering and imagining) through the use of discrete variables of "Yes" (occurred), "No" (did not occur) or "Can't Say".

The results of the study indicated that participants reported a greater variety of cognitive and meta-cognitive experiences during dreaming than those suggested by their self-reflectiveness scores as rated on the Self-Reflectiveness Scale (Purcell et al., 1986). Furthermore, the self-reflectiveness scores obtained in this study replicated past results, and taken together these two scales both support the notion that dreaming cannot be generalized as a period of singlemindedness.

In particular, the Dream Rating Scale further replicated Purcell's work which suggested that the Dream Control and Dream Self-Reflectiveness scales were measuring independent constructs. Results from the Dream Rating Scale indicated that subjectively,

dreamers reported having control over their thoughts and feelings in the absence of having an awareness that they were dreaming (Self-Reflectiveness).

1.5. Relevance of self-regulatory functions to dream research

Recent research examining self-regulatory functions within dreams (Bradley, Hollifield, & Foulkes, 1992; Kahan, 1994; Purcell, 1987, Purcell et al., 1986, 1993), in conjunction with the increasing amount of research done examining lucid dreaming, has provided cogent arguments that the experiences of the dream ego during dreaming vary considerably from dream to dream and cannot be characterized solely as a time of non-reflectiveness or suspension of self-regulatory functions. This then allows researchers to examine dreams in terms of the specific features of a given dream, as opposed to the over-generalizations present within deficiency paradigms.

Thus, past research questions can be asked and interpreted based on the hypothesis that the degree of self-regulatory function within a dream is quite variable, and ranges from minimal self-regulation to a large degree of self-regulation depending on the particular dream. Within this context, the hypothesis that dreams serve an adaptive function in helping us to master stressful situations will be reviewed. Following a review of the past research in this area, which has been largely based within a deficiency framework, results will be examined to determine if the heretofore unexamined process of increased self-regulatory functions (increases in dream intentionality and self-reflectiveness) may play a role in determining how adaptive a given dream is deemed to be.

Dallet (1973) defined dreams that involve daily stressors as "mastery" dreams.

While there are a number of similar theories concerning the mastery hypothesis, the basic premise of mastery theories is that there is a degree of continuity between waking and sleeping thought, and we often dream about what is concerning us in our waking lives. A number of theorists further explain this relationship by arguing that during the day stressful daytime events tap into our memories of past attempts to deal with similar situations. During sleep, these memory systems continue to process information which helps to formulate the content of our dreams (Breger, 1967).

To support a mastery hypothesis, two questions must be answered. First, do people dream about what is concerning them in waking life? If this is the case, then an argument can be made that people dream about what is on their minds. Secondly, how might dreaming about a stressful experience that one was preoccupied with during the day serve an adaptive purpose?

To address the first question, Piccione, Jacobs, Kramer and Roth (1977) performed a study where subjects were asked to complete a daily activity report (DAR) and an emotional tone report (ETR) each hour during the day. That evening, the subjects were awakened during each REM period and asked to record their dreams. Judges then attempted to match the subjects' dream reports with their daily activity and emotional tone reports. The judges were not able to do this above chance levels. However, when the judges were given the matched Daily Activity Reports and the subjects' dreams and asked to pick the activities of the day from the DAR that were best represented in the dream reports, they found that the events of the day that occurred in the dreams were likely to be those activities that had a higher emotional rating on the ETR records. Thus, dream

content is most concerned with and influenced by daytime activities that are the most emotionally intense (Hall, 1969).

Further support that subjects dream about emotionally significant situations comes from Whitman, Kramer and Baldrige (1963) where dreams of patient-therapist dyads were examined. This study involved having both therapists and their patients sleep in the sleep lab and provide dream reports. It was hypothesized that patients would be more likely to dream about their therapist than the therapist about their patients as the therapists would be more central to the patients' lives. However, to increase the relevance of the patient to the therapist, the therapists were asked to sleep in the lab the night before they were to present about a patient at a supervisory conference. The dreams of the patients and therapists were examined, with the results indicating that the patients dreamt about their therapist 41% of the time, but that the therapist dreamt about the patient only 14% of the time. Interestingly however, is that the therapist did dream about a larger preoccupation on their mind - that is, the supervisory conference in 42% of their dreams. Furthermore, the experimental situation occurred in 54% of their reported dreams. These results add further credence to the supposition that people dream about situations that are most on their mind, or as Kramer (1993) states, that is "the principal waking current emotional concern [that] is structuring and influencing dream content" (p. 174).

It seems apparent then, that people dream about activities that they are concerned with during their waking life. How then can it be determined if this dreaming serves an adaptive function? A number of paradigms have attempted to assess this, ranging from examining changes in mood and its relation to dream content, to observing behavioral

deficits after REM deprivation. A summary of these methods and results will be discussed.

1.6. Transfer effects: Evidence of dream adaptation

One widely used method to measure adaptation involves presenting a pre-sleep stressor to subjects before they go to sleep. The basic tenet of this procedure is that adaptation could be demonstrated if the subjects' mood was to improve from evening to morning, and that this improvement could be explained based around the subjects' dream reports. Presumably, mood would improve from evening to morning for the subjects who successfully mastered the stressor and would not improve for those subjects who did not adapt to the stressor. Thus while it is argued that the degree of adaptation to the stressor can be measured by changes from evening to morning mood, it is further suggested that this adaptation (improvement in mood) should occur conjointly with the degree to which the pre-sleep stressor was incorporated into the dream.

Cohen and Cox (1975) used this method by having two groups placed in either a positive or negative situation prior to going to sleep. Subjects were either treated in a friendly manner and given an easy intellectual task before bed (Positive), or they were treated in a perfunctory manner and given a very difficult task to complete within rigid time constraints. Subjects then completed a mood measurement before going to sleep. Throughout the evening, the participants were awakened during REM periods and asked to record their dreams. The next morning their mood was again assessed.

Cohen and Cox (1975) found that some subjects in the negative pre-sleep condition did demonstrate positive changes in mood from evening to morning. When they

examined the dream content of the subjects in the negative condition whose mood improved, compared with those subjects who demonstrated no change, they found that the group whose mood improved were more likely to have dreamt about the anxiety provoking pre-sleep stressor than the subjects whose mood remained unchanged. These results supported the mastery hypothesis that dreaming about a stressful situation helps the dreamer to adapt to the situation (as measured by positive increases in mood).

Conversely, Koulack, Prevost and De Koninck (1985) performed a similar study where subjects were required to spend two nights in the sleep lab. On each night, subjects were given either an easy or a difficult intellectual task. The first night was of uninterrupted sleep, while the second night subjects were awakened during REM sleep to record their dreams. Mood was measured each evening and morning. Koulack et al.'s (1985) results were surprising in that both the Easy and Difficult groups demonstrated a reduction in anxiety from night to morning on the first night. They reasoned, however, that this may have been due to the fact that the Easy task group were becoming acclimatized to the laboratory situation (which may have served as a stressful situation). Further surprising results were found when the individual changes in evening to morning mood, and the subjects' dreams were analyzed. Contrary to Cohen and Cox's (1975) results, Koulack and De Koninck (1985) found that subjects who showed increases in anxiety from evening to morning were more likely to have incorporations of the pre-sleep stressor in their dreams than those who demonstrated improvements in mood. According to these results, it appears that dreaming about a stressful event led to more distress upon waking.

Koulack and De Koninck (1985) interpreted these results as suggesting that sometimes it

is more beneficial to not dream about a stressor, while at other times it may be useful.

To account for these disparate findings with similar methodologies, Wright and Koulack (1987) proposed the disruption avoidance model of dreaming. This model suggests that dreams may be able to assist in the adaptation process through the processes of mastery - incorporating daily stressors into the dream - or through the process of avoidance, thereby leading to better sleep, more positive dreams and more positive waking affect. According to Wright and Koulack (1987), dealing with a problem during a dream may be similar to dealing with a problem during waking. Sometimes people elect to use a problem-solving mastery approach and other times people instead ignore the problem because they do not feel that they are prepared to handle it at that particular time.

The authors argue that adaptation may be best described as an oscillation between mastery dreams and avoidance dreams which may occur within a given night or across nights. They further suggest that this oscillation may serve an additional purpose of helping to ensure that the dreamer is well rested, as dealing with stressful issues while asleep can have a disturbing effect on one's sleep parameters (Freud, 1952; Koulack, 1992; Wright & Koulack 1987). Thus, if people were to continually attempt to master stressful situations, their waking function may begin to decline due to a less restful sleep.

Other experimental methods designed to examine if dreams serve an adaptive function include the use of REM deprivation (REMD) paradigms. Typically, a REMD experiment includes having subjects perform some type of task at baseline and then repeating a similar task after a period of REMD. Greenberg, Pearlmann, Fingar, Kantrowitz, and Kawliche (1970) had subjects complete a number of tests measuring

cognitive and emotional functioning. Subjects were then REM deprived before being asked to complete these tests again. Results indicated that while cognitive functioning was not affected by REMD, emotional functioning as measured by the use of various projective tests was found to vary. Specifically, REMD wishes and feelings which had previously been kept out of consciousness now appeared more overtly in the test protocols. The authors' explanation for this finding was that subjects normally attempt to deal with issues of daily life during waking, however if issues are not dealt with adequately, they will be further processed and assimilated with past successful defence mechanisms during dreaming. In this study, since REM sleep is prevented from taking place, these unconscious wishes and feelings which normally would have been assimilated spilled over into the subjects' waking lives.

Further research using the REMD paradigm also provides support for an adaptive function of dreams. Greenberg, Pillard and Pearlman (1972) had subjects watch a graphic film depicting an autopsy prior to subjects going to bed. Subjects had their response to the film measured through the use of the Psychiatric Outpatient Mood Scale and through the use of physiological measures. After watching the film, half the subjects were REMD and half of the subjects were awakened during NREM periods. The authors hypothesized that the group who was NREM deprived would have the opportunity to assimilate the threatening material into their existing defence mechanisms and thus be better able to deal with a subsequent viewing of the film. Conversely, it was expected that those subjects who were REMD would not be able to assimilate and deal with the threatening material and thus, they would be less able to cope with the subsequent presentation of the material.

As expected, subjects who received REM sleep but who were deprived of NREM sleep were better able to deal with the repeated presentation of the stressor, as shown by reduced anxiety in the mood and physiological measures, compared with those subjects who were deprived of REM sleep. The authors argued that this provided additional support for the notion that dreaming serves an adaptive function in dealing with threatening issues.

While REMD studies seem to provide further support for the adaptive function of dreams, a number of problematic issues remain. To begin, REMD studies do not allow for the examination of the dream content of the subjects. As such, any assumptions that are made are based on behavioral deficits or changes which are then attributed to the deprivation condition. Perhaps of more relevance is the fact that REMD is not synonymous with dream deprivation, as dreaming has been found in all stages of sleep (Foulkes, 1985).

Thus far it has been suggested that for dreams to serve an adaptive purpose, there must be some measurable positive change that is a result of having dreamt. Studies have indicated that sometimes having a dream that includes a daytime stressor leads to more positive subsequent outcomes, such as better mood or less anxiety (Cohen & Cox, 1975). Conversely, other studies have demonstrated that subjects who **do not** dream about a stressful situation appear to be better adjusted when faced with this situation again (Koulack & De Koninck, 1985).

Studies involving REM deprivation suggest that REM sleep is involved in the processing of threatening materials into characteristic defence mechanisms (Greenberg et

al., 1972). When subjects are not able to process this material due to REMD, they are less able to deal with the stressor than if they had been able to sleep normally. Taken together, the research presented thus far seems suggestive of the fact that dreams do have an adaptive function in helping individuals to deal with daily stressors, although whether this function is best accomplished by mastery or compensatory techniques in dreams is still difficult to determine.

Cohen (1979) defines adaptation through dreaming as a change, through information processing, in the relationship between an individual and some problem or challenge either presented by the environment or invented by the individual. Cohen states that to provide support for an adaptive function, the dream researcher must demonstrate that: 1) there is a definite relationship between a pre-sleep problem and a dream experience, and that 2) there is a definite relationship between the dream experience and a measurable increase in the capacity of the individual to deal successfully with the problem. It is noteworthy that the second point may be reflected in the form of "having a higher probability of arriving at a solution, the attainment of a better solution , or at least an affective accommodation to the problem" (Cohen, 1979, p. 256).

The studies presented thus far are suggestive of the fact that: 1) we dream about what is emotionally salient to us, and 2) that dreams appear to facilitate adaptation to daily stressors differentially, depending on the experimental situation. To continue the exploration of the posited adaptive function of dreams, it would be helpful if a variable could be identified that could describe how successful a particular dream was in serving an adaptive function.

A number of effects involving changes in the subject from evening to morning, presumably based on the previous night's dreams have been examined, however, the most developed so far has been that of mood. Typically mood is examined in the context of the wake-sleep-wake paradigm, whereby any recorded differences between evening mood and morning mood are attributed to either the sleeping interval, the dreaming interval or some combination of each.

Extensive work by Kramer and his colleagues has revealed that a number of facets of mood systematically change from evening to morning (Kramer & Roth, 1973, 1980). Results from these studies suggest that a number of mood-related variables change in relation to the sleeping interval. Subsequent findings intimate that dream content specifically appears to be associated with changes in subjects' Depression scores from evening to morning. The association between dream content and change in Depression scores appears to be related to the number of characters appearing within the dream, where the more characters that appear, the greater the likelihood of a more positive waking mood.

Further results from Kramer and his colleagues indicated that Depression decreases (or happiness is increased) from evening to morning approximately 63% of the time. Given that waking mood has been found to be related to mental illness (Beck & Ward, 1961; Cartwright, 1986, 1992; Kramer, Trinder, Whitman & Baldrige, 1969), and performance factors (Johnson, Spinweber, Gomez, & Matteson, 1990; Lutz, Kramer & Roth, 1975; Rosa, Bonnet, Warm & Kramer, 1981), it may be conceivable that changes in mood scores are reflective of the relative success or failure of an adaptive process during

sleep.

To examine this line of research, Kramer's (1993) mood regulation theory will be reviewed. Subsequently, this theory will be evaluated in terms of whether it may represent an adaptive function, as well as determining if the changes in mood observed by Kramer may be explainable in terms of differences in dream ego competency (Dream Control).

1.7. The mood regulation hypothesis

According to Kramer (1993) the functionality of dreams can be described in either an assimilative or accommodative fashion. An assimilative function of dreams (Piaget, 1962) accounts for the totality of the dream experience. These theories assume that dreams may serve some corrective or reductive goal, regardless of whether the dream enters conscious awareness or is subject to secondary workings (Kramer, 1993).

Accommodative theories of dreaming argue that the dreamer may be altered as a result of the dream experience, hence the dream represents a special experience which could have a decisive impact on the dreamer's life (Rossi, 1986). These theories suggest that dreaming must enter conscious awareness and be understood in order for dreams to have their transforming effects.

Kramer's (1993) view is that dreams may be best described in terms of both assimilative and accommodative properties. Unrecalled dreams may continue to serve assimilative functions without the need of conscious awareness. Conversely, dreams that are recalled, may involve more significant issues to the dreamer, thus allowing the potential for further insight through subsequent examination of the dream.

In congruence with Cohen (1979), Kramer argues that if dreaming serves a

functional role, then this should be observable through the use of the wake-sleep-wake paradigm. More clearly, waking thought and feelings would be expected to influence dreams and dreams would be subsequently expected to influence waking thought (Kramer, 1993; Kuiken & Sykora, 1993).

Considering that research has demonstrated that dream content can be influenced by pre-sleep manipulations (Tart, 1969) and that affective factors are more likely to have an effect on dreams than cognitive ones (Ekstrand, 1977; Piccone et al., 1977), Kramer and his colleagues examined dreams in terms of mood and affect.

Kramer, Roth and Czaya (1975) performed a study where individuals were awakened at various times into their REM periods and asked for their dream reports. These reports were then rated according to a number of scales on the Dream Intensity Questionnaire. The results indicated that the level of dream intensity was different between different reporting times. Differences were found between five and ten minute intervals as well as differences between twenty and thirty minute reports. Moreover, the results demonstrated that dream intensity increases over time, such that on average the dream intensity scores calculated at 30 minutes were significantly more intense than awakenings at 5 or 10 minutes. From these results, it was hypothesized that the increases in eye movements and dream intensity may be suggestive of the dream attempting to contain an emotional surge.

Concurrent with Freud's (1952) view that dreams seek to preserve sleep, Kramer argues that successful dreams integrate and contain the emotional surge without waking the individual. Less successful dreams occur when the emotional surge is too intense for

the integrative capacities of the dream, and the dreamer wakes up, usually with remembrance of the dream and the negative affect associated with it (Kramer, 1993).

In an effort to explain differences in the integrative capacity of individuals in containing the "emotional surge", Kramer and his colleagues performed a number of further studies. Their results indicated that the integrative capacity of the dream was not influenced by the amount of dream recall or dream content differences (Kramer, Shoen & Kinner, 1984). Subsequent work suggested that the integrative ability of dreams may be related to the emotional health of the dreamer (Kinney & Kramer, 1985). To assess this, subjects were divided into two groups, based on how often the emotional surge was contained. A group of "disturbed dreamers", or those dreamers who frequently failed to contain the "emotional surge" were compared with a group of vivid dreamers. Both groups were assessed on the MMPI and the emotionally-based scales of the Cornell Medical Index. It was found that the disturbed dreamers had higher scores on all of these indices than the vivid dreamers. Moreover, the disturbed dreamers also had a higher number of prior psychiatric hospitalizations. Thus, Kinney and Kramer (1985) concluded that the integrative capacity of dreams seems to be related to pre-dispositional factors in individuals and their emotional state.

A further factor in predicting integrative failure is that of higher internal responsivity. In a study utilizing subjects experiencing chronic delayed post-traumatic stress disorder, who were presented with an above threshold tone while asleep, they responded 93% of the time. This is much higher than the control group which responded only 52% of the time (Kinney & Kramer, 1985). The researchers concluded that

responsivity may be related to emotional difficulties thus emotional troubles lead to changes in evening internal responsivity, which may lead to increased difficulties in containing the emotional surge which occurs during dreams.

Kramer and his colleagues thus argued that if a function of sleep and dreams is to systematically decrease various facets of mood or to serve as an "emotional thermostat" for controlling the emotional surge, then alterations in sleeping and dreaming should be related to the subsequent emotional state of the dreamer. To examine this, Kramer had subjects sleep in the lab for a period of fifteen consecutive nights. Before going to sleep each evening, subjects were required to complete the Clyde Mood Scale and then to complete the scale upon waking. This scale consisted of a number of sub-scales designed to measure mood facets labelled: Aggression, Friendly, Depression, Clear Thinking, Sleepiness and Jittery. The results demonstrated that scores from evening to morning were different from one another and that these scores typically decreased in mean intensity and variability from evening to morning (Kramer & Roth, 1973b). Typically, subjects would rate themselves as being **less Depressed** in the morning compared to the prior evening.

Kramer performed a number of additional studies to evaluate whether variables such as age (Roth, Kramer & Roehr, 1976), sex (Lysaght, Kramer, & Roth, 1979), location of subject (home or lab), (Roehr, Kramer, Lefton, Lutz, & Roth, 1973) or being awakened for dream reporting (Kramer, 1993), influenced the subsequent variability and changes in evening to morning mood. Overall, the results again indicated that how one feels before going to sleep is systematically different in intensity and variability from

evening to morning. Furthermore, this relationship holds true and appears to be uninfluenced by whether subjects are in the laboratory, at home, vary greatly in age, are of either gender, or whether subjects are awakened for dream collection throughout the evening (Kramer, 1993).

Therefore, Kramer and his colleagues concluded that changes in evening to morning mood appear to be unrelated to a number of variables. To ascertain more clearly what may be related to the decreases in mean mood and variability from evening to morning Kramer utilized the wake-sleep-wake paradigm to evaluate whether different aspects of mood changed in relation to sleep, dreams, or some combination of these.

To begin, Kramer performed a number of sleep deprivation studies to examine the results of sleep deprivation on mood (Vaccarino et al., 1981). Subjects were sleep deprived either for 40 or 64 hours. Subjects were also asked to complete Clyde Mood Scales at their usual sleep and wake up times. The results indicated that as time progressed, there was an increase in the subjects' scores on the Sleepy and Anxious sub-scales and a decrease in the Clear Thinking scale. There were no changes from "sleep time" to "wake up time" in the Friendliness, Aggression and Depression sub-scales for the sleep deprived subjects. Taken together, these results offered support that some aspects of mood are related to the sleeping interval (Sleepiness, Jittery and Clear Thinking), while others are not. Explanations relating to why the Depression, Aggression and Friendliness sub-scales did not change while other scales did, could not be ascertained from this study, but are suggestive that another aspect of the sleeping experience may provide some explanatory power.

1.8. The relationship between mood change and dream content

In conjunction with examining the influence of sleeping conditions on changes from evening to morning mood, Kramer and his colleagues were also interested as to whether a person's dreams would be related to changes in mood. Specifically, Kramer argued that if dreams are related to the affective condition of an individual, then they should show a series of changes in an analogous fashion to the observed evening to morning changes in mood (Kramer, 1993).

To examine if there was a relationship between dream content and changes in mood, Kramer and Roth (1973) performed a pilot study where two men slept for twenty consecutive nights in the sleep lab. The subjects were awakened during each REM period and asked to record their dreams. In addition, each subject completed the Clyde Mood Scale with each of the six sub-scales (Depression, Friendliness, Aggression, Sleepiness, Clear Thinking and Jittery) both before bed and upon waking in the morning. Correlations were then performed between the different content indices, including the character, activity and descriptive scales (Hall & Van de Castle, 1966), and the six components of the Clyde Mood Scale.

Results indicated that three times the number of significant correlations than would be expected by chance alone were found in the data analysis. Furthermore, the greatest number of these correlations involved the Depression scale and the character sub-scales where there were 14 correlations found where 1.2 would have been expected by chance. In describing this relationship between character sub-scales and mood, it was found that the more characters that appeared in the dream, the greater was the decrease in the

Depression sub-scale from night to morning (Kramer & Roth, 1973).

Based on this pilot study, a subsequent study was performed with twelve additional male subjects. The procedure was the same as that used in the pilot study and correlations between the scored dream reports and mood changes on the six mood scales were again calculated. The results were essentially identical to those obtained from the pilot study. While there were a number of correlations between dream content and the mood sub-scales, further analysis revealed that the Depression scale had significantly more correlations than the others (Kramer & Roth, 1980). Thus, these results provided further support that there is a relationship between the Character scales and changes in the Depression mood sub-scale.

According to the studies presented thus far, it appears that different aspects of mood are affected differentially by the process of sleeping. While the Friendliness, Aggression and Sleepiness facets of mood appear to be related to the sleeping interval, other results suggest that regular decreases in the Depression scale may be related to dreaming and more specifically, the number of characters present in the dream. However, not all results have supported this position.

Subsequent work to further examine this relationship by Rosa, Kramer, Bonnet and Thomas (1981) consisted of having two groups of subjects record their dreams and complete the Clyde Mood Scale each evening and morning. In examining the correlations between mood and dream content sub-scales, it was found that similar data did not occur in the two groups. In one group, the results were similar to past findings, while the other group's data did not result in significant correlations. As such, these results did not

provide further support for the mood dream content relationship.

Another study that also did not yield positive results, consisted of selecting 16 subjects from a previous group of twenty-three and dividing their dreams into high and low mood score nights. It was expected that by dividing the dreams among high and low mood groups, the content differences would be evident between the two groups. In contrast to the experimenter's predictions, the results did not reveal any significant differences in dream content scales for these groups when divided according to mood (Kramer, Bonnet & Thomas, 1981).

To explain these disparate results from prior studies, the researchers noted that it may be possible that the nature of the mood-dream content relationship is subject-specific, and may be difficult to detect in a between-subjects design.

1.9. Dream problem solving: A mechanism for mood change

Kramer and his colleagues have hypothesized that a function of dreams is to control the emotional surge that occurs during REM sleep and thereby allow the dreamer to have an uninterrupted night's sleep (Kramer, 1993). They further argue that dreams across a night are thematically consistent (Kramer et. al., 1964), and that the degree to which the dreamer is able to contain the emotional surge may be related to the efficacy with which they problem-solve during the dream (Kramer, 1993).

More clearly, Kramer states that people dream about emotional events that they are preoccupied with during the day. He further argues that there are two principal patterns of this dreaming that are discernable across the night, the Progressive-Sequential Dream Pattern and the Repetitive-Traumatic Dream Pattern. The Progressive-Sequential

pattern of dreaming occurs when an emotional problem is presented in one dream and worked through in subsequent dreams that evening so that the "emotional surge" is discharged through problem solving. Alternatively, the Repetitive-Traumatic pattern of dreaming occurs when a problem is presented and is thematically evident throughout the night, but no progress or solutions occur during the evening's dreams.

Kramer (1993) concludes that dreaming may serve both an assimilative and accommodative function. The mood regulating function of dreaming typifies the assimilative function of dreams where the hypothesized emotional surge is contained, mood is less intense and variable, dream recall does not occur, and the sleep of the individual is not disturbed (Kramer, 1993). According to this theory, a successful night's dreaming would occur about 60% of the time (where night to morning mood decreases) and would be a result of the subject participating in progressive-sequential problem solving within the evening's dreams. Furthermore, in conjunction with the studies involving the mood-dream content correlations, Kramer also suggests that a successful night's dreaming would be typified by having dreams in a progressive-sequential pattern, with a large number of appropriate characters. This would then lead to tension reduction of the emotional surge and consequently, a decrease in Depression scores for the dreamer.

As well as this assimilative function, Kramer then argues that dreams that are recalled may serve an accommodative function, as these dreams could enter conscious awareness and then be used to increase our self-awareness and lead to subsequent insight and change in our waking thoughts and behaviors (Kramer, 1993; Rossi, 1986).

1.10. An alternate interpretation of problem solving in dreams

Kramer (1993) asserts that the hypothesized problem solving function of dreams whereby dreaming "better enables the individual to deal with a situation or thought in waking life" (p. 182), may be measured by examining changes in mood from evening to morning. Moreover, his research indicates that various facets of mood appear to be associated with sleep, while others - specifically Depression - appear to be related to changes in dream content. In examining dream content, the number of characters in dreams has been found to be associated with Depression levels (Kramer & Roth, 1973, 1980), but these results have not been supported using alternative methodologies (Rosa, Kramer, Bonnet & Thomas, 1981).

Given the consistency of results demonstrating changes in mood, and the fact that waking mood is associated with performance (Rosa et al., 1981; Johnson et al., 1990) and mental health (Beck & Ward, 1961; Cartwright, 1986, 1992), it seems fair to suggest that mood may reflect a degree of adaptation during dreams concerning issues of one's daily life. However, given Kramer's contrasting results relating changes in Depression to the number of characters in the dream (Kramer & Roth, 1973, 1980; Rosa, Kramer, Bonnet & Thomas, 1981), it may be useful to consider whether an alternate approach may help to explain the consistent changes in evening to morning mood.

In conjunction with past research, once Kramer and his colleagues observed that sleep variables alone could not account for the changes in the Depression, Aggression and Friendliness mood scales, they attempted to determine if changes in these facets of mood could be explained by differences in dream content. This methodology produced mixed

results (Kramer & Roth, 1973, 1980; Rosa, Kramer, Bonnet & Thomas, 1981). Kramer (1993) implicitly suggests that changes in **dream process** may influence mood.

Specifically, he also states that problem solving in dreams and positive changes in mood are related to: 1) the subject having a progressive-sequential series of dreams and, 2) the subject having the appropriate number and type of characters to deal with the emotional surge. The latter factor is a dream content variable however, the subject having dreams in a pattern where the presenting issue is dealt with in either a progressive-sequential or repetitive-traumatic fashion is clearly a difference in the **process of how the dream is dreamt**.

Thus, in accordance with one of the main tenets of this paper, Kramer's work may be interpreted as suggesting that it is the combination of dream content and process which may influence changes from evening to waking mood. The present research was designed to examine this relationship by examining the intentionality of the dream ego within the dream milieu. Therefore, it was hypothesized that if the dream ego was: 1) expressive and efficacious, 2) central and involved, and 3) active; or generally the dream ego's intentionality is productive, then we would expect that adaptation would occur and more positive mood would result.

To generate further support from Kramer's work, it is clear that in a prototypical progressive-sequential dream, the dream ego would demonstrate intentionality through being efficacious regarding the presenting issue as well as being central within the dream. Alternatively, the definition of a repetitive-traumatic dream is one where no progress is made with the presenting issue and hence the thematic problem is simply re-stated with no

resolution. By definition, this would indicate that the dream ego was not demonstrating dream intentionality to deal with the issues, thus it would be expected that adaptation would be limited and mood would not improve.

This interpretation of Kramer's results may serve as an addendum to his summation as opposed to a contrasting viewpoint. Furthermore, this examination of dream process fits in neatly with Purcell and the Carleton group's work (Purcell, 1987; Purcell et al., 1986, 1993), indicating that there are a variety of levels of dream intentionality and self-reflectiveness. Kramer's results indicate that process is related to mood change, but the degree of engagement of the dream ego is not addressed.

1.11. Mood change relating to self-regulation within the dream

A review of other research will follow to answer a number of key questions. Previously, it has been shown that self-regulatory functions during dreaming vary from person to person across dreams (Kahan, 1994; Purcell 1987; Purcell et al., 1986; Purcell et al., 1993). Further, it has been demonstrated that the capacities of our dream intentionality or self-reflectiveness can be increased through the use of meta-cognitive strategies, and to a lesser degree increased attention to dreaming. Finally, it has been demonstrated that these changes in dreaming can last for a lengthy period of time (Doyle, 1984).

With this information, the question that needs to be asked is: Do differences in the degree of dream self-regulatory functions - specifically dream control or intentionality relate to any important changes in waking functioning? Besides realizing that there are different degrees of intentionality in a dream, is this relevant in any real sense? To

answer if dream intentionality or self-reflectiveness relate to problem solving, it would have to be demonstrated that "there is a definite relationship between the dream experience and a measurable increase in the capacity of the individual to deal successfully with {a presenting} problem" (Cohen, 1979, p. 256). While no studies as of yet have directly tested this hypothesis, Purcell (1987) and a number of related studies involving nightmare therapy may provide some insight into this issue.

As previously described, Purcell (1987) divided subjects into Baseline, Attention Control and Schema conditions. Each group was to record their dreams throughout the experimental period. The Baseline group received no experimental manipulation. The Attention group met with the experimenter weekly to discuss various aspects of dreaming unrelated to the study. The Schema subjects discussed aspects of dreaming involving dream control and lucidity and were asked to learn cognitive schemata where they would question the state that they were presently in each time that they noticed a bracelet on their wrist. They were also to assert that they could ask similar questions while they were dreaming.

Purcell (1987) had subjects complete a post-test questionnaire to assess whether the different experimental conditions contributed to transfer effects from dreaming to waking. While the group manipulations did not attain statistical significance a sub-group of the schema condition, those subjects who had at least one lucid dream during the experiment, did demonstrate sleep to waking transfer effects. Post-test questions indicated that the lucid group found dreams to be more interesting, had more dream recall and less instances of their dreams producing waking confusion regarding an issue than

their non-lucid counterparts. Therefore, these results suggest that differences in dreaming self-regulatory processes are associated with waking changes in subjects.

A similar conclusion may be drawn from the nightmare literature. Neidhardt, Krakow, Kellner, and Pathak (1992) performed a study with twenty subjects who had lived with chronic nightmares for an average of 17.2 years. Subjects were randomly divided into two groups and asked to write down their nightmares for a period of one month. After the baseline period, all subjects were asked to hand in their written collection of nightmares.

The Recording group did not receive any further interventions after the one-month period. The Rehearsal group however, received a single group treatment session where an imagery rehearsal technique designed to help reduce nightmares was taught. Following learning imagery techniques with pleasant images, the subjects were instructed to perform a number of steps to reduce their nightmares. This procedure involved: 1) having subjects select a recent nightmare and write it down, 2) consciously changing the nightmare in any way they wished (no instructions were given on how to change it), 3) writing the nightmare down in its changed version, and 4) rehearsing the changed version with imagery. The subjects were told to practice at home once a day for three consecutive days using the imagery of the changed nightmare. If after three days the subjects had a new nightmare, the subjects were to again perform the above steps with the new nightmare for three days. This process was to continue as long as needed.

After three months, follow-up questionnaires including the Symptoms Checklist and Symptom Questionnaire were completed by all subjects. The results indicated that

nightmare frequency declined significantly in both groups in the three-month period. The Rehearsal group declined from 7.2 nightmares per month to 2.0 per month (72% reduction) and the Recording group declined from 9.4 per month to 5.0 per month (47% reduction). No significant group differences were found in nightmare frequency. Furthermore, anxiety, depression, somatization, hostility and total distress scores decreased significantly in the Rehearsal group. The authors concluded that their intervention was successful in reducing nightmares in both groups. In examining the methods used by subjects to change their nightmares, they found that some subjects changed only the ending, some changed the beginning, while others adjusted their nightmares to be triumphant successes.

Within the context of the present study, it may be that the intervention of imagery and changing the nightmare script may have had an effect on the amount of self-regulating features the dream ego exercised within the dream milieu. Within the wake-sleep-wake paradigm, making conscious changes to the nightmare during waking appears to have had an effect on the subsequent dreams.

A similar study was performed by Halliday involving a single subject (1982). This subject was living with recurrent nightmares after being involved in a traumatic farm accident. The subject claimed to have a recurrent nightmare about the accident. The intervention involved having a therapist talk to the subject about how it was possible to alter a nightmare while it was occurring. The therapist told of past clients who had similar nightmares, but learned to change them by focusing on making very small, emotionally-insignificant changes to the scene. Further, it was suggested that people often do not

believe it is possible to alter a nightmare because individuals attempt to change too much at one time.

The subject then attempted this method by selecting an insignificant detail (the colour of the work-shed) to change while awake. At follow-up 10 days later, the subject revealed that the nightmare no longer occurred and that the entire nightmare had faded when he changed the shed colour during his dream. He further noted that when he realized he could change the colour of the shed he realized he was dreaming and could alter the dream.

A final study by Brylowski (1990) reveals a treatment for reducing nightmares by teaching the subject to lucid dream. This subject was recruited initially through the psychiatric emergency room claiming to be depressed and suicidal. Diagnostic tests did not validate this claim but the subject had been involved in a number of unstable relationships and was complaining of consistent distressing nightmares (1 to 4 per week).

In one nightmare the subject revealed that she was trapped in a closet with someone approaching. She tried to escape but could not because the door was locked. She woke up terrorized and in a panic. When the therapist asked why she did not pull out a dream key and open the door, or why she did not fly away the subject was fascinated by the possibilities and agreed to participate in a lucid dream therapy program.

The program consisted of having the subject keep a dream/nightmare journal which she would bring to therapy each week. In addition she was to practice the Mnemonic Induction of Lucid Dreaming (MILD) technique (LaBerge, 1985) where each night before falling asleep she was to repeat that "the next time I'm dreaming I want to

remember to realize that I am dreaming". Also, she was encouraged to modify the MILD to include regularly occurring traumatic dream cues that might surface in her dreams. Finally, the dreams and nightmares would be discussed in therapy session in the context to how they related to issues in her life.

After 16 weeks of therapy the author concluded that the therapy helped to reduce nightmare frequency and distress as well as helping to enhance ego growth and personal development (Brylowski, 1990). Of further interest was Brylowski's observation that his subject's new found ability to control her dream ego began to extend into her waking life as well. Thus, her awareness of behavioral options and the confidence to act on her ideas began to improve. Furthermore, her ability to control her emotional reactions and attempt productive responses to highly charged dream events provided an example for the therapist to access in reinforcing her coping abilities during wakefulness.

Taken together the above mentioned nightmare studies demonstrate subjective improvements in evening to morning mood, by decreasing distress associated with nightmares. Of central importance, however, is that the techniques used to reduce nightmares may be viewed as waking strategies to help increase dream self-regulatory features of dream control or dream self-reflectiveness. Thus, by increasing the intentionality or degree of reflectiveness exhibited by the dream ego these subjects were able to have more pleasant dreams and wake up in a more positive mood. Therefore, to extend Kramer's (1993) view of problem solving within dreams, it seems that waking interventions influenced self-regulating features exhibited by the dream ego and the process of dreaming from traumatic-repetitive to progressive-sequential through the

intervention of the dream ego.

The present study was designed to see if the hypothesized relationship between dream intentionality, changes in evening to morning mood and adaptation may be demonstrated by attempting to increase dream intentionality within normal subjects (as opposed to subjects who have frequent nightmares) and correlating dream control scores with changes in mood from Evening to Morning in subjects.

CHAPTER 2: Hypotheses

Theoretical and empirical literature support the prediction of the main effect of treatment condition on the degree of dream intentionality (DC) demonstrated in subjects' dream reports.

Hypothesis 1:

It is expected that as attention to dream processes and behavioral options increase, scores on dream control will also increase. Significant group differences are predicted such that the mean dream control score for the Dream Intentionality Schema (Sc) group is predicted to be the highest, followed by the Attention (A) group and the Baseline (B) condition.

Hypothesis 2:

It is expected that certain aspects of mood will decrease in mean intensity from evening to morning. Decreases in mean intensity are predicted between evening and morning mood scores across all subjects on the Friendliness, Aggression, Depression,

Sleepiness, Clear Thinking and Jittery sub-scales.

Hypothesis 3:

It is predicted that changes in mood from evening to morning in the mood scale of Depression will be negatively correlated with the subjects' Dream Control scores on a nightly basis. It is further predicted that a negative correlation between DC and change in Friendliness and Aggression will be found. Clear thinking, Sleepiness and Jittery scores were not predicted to be related to Dream Control scores.

CHAPTER 3: Methods

3.1. Participants

Ninety-two (92) subjects from the undergraduate Psychology 100 class indicated a willingness and interest in participating in a home dream diary study. Subjects were recruited in the middle of the Winter term (late February) based on their self-reported ability to recall between 2-5 dreams per week on a consistent basis. From this larger pool of subjects, 12 were excluded based on their self-reported nightmare frequency (weekly), and eight subjects were not included due to low reported dream recall. The remaining subjects ($n = 72$) were contacted and the available subjects were admitted to the study. These 60 subjects were randomly assigned to the three treatment conditions (20 in each group) for course credit based on their completion of the posted sign-up sheets and sleep habits questionnaire. Of the 60 subjects who began the study, 39 subjects' data were considered usable (13 in each group). Due to incomplete data sets over the 3-week experimental period (greater than 7 of 21 days data missing), 21 subjects' data were

removed. Group attrition rates were identical in each Treatment Condition and were unrelated to the Gender of the subjects. Of the 39 usable subjects, their mean age was 21.1 years, with subjects ranging from 18-39 years. Overall, there were 23 Female and 16 Male subjects who were evenly dispersed within the three treatment conditions: Schema group (6 Males, 7 Females), Attention group (5 Males, 8 Females) and Baseline group (5 Males, 6 Females). One-way analysis of variance indicated that the three Treatment Conditions did not differ significantly in the age of the subjects [$F(2,36) = .28, p = .75$].

3.2. Materials

The Clyde Mood Scale, the Dream Control Scale, the Report Skills Questionnaire and the Behavioral Options Questionnaire were utilized within this study (See Appendices for all instruments). **The Clyde Mood Scale** (Clyde, 1963) was designed to measure human emotions and behavior which are influenced by certain experimental conditions. The scale consists of 48 adjectives which subjects rate their current feeling congruence with ranging from "not at all" to "extremely" like the listed adjective, on a 4-point scale. Through factor analysis the adjectives are divided into six sub-scales which are internally reliable, but largely independent of one another. The sub-scales clusters are described as Friendliness, Aggression, Clear Thinking, Sleepiness, Depression, and Jittery. Consistent inter-rater reliability of this instrument by various professionals in a clinic setting has been demonstrated between raters ranging from intraclass correlations as low as $ICC = .37$ to maximal relations of $ICC = .91$. The average ICC across mood for the four sets of raters was found to be $ICC = .65$. As the participants were the only raters of mood in this study, reliability was non-problematic. This instrument has also been demonstrated to be a valid

instrument for measuring the effect of stress on human emotion and behavior. Results from past studies have indicated that the Clyde is a valid instrument for distinguishing between different experimental or clinical groups relative to controls based on mood changes (Clyde, 1963).

The **Dream Control (Intentionality) Scale** was designed by Purcell (1987) to measure the ordinal process along which dream control progresses. This 9-point scale ranges in the degree of demonstrated dream control from instances where the dreamer has no role in the dream, progresses to instances where the dreamer has a minimal to well developed role, and increases to the point where the dreamer's role is well developed with increasing effectiveness which at the top of the continuum progresses to control in and control over the dream itself (lucid awareness). This scale encapsulates the theoretical component of volitional control including his/her centrality, emotional expressiveness, behavioral autonomy and assertiveness, degree of intentional choices and his/her effectiveness and degree of mastery within the dream. Past research by Purcell (1987) has demonstrated that dream control ratings were distributed in a normative fashion, and that dream control can be increased by having subjects pay more attention to their dreams and by teaching subjects to be aware of their ability to exercise behavioural options within a dream. The Dream Control scoring protocol has demonstrated adequate inter-rater reliability. In Purcell (1987) exact agreement between judges was found to occur 51.5% of the time. Pearson correlations revealed high inter-rater reliability at $r = .72$.

The **Reports Skills Questionnaire** is an instrument designed to remind subjects about detailed dream reporting as well as helping them to remain attentive to their dreams.

The Questionnaire contains questions involving details of the dream such as the presence of talking, colour, speech or emotion. This instrument appears on the reverse side of each dream log form for the Attention Control group and was completed for each recorded dream for subjects within this group.

The **Behavioural Options Questionnaire** is an instrument designed to focus subjects on areas in their dream where they could have acted in a different fashion. These areas involve aspects of dream competency stressing the centrality, emotional expressiveness, effort and success/failure of the dream ego within the dream. This instrument requests with an open question format that subjects indicate to what extent they perceived that they were central, expressive, or effortful in their dreams. Subjects are then asked to identify where they may have acted differently and to postulate how acting differently in these areas may have influenced the dream outcome (or not have influenced the dream outcome). Subjects in the Dream Intentionality Schema Group had this instrument on the back of each of their dream log forms and were instructed to complete it for each dream that they recalled.

3.3. Procedure

Subjects were selected and randomly assigned into one of the three treatment conditions based on their self-rated recall of dreams with respect to frequency (from 2-5 per week) and consistency. The Treatment Condition groups were as follows:

1. Baseline (B)
2. Detailed Dreaming Attention Group (A)

3. Dream Intentionality Schema Group (Sc)

Each group met separately with the experimenter to receive their instructions regarding the study. At the initial session all subjects received:

1. Dream Log forms - to record each of their dreams on.
2. Clyde Mood Scale Forms
3. Written Group-Specific Instructions

In addition to the above, the Schema and Attention conditions received the following:

1. Dream Questionnaires - On the back of the Dream Log forms for these groups were the Report Skills Questionnaire for the Attention group, and the Behavioral Options Questionnaire for the Dream Intentionality Schema Group.

It was explained to all subjects that every night immediately before going to sleep they were to complete the mood scale form marked "Evening". The next morning they were instructed that they should complete the "Morning" mood scale immediately upon waking up. In addition, subjects were asked to record any dreams that they recalled having during the night and if multiple dreams occurred, to identify which dream occurred earlier in the evening and which dream closer to the morning.

In addition to the above instruction, further instructions were provided to each of the three groups.

3.3.1. Group specific instructions were as follows: (See Appendices for specific treatment conditions for each treatment condition each week).

Baseline (B): This group met with the experimenter weekly to answer any pressing questions and to drop off their dream logs and mood records. This group was to serve as a baseline to the other groups as these subjects did not receive any experimental interventions aside from completing the dream log forms and the Mood Scale Questionnaires.

Detailed Reporting Attention (A): Subjects in this group met with the experimenter for one forty-five minute session per week, for three weeks, as well as dropping off their dream reports following the third week. The purpose of these sessions was to broadly discuss dreams, as well as seeking to focus subjects on the fine points of recording details of their dreams and to increase the group's knowledge of selected aspects of dreaming. Unrelated theories of dreaming (to this study) such as dreaming as memory consolidation or as a time of "unlearning" were discussed. This group was designed to serve as a control condition relative to the Dream Intentionality Schema group, as both groups receiving identical "experimenter time", but only the Schema group received specific interventions designed to increase dream intentionality.

Dream Intentionality Schema Group (Sc): Over a period of three weeks, subjects in this group were asked to meet with the experimenter once a week for one forty five minute session. The purpose of these sessions were to teach the participants strategies that were designed to increase the participants' dream ego competency (Dream Control) within their dreams. To do this, subjects in this group had their questions answered regarding dream reporting, as well as being taught about how to attend to their dreams in such a fashion that they would be more aware of behavioral options within dreams.

Subjects were also asked to wear a leather bracelet while waking and to practice asking themselves a set of questions regarding the choices they had made in the last twenty minutes and to consider what other choices that they *could* have made, and to recognize that different choices may results in different outcomes. Finally, the subjects were encouraged to assert to themselves that these same type of behavioural options/choices are available to them in their dreams, and that different choices in their dreams may also result in different outcomes. Subjects met with the experimenter on a weekly basis and during these meetings subjects submitted their completed Clyde mood scales, dream logs and their Behavioral Options Questionnaire.

The Behavioral Options Questionnaire (see Appendices) consists of questions regarding dream ego competence. Thus, subjects were asked to respond to what degree they were central to the dream, expressive of their feelings, effortful and efficacious. As well, they were instructed to identify instances in their dreams where they could have made choices to be more competent (within these categories) and to describe how these different choices **may** have influenced the dream outcome

3.3.2. Scoring of dream reports protocol

A training set of 100 unusable (due to group attrition) dreams was used to train three judges on how to accurately assess the construct of Dream Control (Purcell, 1987) in subjects' dreams. The experimenter and one other judge were considered the primary scorers, with the third judge, following initial training, remaining available in the case of a dream being considered unresolvable following initial scoring and follow up discussions between the two primary judges.

The dreams collected during the experimental period were coded blindly by the third judge to remove any possible identifiers which would indicate group membership. Subsequently, all dreams were randomly divided into 3 equal blocks and scored on the 9-point dream control scale by the two primary judges. After scoring each "block" of dreams (127 dreams) the judges met to submit their ratings and to discuss the dreams which were not rated identically, in order to resolve the discrepant scores. Raters met in order to provide the judges with feedback relating to their consistency, and to prevent the emergence of any personal scoring bias which may have occurred in the absence of this type of feedback. Dreams were scored according to the protocol outlined in Purcell (1987) as found in Appendix E.

3.4. Statistical analyses

Descriptive statistics were performed on dependent variables (DC, Word Count, Dream Recall and Evening and Morning mood scores) for each of the independent variables of interest [Treatment Condition, Gender and Exposure time (Weeks)].

Repeated-measures analyses of variance were used to identify differences or interactions in the dependent variables attributable to the independent variables.

Repeated-measures analyses of variance were performed on extraneous variables, (Word Count and Dream Recall) in order to determine if these variables differed in relation to the independent variables. Pearson correlations were performed between DC and the extraneous variables, and if a significant relation was evident, covariate analyses were performed when appropriate.

Repeated-measures analyses of variance were performed in examining mood change from Evening to Morning for each IV. In order to determine if a relation was evident between DC scores and mood change, residual change scores were calculated to remove the variance in Morning mood which was accounted for by knowing the initial Evening mood (as Evening and Morning are highly correlated). The residual change scores (with Evening effects removed) were then correlated with both mean DC scores pooled across Weeks, and on a daily basis. Statistical corrections (*eg.* Greenhouse-Geiser, Bonferonni) were used when appropriate to adjust for the probability of Type 1 error.

CHAPTER 4: Results

4.1. Scoring Reliability

Inter-rater reliability was considered satisfactory on the 9-point dream control scale. Overall of the 383 usable dreams collected, 258 reached the scoring criteria of exact agreement during the initial evaluation (67.4%).

Dreams were scored in three equal blocks. In round 1, exact agreement was reached by the two judges in 79/127 (62.2%) cases. In round 2 and 3 respectively, exact agreement was reached in 87/127 (68.5%) and 88/129 (68.2%) respectively.

Dreams in which scoring discrepancies were noted were discussed following each of the three scoring blocks, and discrepancies were resolved. The scoring protocol included the provision that any dream which was not resolvable by discussion between the two primary judges would be scored by a third judge, and if this score was consistent with one of the other judges, this score would be accepted. However, the remaining 30.8% of dreams were successfully resolved without the necessity to utilize the third judge.

Intraclass correlations coefficients (ICC; Bartko & Carpenter, 1976) and Pearson product moment correlations were calculated for each of the three scoring blocks. Overall inter-rater reliability was satisfactory on the 9-point dream control scale at $ICC = .98$, ($p = .0001$); and $r = .73$ ($p = .0001$). Inter-rater reliability was found to be consistent across the 3 scoring blocks as $ICC = .95$, $.95$, and $.92$ ($p = .0001$), for Blocks 1 through 3 respectively. Pearson correlations values also indicated satisfactory consistency with $r = .74$; $.77$; and $.68$ ($p = .0001$) for Blocks 1 through 3 respectively.

4.2. Scale properties

Consistent with past research (Purcell, 1987), the normality of the dream control distribution was noted. The grand mean pooled across condition for Dream Control was 4.76 ($SD = .58$) on the 9-point Dream Control scale. The pictorial depiction of the distribution of Dream Control indicates that the majority of Dreams within this study were scored between 3 and 7 (93%) on the 9-point scale (see Figure 1).

Moreover, the distribution of Dream Control scores within the three conditions indicated that the subjects within the control conditions (Attention and Baseline) had over 52.7% (145/275) of their dreams scored as 4 or less on the Dream Control scale, with 43% (119/275) of total dreams being scored as 4/9 in Dream Control. In contrast subjects in the Schema condition had 32% (35/108) of their total dreams scored as 4 or less on the 9-point Dream Control scale and only 27.8% (30/108) of dreams scored as 4/9 on the Dream Control scale. Reciprocally, in examining the distribution within the various Treatment Conditions as it relates to high Dream Control scores (6 or higher), it was found that 34.3% of the Schema groups' dreams were scored as 6 or higher, while only 20% of the Control Conditions dreams (Attention and Baseline) reached a minimum Dream Control score of 6 (see Figure 2).

Figure 1. illustrates the Dream Control distribution for the all subjects regardless of Treatment Condition. The distribution illustrates that the modal value on the 9-point scale was 4, with the overall mean Dream Control rating being 4.76.

Figure 2. illustrates the Dream Control distribution for the 3 Treatment Conditions. The distributions demonstrate that the Schema condition (mean DC = 5.2) has higher Dream Control mean values, and more instances of very high Dream Control relative to the Attention (mean DC = 4.45) and Baseline Conditions (mean DC = 4.6).

4.3. Examination of extraneous variables

4.3.1. Relation between word count and dream control

It was hypothesized that as Word Count has been related to a number of dreaming variables in past research (Antrobus, 1982, Purcell, 1987), it may be correlated with the

Figure 1. Distribution of dreams (%) across Dream Control scale categories (n = 383)

Figure 2. Distribution of dreams (%) across Dream Control scale categories for each Treatment Condition

construct of Dream Control. As this variable was not of specific interest in the present study, any significant differences in Word Count among the Treatment Conditions, or other variables of interest (Gender) would necessitate the use of statistical procedures (covariate analyses) to control for any significant differences in this variable.

In order to determine if Word Count was significantly related to Dream Control, a Pearson product moment correlation was performed correlating Mean Dream Control with Mean Word Count scores. The correlation ($r = .42$) was found to be highly significant [$F(1,37) = 7.99, p = .008$]. Thus, it was found that dreams with higher Word Counts had a greater probability of having higher dream control scores.

Therefore, as Word Count was significantly related to Dream Control, the necessity to control for the effect of initial differences in Word Count among the independent variables of interest (Treatment, Gender, Weeks) was investigated.

4.3.2. Word count by treatment

Prior to assessing the possible extent of the relationship between Dream Control and Treatment Condition (Schema, Attention, Baseline), analyses were performed on the Word Count variable (number of words used to describe the events of each recorded dream) in order to determine if the three Treatment Conditions differed significantly in the number of words used to record dreams.

Results of the repeated measures ANOVA examining Word Count Means across Treatments and Weeks (3) revealed that no main effect was found attributable to Treatment Conditions [$F(2,33) = .34, p = .72$]. Thus, although the overall Word Count

means across Weeks for the three Treatment Conditions were different with the Schema condition reporting an average of 91 words per dream while the Attention condition reported 80, and the Baseline group 83, these differences did not attain statistical significance.

Moreover, no differences were found in examining the Treatment x Week interaction, [$F(4,66) = .47, p = .76$]. Therefore, weekly Word Count means were not differentially effected based on the Treatment Conditions which the subjects were in.

4.3.3. Word Count by gender and weeks

As analyses examining the relationship between Gender and Dream Control were to be performed, initial analyses to determine if Word Count scores were significantly different between Male and Female subjects were examined.

Results from a repeated measures analysis of variance, indicated that Males (mean = 87.2) and Females (mean = 85.6) did not differ significantly in Mean Word Count [$F(1,30) = .45, p = .51$]. The Gender x Week interaction was also non-significant [$F(3,90) = 1.11, p = .35$]. Individual post-hoc t-tests examining possible Gender differences in each of the three weeks (Male and Female Word Count Means at Week 1, 2 and 3), and overall were all found to be non-significant. Therefore, no difference in Word Count were found to be related to the Gender of the participants.

In order to determine if Word Count varied in relation to the Weeks of the experimental period, results from the repeated measures analysis (Word Count Weeks x Treatment Condition x Gender) were examined. The results indicated that a significant main effect for Weeks on Word Count was present [$F(2,66) = 6.4, p = .003$].

In order to determine the nature of this difference in Word Count scores across Weeks, post-hoc paired samples t-tests were performed to allow pairwise comparisons across Weeks (Week 1 mean = 96.2, Week 2 mean = 84.3, Week 3 mean = 72.8). The results indicated that Week 1 Word Count means were significantly greater than Week 2 [$t(1,36) = 2.25, p = .03$], and Week 3 means [$t(1,36) = 3.37, p = .002$]. There was a trend evident for higher Word Count means for Week 2 than Week 3 scores [$t(1,35) = 1.86, p = .07$].

As stated above, despite the linear decrease in Word Count as the experimental period progressed, no interactions were found relating to Treatment or Gender. Thus, the decrease in Word Count over Weeks is best conceived as a main effect of time, unrelated to Gender or Treatment Condition.

As no initial or overall differences in Word Count were found with the exception of the significant decrease in Word Count scores over Weeks, statistical control procedures were not necessary to control for initial differences relating to Treatment Conditions, Gender or any interactions (as none were present). However, as Word Count was found to be significantly correlated with Dream Control, Word Count was subsequently used as a covariate when possible, in order to reduce unaccounted for variance in the error term, thereby providing more concise analyses of the relationships being examined.

4.3.4. Dream Recall across independent variables

Past research (Purcell, 1987) has identified that dream recall may be related to Dream Control. Specifically, Purcell (1987) found that individuals pre-selected as High

Dream Recallers, had significantly higher Dream Control scores than individuals pre-selected into the Low Dream Recall group. Purcell also found that *actual* dream recall rates within the experimental period were related to Dream Control with subjects who demonstrated high recall rates, as assessed by the number of dreams reported, having higher dream control scores than subjects who demonstrated lower recall rates.

Within the present study subjects were not pre-assigned to Treatment Conditions based on self-reported dream recall rates. In order to determine if *actual* recall rates differed between Treatment Conditions or Gender, a repeated measures Weekly Dream Recall by Treatment Condition by Gender analysis was performed.

Results indicated that the main effect for Treatment Condition on Dream Recall (mean number of reported dreams for Schema = 8.3, Attention = 10.9, Baseline = 10.2) approached but did not reach significance [$F(2,33) = 2.7, p = .083$]. The Treatment x Gender interaction, however, was highly significant [$F(2,33) = 5.4, p = .009$].

In order to examine what simple main effects were contributing to the Treatment x Gender interaction, a one way ANOVA was performed examining Dream Recall x Treatment Condition with Male subjects. The ANOVA revealed that significant differences in dream recall rates were present among Treatment Conditions [$F(2,15) = 4.42, p = .03$]. Multiple comparisons revealed that the mean number of Recalled Dreams for Males within the Attention condition was significantly greater for the subjects within the Schema condition ($p = .03$), while no significant differences were found between the Schema and Baseline conditions ($p = .11$) or between the Attention and Baseline conditions ($p = .82$).

In order to further confirm where the simple main effects for the Treatment x Gender interaction occurred, a subsequent one-way ANOVA was performed examining if there were Treatment Condition differences in Dream Recall when examining only Female subjects. The results indicated that no significant differences were present [$F(2,20) = 1.4, p = .27$]. Multiple comparisons were also found to be non-significant, (Schema versus Attention, $p = .89$, Schema versus Baseline, $p = .52$, Attention versus Baseline, $p = .26$).

Therefore, the Gender x Group interaction in Dream Recall, relates to the significant differences in overall Dream Recall for Males subjects when comparing Recall rates for subjects in the Attention (mean dream recall = 13.8 over study) versus Schema condition (mean dream recall = 6.5 over study). Female subjects did not demonstrate differential dream recall across Treatment Conditions.

Dream recall across Weeks was found to differ significantly as the experimental period continued. Overall, average recall rates were 4.44 dreams in Week 1, 2.98 dreams in Week 2, and 2.5 dreams in Week 3. Paired sample t-test indicated that subjects recalled significantly fewer dreams on average in Week 2 than Week 1 [$t(1,38) = 4.44, p = .001$]. Significantly fewer dreams were recalled in Week 3 when compared with Week 1 values (4.44 versus 2.98, $t(1,38) = 6.46, p = .001$). Although the decrease in Recalled Dreams across Weeks continued from Week 2 to Week 3 (2.98 versus 2.50), this difference did not attain statistical significance [$t(1,38) = 1.73, p = .09$], although a trend was evident.

The Week x Gender interaction approached significance [$F(2,66) = 2.96, p = .06$];

as did the Week x Treatment Condition interaction [$F(4,66) = 2.34, p = .064$]. The three way interaction of Week x Treatment x Gender was found not to be significant [$F(4,66) = .70, p = .60$]. No significant main effect on Dream Recall rates relating to Gender (Males mean = 9.3, Female mean = 10.2) was found, [$t(1,37) = -.737, p = .47$].

4.3.5. The relation of dream control and dream recall rates

In order to determine if the noted differences in the variables of Treatment Condition (which approached significance), as well as the various interactions noted, were of relevance to subsequent analyses examining differences in Dream Control, a Pearson product moment correlation analysis was performed examining Overall Dream Recall rates and mean Dream Control scores for subjects, in order to determine if Dream Recall was an important predictor of Dream Control.

Results indicated that Dream Recall *did not* significantly correlate with Dream Control scores [$r = .138, F(1,37) = .72, p = .40$]. Therefore, although Dream Recall rates did vary considerably across Treatment Conditions, and Weeks, differences in Dream Recall were not found to be related to the variable of interest, Dream Control. As such, statistical procedures designed to partition out variance in Dream Control which could possibly be accounted for by knowing Dream Recall rates were not appropriate to be performed, as Dream Recall did not significantly add to the proportion of variance accounted for in mean Dream Control.

4.4. Tests of Hypotheses

As theoretical and empirical literature support the prediction of a main effect of Treatment Condition (Schema, Attention Control, Baseline) on the degree of Dream

Control/Intentionality demonstrated in subjects' dream reports, analysis of variance procedures were performed in order to identify if there was evidence of a main effect for Treatment Condition. It was predicted that Dream Control would differ across Treatment Condition (Schema, Attention Control and Baseline) such that subjects in the Schema condition would demonstrate significantly higher mean Dream Control than subjects in the Attention Control or Baseline conditions.

As Word Count has been found to be related to DC, the mean Word Count variable was used as a covariate, when applicable, in order to remove its effect from the error term of analyses examining the relation of Dream Control to Treatment Condition and Gender. This would improve the accuracy of the regression analysis by accounting for a greater proportion of variance.

4.4.1. Hypothesis one: Treatment effects on dream control

Results indicated that there was a significant main effect for Treatment Condition [$F(2,35) = 4.77, p = .04$]. As predicted the Schema group (mean = 5.16, SD = .60) had the highest mean Dream Control, followed by the Baseline (mean = 4.67, SD = .52) and Attention Control (mean = 4.45, SD = .27) conditions. In order to determine if the Treatment Conditions differed significantly as expected, post-hoc Tukey HSD analyses were performed. Results indicated that the Schema condition had significantly higher Dream Control than the Attention condition ($p = .002$), and the Baseline Condition ($p = .034$). No significant differences were found between the Attention and Baseline conditions, ($p = .47$).

Table 1. presents the Means and Standard Deviations of Dream Control, Word Count and Dream Recall for the individual Treatment Conditions and Gender variables.

Figure 3. shows the mean Dream Control scores for each of the Treatment Conditions pooled across Weeks and Gender. As noted, Schema subjects have significantly higher mean Dream Control scores than the Attention or Baseline Conditions.

4.4.1.1. Dream control over exposure time (Weeks)

As subjects' attentional and motivation diligence may have varied across the experimental period (as demonstrated by decreases in Word Count and Dream Recall rates as the study continued), a repeated measures ANOVA was performed examining differences in mean Dream Control across the three experimental weeks (Group x Weeks repeated measures). Results indicated that there was no significant differences in Dream Control across Weeks [$F(2,66) = .33, p = .72$].

As subjects within the Schema condition began receiving waking entrainment designed to increase their awareness of the possibility of exercising volitional control while dreaming on Day 1 of the study, it was anticipated that Dream Control scores within this condition may have continued to increased with the passage of time, while it was anticipated that the other two conditions would maintain stable levels of Dream Control (with some variability in Dream Control relating to increases in Attention to dreaming). Thus, it was anticipated that a Treatment by Weeks interactions may be evident.

However, as demonstrated within the repeated measures Treatment x Weeks ANOVA, the Treatment x Week interaction did not attain significance [$F(4,66) = 1.1, p = .36$].

Table 1.

Means and Standard Deviations for Dependent Measures
Across Treatments Conditions for Hypothesis 1

Variable	Gender	Schema	Attention	Baseline	Mean
DC	Male	5.40 (.65)	4.56 (.26)	4.80 (.52)	5.00 (.63)
	Female	4.96 (.50)	4.43 (.28)	4.58 (.53)	4.60 (.49)
	Total	5.17 (.60)	4.48 (.27)	4.67 (.52)	4.76 (.58)
Word Count	Male	79.40 (27.6)	70.40 (29.2)	92.4 (28.2)	80.70 (27.8)
	Female	100.80 (22.4)	87.10 (35.8)	76.8 (43.4)	87.10 (35.6)
	Total	91.10 (26.1)	80.20 (32.9)	82.8 (37.7)	84.40 (32.3)
Dream Recall	Male	6.5 (2.1)	13.8 (6.1)	8.0 (3.8)	9.8 (5.1)
	Female	9.8 (1.3)	9.1 (2.4)	11.6 (4.4)	10.2 (3.1)
	Total	8.3 (2.4)	10.9 (4.6)	10.2 (3.1)	10.0 (4.0)

Figure 4. depicts the Mean Dream Control scores of each of the three Treatment Condition throughout the three week experimental period. The results support the identified main effect for Treatment Conditions as the Schema group has greater across Weeks Dream Control. Although the Schema Dream Control values are at their lowest value in Week 2, when the Attention and Baseline values are at their highest, the interaction is not significant.

Figure 3. Mean Dream Control Score and standard deviation for each Treatment Condition

Figure 4. Weekly means on Dream Control for each Treatment Condition

4.4.1.2. Relation of dream control to gender and weeks

The effect of Gender on mean Dream Control was assessed within the Group x Gender ANOVA with Word Count used as a covariate. Results indicated that Males (mean = 5.00, SD = .63) had higher Dream Control than Females (mean = 4.6, SD = .49) and that this difference was significant [$F(1,32) = 5.94, p=.02$]. This finding was consistent with Purcell's (1987) results. The Group x Gender interaction did not attain significance [$F(2,32), = 1.16, p=.33$].

Figure 5 presents the mean Dream Control for Males and Females in each of the three Treatment Conditions. It is evident that Dream Control differences are present across both Treatments and Gender, but no interaction is present.

Although the repeated measures analysis of Group x Weeks was non-significant, a Gender x Weeks repeated measures ANOVA was performed to determine if an interaction was present. Results indicated that the interaction did not attain significance [$F(2,60) = .76, p = .47$].

In order to further examine potential differences in Dream Control between Genders over Weeks, individual independent samples t-tests were performed on overall Dream Control means, and on the Weekly means. Analyses revealed that in Week 1 Males (mean = 5.1, SD = .60) had significantly higher Dream Control than Females [mean = 4.6, SD = .49], $t(1,36) = 2.7, p = .01$. However, while in Weeks 2 and 3 Males (Week 2 mean = 5.0, SD = .66; Week 3 mean = 4.8, SD = 1.12) continued to have higher mean Dream Control scores than Females (Week 2 mean = 4.7, SD = .67, Week 3 mean = 4.6, SD = .63), the mean differences did not attain significance in either Week 2,

Figure 5. Mean Dream Control and standard deviation for male and female subjects in each Treatment Condition

[$t(1,36) = 1.48$, $p = .15$], or Week 3, [$t(1,36) = .56$, $p = .58$].

While the Gender x Weeks interaction was not significant, it would appear that the differences between Males and Females are largely present in Week 1, with differences diminishing to non-significant levels as the study progressed.

4.4.2. Hypothesis 2

It was predicted that the mean mood intensity would decrease from Evening to Morning in each of the six mood subscales.

4.4.2.1. Examination of initial differences (Week 1) in mood scores for treatment conditions and gender

As it was hypothesized that mood across the six subscales would decrease on average, from Evening to Morning regardless of Treatment Condition or Gender effects, initial one-way ANOVAs were performed on each of the Week 1 Evening mood scores for the Aggression, Clear Thinking, Depression, Friendliness, Jittery and Sleepiness mood variables in order to determine if any *initial* differences were found relating to Treatment Condition [Treatment Condition x mean mood score (6)].

Results from the series of one-way ANOVAs provided evidence that no significant differences were noted in the Evening Scores of the six mood scales among the three Treatment Conditions. Thus, random assignment to the three treatment conditions was successful as no initial significant group differences were noted. Taken together, while some variability was evident in the Week 1 Evening scores, no significant main effects for Treatment Condition which would be expected to impact on subsequent analyses were found. Comparable analysis to the above were performed in an effort to determine if

Week 1 Evening mood scores varied in relation to the Gender of the participants. A series of six independent samples t-tests were performed examining possible differences in Evening mood scores which were attributable to the Gender of the participants. Results indicated that although Male subjects' Sleepiness values as of Week 1 were higher than Female subjects', that this difference did not attain significance [$t(1,37) = -1.87, p = .07$]. All other possible Gender comparisons across mood variables were also found to be non-significant.

4.4.2.2. Analysis of mood change from evening to morning

As past research (Kramer, 1993) had provided evidence for the relationship that mood, on average, decreases in mean intensity from Evening to Morning, a series of repeated measures analyses of variance were performed. The purpose of these analyses were to determine if Evening and Morning mood differed from one another; to determine the magnitude and direction of this mood change if present, as well as to examine if the variables of Treatment Condition and Gender were found to be related to change in mood over Time (from Evening to Morning).

It was hypothesized that mood would decrease in each of the six mood subsets from Evening to Morning, and that the differences in these values across Time (Evening mood mean compared with Morning mood mean) may be significant depending on the magnitude of the mood change. This hypothesis was examined through the completion of a series of Treatment Condition x Gender x Time (change in Evening to Morning Mood) repeated measures analyses. The relative effect of Time (change in mean mood scores from Evening to Morning across Weeks), Treatment Conditions and Gender are examined

in turn.

4.4.2.3. Mood change over time

In congruence with past research, four of the six mood scales demonstrated a decrease in mean mood intensity on average from Evening to Morning (see **Table 2.**). Specifically the mood scale of Aggression [$F(1,33) = 2.6, p = .12$], Depression [$F(1,33) = 1.7, p = .20$], Sleepiness [$F(1,33) = 2.8, p = .10$], and Friendliness [$F(1,33) = 8.0, p = .008$] all demonstrated decreases in mean mood intensity from Evening to Morning, although only the Friendliness scale attained a significant decrease.

Contrary to the predicted hypothesis, the mood scales for Clear Thinking [$F(1,37) = 29.3, p = .001$], and Jittery [$F(1,33) = 6.3, p = .01$] attained statistical significance, but not in the predicted direction. Thus, the results indicated that subjects rated themselves as significantly more Clear Thinking and Jittery following a night's sleep over the experimental period.

Figure 6. Demonstrates the mean Evening and Morning scores and standard deviations for each of the six Mood Scales regardless of Treatment Condition, Gender or Weeks in the study. As illustrated, a reduction in mean intensity from Evening to Morning is noted in the Aggression, Depression, Sleepiness and Friendliness scales, although only the change in Friendliness from Evening to Morning attained significance. Jittery and Clear Thinking scores demonstrated significant increases in mood intensity from Evening to Morning.

Figure 6. Mean Evening and Morning scores and standard deviation on six mood subscales

4.4.2.4. Mood change by treatment condition

No a priori hypotheses concerning possible main effects of Treatment Conditions on change in mood from Evening to Morning were generated. However, implicitly, as an objective of the present study was to enhance Dream Control in subjects in the Schema Condition, and it has been hypothesized that Dream Control may be related to changes in mood, it was deemed reasonable to determine if Treatment Condition differences in terms of main effects or interactions were present. It was hypothesized that if Treatment effects were present, that these effects would be related to the Schema condition, which presumably would demonstrate higher Dream Control.

Results indicated that the main effect for Treatment Condition or interaction between Treatment Condition and Time (Evening to Morning mood change) did not attain or approach significance for any of the Mood scales with the exception of a main effect for Treatment Condition in the Depression category which exhibited a trend [$F(2,33) = 3.1, p=.058$]. Analyses of effect sizes revealed a large effect between the Schema and Baseline means (mean difference = 4.67, effect size = 0.72), moderate effects between the Attention and Baseline groups (mean difference = 3.7, effect size = 0.57) and a small effect between the Schema and Attention condition (mean difference = 1.0, effect size = .15).

As large and moderate effects were noted, post-hoc multiple comparisons utilizing the Tukey HSD analysis were performed which revealed that significant group differences between the Schema and Baseline condition were noted in Mean Evening Depression scores ($p = .04$), whereby the Baseline group had significantly lower Depression scores than the Schema condition. The Schema and Attention conditions did not differ significantly from one another ($p = .85$), nor did the Attention and Baseline conditions ($p = .13$).

The trend towards Schema having the highest Evening Depression scores followed by Attention and Baseline continued in the Morning Depression scores, but the Treatment Condition differences were not significantly different from one another (Schema versus Baseline, $p = .13$, Schema versus Attention, $p = .92$, Attention versus Baseline, $p = .25$)

All other effects including the Treatment Condition x Time, Treatment Condition x Gender, and the Treatment Condition x Gender x Time interaction were found to be non-significant for each of the six mood scales.

Therefore, taken together despite different waking entrainment being provided to the three Treatment Conditions, no relation between change in mean Evening to Morning mood was found to be significant (as no significant Treatment x Time interactions were noted). The only significant finding involved a borderline Treatment difference found within the Depression scale, in which the Schema subjects had significantly higher mean Evening Depression scores than the Baseline Condition. As no interactions of Treatment x Time were found, it would appear that the changes in different aspects of mood are largely unrelated to the group-specific interventions utilized within this study.

4.4.2.5. Mood change by gender

Despite past research by Kramer (1993) which has repeatedly demonstrated that mood and mood change is unrelated to the Gender of the participants, possible Gender main effects and interactions were assessed through the Treatment Condition x Gender x Time (Mean Evening and Morning mood) repeated measures analysis of variance. While no a priori hypotheses were made, based on past research no Gender effects were predicted.

As predicted, no significant Gender main effects or interactions (Gender x Group, Gender x Time, Gender x Group x Time) were found to approach or attain significance with the exception of the Sleepiness scale. Post-hoc analyses revealed that the mean Evening Male Sleepiness score regardless of group (mean = 57.6, SD = 5.0) was less than the average Sleepiness score for Female subjects (mean = 60.7, SD = 7.9), but that this difference did not reach significance, [$t(1,37) = -1.37$, $p = .17$]. However, while the mean Morning Sleepiness scale again demonstrated that Males (mean = 54.2, SD = 7.0) reported themselves as having lower Sleepiness scores than Females (mean = 60.0, SD = 7.2), this difference did attain significance [$t(1,37) = -2.5$, $p = .01$].

Therefore, despite a Gender difference in the average reported degree of Sleepiness on the Clyde Mood scale for Males and Females with Morning Sleepiness, Gender was not otherwise found to be related to Mood Change or to relate to any interactional affects. Based on the examination of Treatment, Gender and mood change over Time, it is evident that the changes in mood are not attributable to waking entrainment, or gender differences, but instead the pattern of changes in mood occur in a systematic fashion regardless of these variables.

Table 2. shows the means and standard deviations of evening and morning mood scores for Aggression, Clear Thinking and Depression for each Treatment Condition and Gender.

Table 3. shows the means and standard deviations of evening and morning scores for Friendliness, Jittery and Sleepiness for each Treatment Condition and Gender.

4.4.3. Hypothesis 3: Examination of mood change and dream control

It was predicted that a significant correlation would be found between the variable

Table 2. Evening and Morning Means and Standard Deviations for Aggression, Clear Thinking and Depression Scales by Treatment Condition and Gender

Mood		Schema		Attention		Baseline		Mean	
		P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.
Aggression									
	Male	46.2 (3.7)	46.3 (3.2)	47.7 (6.9)	45.3 (4.2)	42.0 (2.6)	42.4 (2.6)	45.3 (5.0)	44.8 (3.6)
	Female	46.7 (5.3)	46.0 (5.1)	46.6 (5.1)	45.5 (4.9)	45.6 (7.7)	45.2 (7.4)	46.3 (5.9)	45.6 (5.7)
	Mean	46.5 (4.5)	46.2 (4.2)	47.0 (5.6)	45.4 (4.5)	44.2 (6.3)	44.1 (6.0)	45.9 (5.5)	45.2 (7.4)
Clr. Thinking									
	Male	40.9 (3.0)	43.0 (5.0)	39.8 (8.7)	44.5 (11.7)	37.6 (4.5)	41.5 (7.2)	39.6 (5.5)	43.0 (7.8)
	Female	43.5 (4.5)	44.6 (3.9)	40.1 (4.4)	43.2 (5.7)	40.1 (6.0)	42.3 (6.5)	41.1 (5.1)	43.2 (5.4)
	Mean	42.3 (3.9)	43.9 (4.4)	40.0 (6.0)	43.7 (8.1)	39.2 (5.4)	41.9 (6.5)	40.5 (5.2)	43.2 (6.4)
Depression									
	Male	41.0 (3.2)	39.8 (5.1)	41.2 (8.4)	40.0 (7.9)	35.0 (2.8)	36.1 (3.5)	39.2 (5.7)	38.7 (5.7)
	Female	40.4 (4.6)	39.9 (5.1)	38.7 (4.2)	38.6 (4.8)	36.7 (4.0)	35.7 (4.2)	38.5 (4.3)	38.0 (4.8)
	Mean	40.7 (3.9)	39.8 (4.9)	39.7 (6.0)	39.1 (5.9)	36.0 (3.5)	35.8 (3.8)	38.8 (4.9)	38.3 (5.1)

Table 3. Evening and Morning Means and Standard Deviations for Friendliness,
Jittery and Sleepy Scales by Treatment Condition and Gender

Schema		Attention		Baseline		Mean			
		P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.
Friendliness	Male	41.5 (5.9)	41.8 (7.8)	40.1 (8.5)	37.2 (3.8)	41.2 (6.0)	39.5 (5.8)	41.0 (6.4)	39.6 (6.1)
	Female	43.1 (5.8)	40.5 (7.6)	44.9 (8.9)	41.9 (9.4)	39.6 (10.5)	39.1 (10.8)	42.5 (8.6)	40.5 (9.1)
	Mean	42.4 (5.7)	41.1 (7.4)	43.0 (8.7)	40.9 (7.9)	40.2 (8.8)	39.3 (8.9)	41.9 (7.7)	40.1 (7.9)
Jittery	Male	48.1 (2.8)	49.1 (4.3)	49.5 (5.0)	52.6 (6.9)	51.1 (5.0)	50.8 (4.5)	49.5 (4.2)	50.7 (5.1)
	Female	46.1 (1.3)	47.8 (2.4)	51.6 (7.8)	52.1 (8.5)	47.3 (3.0)	48.6 (3.9)	48.5 (5.4)	49.6 (5.8)
	Mean	47.0 (2.3)	48.4 (3.3)	50.8 (6.7)	52.3 (7.6)	48.8 (4.2)	49.5 (4.1)	48.9 (4.9)	50.0 (5.5)
Sleepiness	Male	55.3 (4.0)	52.2 (10.5)	59.2 (7.1)	56.8 (4.5)	58.8 (5.0)	54.1 (2.9)	57.6 (5.0)	54.2 (7.0)
	Female	62.3 (7.4)	63.3 (8.0)	59.6 (7.2)	60.5 (6.4)	60.5 (9.6)	56.7 (6.7)	60.7 (7.9)	60.0 (7.2)
	Mean	59.0 (6.9)	58.1 (10.5)	59.5 (6.9)	59.1 (5.8)	59.8 (7.6)	55.7 (7.60)	59.4 (7.0)	57.7 (7.6)

of Dream Control and the residual change in mood from Evening to Morning within the Depression mood scale. It was further predicted that significant correlations between Dream Control and residual change from Evening to Morning in the Aggression and Friendliness mood subscales would be found.

4.4.3.1. Relation of evening to morning mood

As the hypothesis being examined was designed to determine if changes in Evening to Morning mean Mood Scores (pooled across Weeks), could, in part, be explained by differences in subjects' Dream Control, paired sample correlations were performed comparing mean Evening mood to mean Morning Mood for each of the six mood scales.

As past research (Kramer, 1993) has indicated that mean Evening and mean Morning scales are highly correlated with one another, paired samples correlations were performed in order to determine the magnitude of this relationship within the present study.

Consistent with past findings, the results of the correlational analysis indicated that Mean Evening mood of each of the six mood subscales, was a very strong predictor of Mean Morning mood scores in the corresponding scale. Specifically, as demonstrated in **Table 4.**, the correlations between Mean Evening and Mean Morning mood scores ranged from .850 to .894 for the Aggression, Clear Thinking, Depression, Friendliness and Jittery subscores (all significant at $p=.0001$), while a lower, but still strong Evening to Morning correlation was evident for Evening and Morning Sleepiness scores ($p=.001$).

Table 4. Paired Samples Correlations and Significance Levels for Mean Evening and Mean Morning Mood for each of the Mood Subscales

	Correlation Coefficient	Significance Level	N
Aggression	.894	.0001	39
Clear Thinking	.870	.0001	39
Depression	.888	.0001	39
Friendliness	.886	.0001	39
Jittery	.850	.0001	39
Sleepiness	.520	.001	39

4.4.3.2. Statistical removal of initial values for mood

As the hypothesis of interest to the present study was to determine if differences in Dream Control, may, in part, be related to changes in mood scores from Evening to Morning, it was deemed necessary to statistically control for the high proportion of variance accounted for in each of the Mean Morning Mood scores by knowing the initial Evening Mood values (Benjamin, 1963).

Thus, by removing the proportion of variance in Morning Mood which was attributable to Evening Mood, the possible influence of other factors on change in mood could then be examined. In order to remove the effects of Initial Evening Values, the best linear regression correlation between Mean Evening and Mean Morning Mood scores was determined for each of the six mood scales. Once the predicted values for the Morning

mood were determined in relation to the particular Evening mood Mean, the predicted values were saved (Y').

Residual change scores for each of the Mean Mood scales were calculated by subtracting the predicted scores for Mean Morning Mood from the actual Mean Morning Mood scores (Y) for each of the 6 mood scales. By calculating the residual change score, any relation between the residual change scores, and other variables (specifically Dream Control scores as hypothesized) could then be considered independent of the influence of the Initial Evening Scores (ie. correlation between residual change score and Evening mood score = 0).

The residual change scores (Mean Morning Mood (Y)-Predicted Morning Score (Y')) for each of the 6 mood scales were plotted in order to determine if the residual change scores were distributed in a normal fashion. As all subscales were found to be normally distributed, it was not deemed necessary to standardize these scores.

4.4.3.3. Dream control and residual change scores

In order to determine if changes in Evening to Morning mood (pooled across Weeks) in each of the mood scales, which was not related to Initial Evening mood values, were related to the mean amount of volitional control (Dream Control) exercised by the dreamer during the experimental period, Pearson product moment correlations were performed between mean Dream Control and mean Residual Change scores for each mood scale.

In contrast to Hypothesis 3, as outlined in **Table 5**, no significant correlations were noted between Mean Dream Control and the Residual Change scores in any of the

six mood scales. Thus, the systematic decrease in mood does not appear to be related to the average Dream Control demonstrated by subjects over the experimental period. It is of interest however that, as predicted, the highest correlations were between Mean Dream Control and the Depression scale ($r = .20$), which, although not approaching significance, provided some suggestion that a relationship might exist between Dream Control and the process by which Depression scores change from Evening to Morning.

In examining the data within Table 5 as it relates to Hypothesis 3, the fact that no significant relationship was found between Mean Dream Control (regardless of Treatment Condition, Gender or Weeks) and Residual Change Scores for each Mood scale, was not totally unanticipated. Although, the finding that Mood scales when examined over time typically decrease in mean intensity (Kramer, 1993) was supported on four of six mood scales, this omnibus examination of Mood change does not examine the considerable variability in mood change in each mood scale which occurs on a daily basis. Past research has indicated that within-subject changes in mood from evening to morning on a given day are much more variable than these changes are when averaged over time (Kramer, 1993).

Moreover, the data presented in Table 5 is essentially an examination of the degree to which a subject's average Dream Control, correlates with a general pattern of mood change. Thus, it was anticipated that the sensitivity of daily Dream Control changes to differences in Evening to Morning mood on the morning in which the Dream occurred may yield a different picture.

Table 5. Correlational and Significance Levels of Mean Dream Control and the Mean Residual Scores for each of the 6 Mood Scales

	Correlation	t value	significance
Mean Residual Aggression by Mean Dream Control	$r = .15$	0.90	$p = .37$
Mean Residual ClearThinking by Mean Dream Control	$r = .11$	-0.69	$p = .49$
Mean Residual Depression by Mean Dream Control	$r = .20$	-1.20	$p = .23$
Mean Residual Friendliness by Mean Dream Control	$r = .02$	0.09	$p = .93$
Mean Residual Jittery by Mean Dream Control	$r = .034$	-0.22	$p = .83$
Mean Residual Sleepiness by Mean Dream Control	$r = .08$	-0.46	$p = .65$

4.4.3.4. Examination of daily mood changes and dream control

In order to remove the initial influence of Evening Mood Scores on Morning Mood Scores, residual change scores were calculated on a daily basis for each of the mood scales (6), for each of the 21-day experimental period. Thus, the Evening Mood score for the given day was regressed on the Morning Mood score for the same day. Subsequently, the predicted Morning score was subtracted from the actual Morning mood value resulting in the residual change scores for each mood subset (6), for each of the days of the experimental period (21).

Residual change scores, which reflected the change in daily mood (from evening to morning) which was not attributable to initial evening mood scores were then correlated with the daily Dream Control values. In order to reduce the probability of making a Type 1 error due to repeated correlations (21 correlations per mood scale, 126 correlations overall) Bonferroni corrections were implemented whereby the alpha level for each correlation was set at $\alpha = .002$ (whereby the alpha level of $p = .05$ was divided by the number of correlations (21) performed within each mood scale).

The correlation coefficients, t values and significance levels for each of the mood scales are presented in **Tables 6 - 11**.

Table 6. Daily correlations between Dream Control and Residual Mood Change for Aggression

<u>Aggression</u>	correlation coefficient	t value	significance level	number of values
Day 1	.04	0.20	.84	30
Day 2	.05	0.20	.83	23
Day 3	.05	0.23	.81	27
Day 4	.07	0.34	.74	21
Day 5	.08	0.33	.75	18
Day 6	.13	-0.63	.53	25
Day 7	.33	1.40	.17	19
Day 8	.11	0.55	.59	25
Day 9	.32	1.40	.12	15
Day 10	.35	1.30	.21	15
Day 11	.07	0.27	.79	17
Day 12	.333	1.30	.23	15
Day 13	.34	-1.20	.23	14
Day 14	.18	-0.65	.52	16
Day 15	.31	-1.24	.24	15
Day 16	.520	2.10	.06	13
Day 17	.06	-0.23	.82	16
Day 18	.52	2.40	.03	16
Day 19	.31	1.10	.31	12
Day 20	.05	-0.70	.86	11
Day 21	1.10	0.34	.34	9

Table 7. Daily correlations between Dream Control and Residual Mood Change for Clear Thinking

<u>Clear Thinking</u>	correlation coefficient	t value	significance level	number of values
Day 1	.03	0.14	.89	30
Day 2	.21	0.98	.34	23
Day 3	.19	-0.98	.34	27
Day 4	.14	-0.60	.55	21
Day 5	.03	-0.13	.89	18
Day 6	.07	0.34	.73	25
Day 7	.26	1.12	.26	19
Day 8	.02	0.11	.92	25
Day 9	.12	0.43	.67	15
Day 10	.37	-1.40	.16	15
Day 11	.003	0.01	.99	17
Day 12	.07	0.26	.80	15
Day 13	.07	-0.24	.80	14
Day 14	.02	0.08	.93	16
Day 15	.07	-0.28	.79	15
Day 16	.44	1.70	.11	13
Day 17	.07	-0.27	.79	16
Day 18	.29	1.20	.26	16
Day 19	.13	0.45	.66	12
Day 20	.34	-1.20	.27	11
Day 21	.01	0.02	.98	9

Table 8. Daily correlations between Dream Control and Residual Mood Change for Depression

<u>Depression</u>	correlation coefficient	t value	significance level	number of values
Day 1	.06	-0.35	.73	30
Day 2	.20	-0.89	.39	23
Day 3	.31	-1.60	.12	27
Day 4	.14	-0.62	.54	21
Day 5	.38	-1.60	.13	18
Day 6	.27	1.30	.20	25
Day 7	.10	0.45	.66	19
Day 8	.29	1.47	.15	25
Day 9	.06	-0.21	.83	15
Day 10	.03	-0.12	.91	15
Day 11	.50	-2.30	.03	17
Day 12	.17	-0.60	.56	15
Day 13	.24	-0.84	.41	14
Day 14	.27	1.10	.31	16
Day 15	.32	-1.30	.23	15
Day 16	.32	1.20	.27	13
Day 17	.29	1.20	.26	16
Day 18	.08	0.32	.75	16
Day 19	.26	-0.89	.39	12
Day 20	.05	-0.15	.89	11
Day 21	.06	0.16	.88	9

Table 9. Daily correlations between Dream Control and Residual Mood Change for Friendliness

<u>Friendliness</u>	correlation coefficient	t value	significance level	number of values
Day 1	.05	0.29	.78	30
Day 2	.18	-0.82	.42	23
Day 3	.37	2.00	.05	27
Day 4	.27	-1.20	.24	21
Day 5	.31	1.20	.23	18
Day 6	.38	1.97	.06	25
Day 7	.08	-0.32	.75	19
Day 8	.38	1.98	.06	25
Day 9	.11	-0.40	.69	15
Day 10	.46	1.89	.08	15
Day 11	.21	-0.61	.55	17
Day 12	.197	0.88	.39	15
Day 13	.17	-0.60	.56	14
Day 14	.32	-1.20	.23	16
Day 15	.50	-2.10	.05	15
Day 16	.27	-.096	.36	13
Day 17	.02	-0.07	.94	16
Day 18	.24	0.97	.36	13
Day 19	.42	1.50	.15	12
Day 20	.17	-0.54	.60	11
Day 21	.25	0.74	.48	9

Table 10. Daily correlations between Dream Control and Residual Mood Change for Jittery

<u>Jittery</u>	correlation coefficient	t value	significance level	number of values
Day 1	.09	-0.51	.61	30
Day 2	.04	0.18	.86	23
Day 3	.08	-0.42	.68	27
Day 4	.24	1.10	.29	21
Day 5	.22	-0.87	.39	18
Day 6	.04	-0.18	.86	25
Day 7	.19	-0.80	.44	19
Day 8	.09	0.43	.67	25
Day 9	.03	0.10	.93	15
Day 10	.09	-0.01	.97	15
Day 11	.21	0.84	.41	17
Day 12	.20	-0.70	.50	15
Day 13	.37	-1.40	.19	14
Day 14	.10	0.37	.71	16
Day 15	.21	-0.81	.43	15
Day 16	.16	-.056	.59	13
Day 17	.18	-0.70	.50	16
Day 18	.06	0.25	.81	13
Day 19	.33	-1.20	.27	12
Day 20	.21	-0.67	.52	11
Day 21	.10	0.27	.79	9

Table 11. Daily correlations between Dream Control and Residual Mood Change for Sleepiness

<u>Sleepiness</u>	correlation coefficient	t value	significance level	number of values
Day 1	.20	-1.10	.28	30
Day 2	.20	0.89	.38	23
Day 3	.06	-0.33	.75	27
Day 4	.09	-0.41	.69	21
Day 5	.37	-1.50	.14	18
Day 6	.12	-0.60	.56	25
Day 7	.31	1.30	.20	19
Day 8	.07	0.33	.75	25
Day 9	.13	0.49	.64	15
Day 10	.17	0.60	.56	15
Day 11	.03	0.12	.90	17
Day 12	.04	-0.13	.90	15
Day 13	.17	0.60	.56	14
Day 14	.14	0.50	.63	16
Day 15	.19	.074	.47	15
Day 16	.29	-1.00	.32	13
Day 17	.17	-0.65	.53	16
Day 18	.55	-2.60	.02	16
Day 19	.22	-0.75	.47	12
Day 20	.26	-0.85	.41	11
Day 21	.38	1.16	.28	9

Although with the Bonferonni corrections of the alpha level to protect against the possibility of Type 1 errors, no daily DC by residual mood score correlation reached significance at the .002 level, the strength of the correlation coefficients were found to be higher than the correlation of Mean Dream Control versus Mean Residual Mood change scores. At the alpha less than .06 level, the following number of correlations attained or showed a trend towards significance over the 21-days.

Aggression = 2/21

Clear Thinking = 0/21

Depression = 1/21

Friendly = 4/21

Jittery = 0/21

Sleepy = 1/21

Furthermore, the mean correlation coefficient across the 21 days for each mood scale was calculated and compared with the correlation coefficients from the mean Residual Change versus mean Dream Control values. The results indicated that daily Dream Control scores appear to be more related to change in mood from Evening to Morning than the mean residual mood change scores across Weeks (see **Table 12**). Moreover, although no significant daily DC to residual mood correlations were found to be significant following the Bonferroni procedure, the correlation coefficients, and unadjusted significance levels provide some evidence that changes in Friendliness may relate to the degree of DC exercised by the subject during the evening's dreams. As the data in Table 12 implies that daily analysis of mood change may be more sensitive to

dreaming variables, descriptive statistics were performed to determine the frequency and direction that mood changes on a daily basis. To do this the percentage of instances where mood decreased from Evening to Morning were calculated. A similar pattern to that found in Table 12 emerged whereby the mood scales which demonstrated the greatest magnitude of change, were also noted to differ in a predictable fashion from pre-sleep to post-sleep. Specifically, the Friendliness subscale was found to decrease from Evening to Morning 60.7% of the time followed by the Sleepiness scale, 58.0%, Depression, 51.7%, Aggression, 50.5%, Jittery, 40.7% and Clear Thinking 35.9%.

Table 12. Mean daily correlation coefficients of each of the 6 Mood Scales versus the correlation coefficients between Mean Dream Control and Mean Residual Mood.

Mood Scales	Mean of Daily Correlation Coefficients examining Dream Control and Residual Mood Change	Correlation Coefficients Examining Mean Dream Control versus Mean Residual Change Scores
Aggression	.21	.15
Clear Thinking	.14	.11
Depression	.21	.20
Friendly	.26	.02
Jittery	.15	.03
Sleepy	.20	.08

CHAPTER 5: Discussion

Much of the past research examining potential dream functions has focused on a possible adaptive purpose to dreaming (French & Fromm, 1964; Koulack, 1993).

Research examining this hypothesized adaptive function has largely consisted of evaluating subjects' initial affective response to a stressful situation before sleeping, and re-evaluating the subjects' mood the following morning. Differences in mood change are then examined and related to dream content variables identified from the subjects' dreams from the prior sleeping interval (Cohen & Cox, 1975; Koulack, Prevost, & De Koninck, 1985). Studies utilizing this methodology have provided equivocal results to date. Cohen and Cox (1975) reported that subjects who incorporated elements of the negative pre-sleep experience into their dreams were more likely to demonstrate a positive increase in mood, presumably due to adaptation, than subjects who were not found to have incorporated the pre-sleep experience. The latter subjects' mood was often found to remain unchanged from Evening to Morning. However, using a comparable methodology Koulack, Prevost, and De Koninck (1985) found that subjects who showed increases in anxiety from evening to morning were more likely to have reported incorporations of the pre-sleep stressor in their dreams than those who demonstrated improvements in mood.

Thus, these studies have failed to provide consistent support that it is more functional (with respect to improving mood) to dream about stressful issues or not to dream about stressful issues. Despite inconsistent empirical research, clinical dream work continues to be utilized as a tool for self growth, problem solving, and as a method for accessing the "royal road to the unconscious" (Cartwright, 1989; Freud, 1900; Rossi,

1986).

In an effort to better understand the variability in dreams in terms of the degree to which the dreamer is cognitively aware or involved, more recent research has provided support that dreaming differs not only in nightly dream content, but also in the degree of self-regulation or executive functioning which the dream ego engages in within the dream milieu (Kahan, 1994; Purcell, 1987). Potential functions of dreaming are thus now being re-examined in light of these differences.

Purcell (1987) and others have demonstrated that dreaming, or more accurately the dream ego's involvement in the dream, should be considered within a continuum, whereby the degree to which the dream ego exercises self-reflectiveness or volitional control may range considerably. Recent research has focused on examining whether differences in the degree of nightly dream control exercised by the dream ego may relate to variations in daytime affect or other waking variables. As aspects of mood have been found to systematically differ from evening to morning (Kramer, 1993), and a number of mood scale changes appear to be related to subjects' dreams (Kramer & Roth, 1980), it was hypothesized that changes in Evening to Morning mood may be related to the degree of volitional control exercised by the dreamer the previous night.

Conceptual models designed to explicate consciousness and information transfer across the now anachronistic sleep-wake "boundary" will be discussed. Changes in mood from Evening to Morning will be examined in the context of the rationale that information, and indeed strategies to enhance self-regulation, are transferable from waking to sleeping, and from sleeping to waking. Finally, the pattern and variability in mood will be examined

in relation to differences in the degree to which the dream ego exercises control within the dream milieu. The implications of the results from the present study, and future directions will then be presented.

5.1. Self-regulation during dreaming

Despite research into lucid dreaming dating back to Green's (1968) work, much of the subsequent empirical research and dream theory have continued to work within the deficiency paradigm, whereby dreams are defined by how they are different from, and deficient relative to waking cognition (Rechtschaffen, 1978). The thrust of such research suggests that dreaming is typified by the "singlemindedness" of the dream ego, as the dreamer "slavishly attends" to the dream situation without reflective awareness, or any significant degree of Dream Control (DC). This view has persisted despite a number of key studies within the lucidity literature which have provided unequivocal support that self-regulatory features of consciousness can be present in a comparable degree during dreaming, as they are during waking self-regulation (Hearne, 1982, LaBerge, 1985). Moreover, others (Darling et al., 1993; Kahan, 1994; Purcell, 1987, Purcell et al., 1986) have provided evidence that variability in the degree of self-regulation is present within dreaming, even in the absence of lucidity, and that the degree to which subjects engage in self-reflection or act upon behavioral options (Dream Control) in an effortful manner are best conceived of as a continuous variable.

The present study provided support for the continuum of Dream Control, whereby it was found that the degree to which dreamers were central, active, effortful, and cognizant of behavioral options varied considerably from dream to dream within and

across dreamers. The results were in partial congruence with Rechtschaffen's (1978) assertion that dreams are typified by "singlemindedness" in that the distribution of dreams in Dream Control across the three Treatment Conditions revealed that 39% of total dreams were scored as 4/9 (the Mode). This modal score defines instances where subjects demonstrate a lack of volitional control or effort, or exercise little involvement to influence dream outcomes. However, the results also indicated that in 29% of dreams, subjects exercised a moderate degree of effort or expressiveness (5/9) in attempting to best respond to demands within the dream. Furthermore, an additional 23% of dreams were reported where the subjects exercised considerable control in their dreams (6+), including many instances where the subjects demonstrated continued or prolonged effortful behavior or creativity, which often resulted in a favourable dream outcome.

As Rechtschaffen's assertions regarding the "singlemindedness" of dreams were based on his view of "typical" dreaming, or dreams which were not affected by experimental manipulations, the modal values of the Baseline and Attention conditions (minimal experimental manipulation) were examined. The group-specific distributions revealed that the modal DC value for each of these conditions was 4/9 occurring in 40.6 % and 45.8% of the total dreams respectively. However, despite the minimal degree of experimental manipulation in these groups, over 50% of the Baseline condition dreams revealed scores compatible with a moderate (5+) degree of DC or greater, of which 20% of these dreams received high (6+) DC ratings. The Attention group had over 44% of dreams scored with a moderate degree of DC (5+), of which 16.9% of these dreams demonstrated high DC (6+). Thus, it was found that despite only a minimal degree of

non-specific experimental manipulation for these groups, a large proportion of their dreams (47%) demonstrated moderate to high degrees of volitional control in responding to dream generated events. This finding is incongruent with Rechtschaffen's assertion that dreaming is typified by singlemindedness.

In considering the hypothesized influence of waking entrainment on DC, as predicted a main effect for Treatment Condition was found indicating that the dreams of subjects in the Schema condition were scored as significantly higher in Dream Control than the dreams of subjects within the Control Conditions (Attention Control and Baseline). The distribution results further revealed that only 27.8% of Schema group dreams were scored as 4/9 on DC, and that the modal value for Schema subjects was 5 (32.4%). Furthermore the DC distribution revealed that 65 % of the Schema condition dreams demonstrated a moderate degree of competency and awareness of behavioral options (5+) or higher, with a sizable proportion of these dreams (33%) demonstrating significant degrees of Dream Control (6+).

In examining the combined DC scores across all three Treatment Conditions it is evident that the scores from the Schema condition resulted in an overall shifting of the total distribution of Dream Control towards higher order dream control. The impact of Treatment Condition on the overall distribution was most evident in examining the higher order instances of Dream Control (7+), whereby the Schema condition reported more than twice the number of instances of very high Dream Control (12 out of 108 total dreams) than that recorded by the combined scores of the Attention and Baseline Conditions (5 out of 275 dreams). Taken together, the DC results of the Control (Attention and Baseline)

conditions support the notion that a high proportion of dreams are typified by singlemindedness or a lack of volitional awareness. However, although these latter groups received only a minimal degree of experimental manipulation, the distribution of dreams revealed that a considerable proportion of reported dreams do demonstrate a moderate to high degree of DC (47% scored as 5+). The degree of exercised DC is further enhanced within the Schema condition where over 66% of dreams were rated as 5+ on the DC scale. Based on the Treatment Condition specific findings and the overall distribution of results across groups which revealed that 52% of reported dreams were scored as demonstrating moderate to high degrees of volitional control (5+), these findings are not consistent with the blanket statements put forward by Rechtschaffen and other deficiency theorists that dreaming can be simply defined as a period of "singlemindedness", to the exclusion of the demonstrated variability of the degree of dream competency which the dream ego may engage in within the dream milieu.

Other possible factors which may have contributed to subjects' overall Dream Control values within this study, may be the very act of recording and paying attention to dreams, relative to individuals who were not in a dream study. While the present methodology was not designed to allow for the comparison of subjects' Dream Control scores relative to a non-involved cohort (an untenable methodological difficulty), it is thus difficult to ascertain if increases in attention to dreaming itself leads to enhanced dream control scores. Past research into dream recall has demonstrated that simple encouragement to recall more dreams (Halliday, 1992), as well as the act of paying more attention and recording remembered dreams (Faraday, 1973), are positively related to the

frequency of dream recall.

While the impact of attention and recording of dreams is not directly testable in the present study, some insight into this issue may be gleaned from Purcell's study 1 (1987) where she found that subjects in her Baseline Condition, who only were required to hand in their dreams following the three weeks of the study with no further instruction or encouragement, had markedly reduced DC scores relative to the other two conditions. In Purcell's study 2 (1987) the methodology was revamped such that Baseline subjects were required to hand in their dreams on a weekly basis, but no further interventions were implemented. With this slight change in demand characteristics, it was found that the expected group differences persisted between the Baseline Condition and the group which received specific cognitive training to enhance DC (Schema group), but the Baseline Condition did not differ significantly in DC from the Attention condition. Thus, it appears that encouragement and increased attention, including such subtle demand characteristics as handing in dreams on a weekly basis, do relate to some increases in Dream Control, in the absence of any experimental intervention designed to specifically influence this factor.

5.1.1. Treatment condition effects on dream control

The present study provided further support that meta-cognitive strategies and information are able to pass through the wake-sleep boundary. This premise is supported by the Schema group having significantly higher Dream Control scores than the Attention or Baseline Conditions, indicating that components which contribute to Dream Control are learnable skills (Purcell, 1987) and that waking entrainment can have a measurable effect on subjects' subsequent dream control and other self-regulatory processes (LaBerge, 1985;

Purcell, 1987). Interestingly, while in past research self-reported Dream Recall rates were found to be related to Dream Control (Purcell, 1987), the present study found no relationship. This finding is of further interest considering that attentional and motivational factors have been found to be related to Dream Recall (Halliday, 1992), as well as it being hypothesized that these factors may contribute to higher Dream Control scores (Purcell, 1987).

In Halliday's (1992) study of Dream Recall, patients at a local community mental health clinic who had not recalled any dreams the previous month were divided into two conditions. In the control condition, once the therapist had ascertained that the patients had not recalled any dreams in the previous month, the therapy session continued without any further mention of dreams. Subjects in the experimental condition by contrast, who also had not reported any dreams in the past month, were given strong encouragement to recall their dreams including being asked to remember dreams for the purpose of therapy, receiving emphasis that dreams can be important, discussing the possible therapeutic uses of dreams, and by providing subjects with personal examples of dream use in a therapy setting. During follow-up all subjects were again asked about their recent dream recall, and to provide an example if recall did occur. Halliday (1992) found that the increased attention, motivation and demand characteristics placed on subjects within the "Encouragement" condition contributed to significantly higher Dream Recall rates at follow-up, than that reported by subjects who were only briefly questioned about their previous months dream recall. These findings were interpreted as providing support that increased motivation and attention to recall dreams by increasing their salience (ie. useful

in therapy) enhances dream recall rates.

It is noteworthy that as higher dream recall appears to be related to increased motivation and attention to recall dreams, these factors have also been hypothesized to have an impact on subjects' Dream Control. Despite the present study's findings it may be that self-reported dream recall rates may continue to be significantly related to Dream Control as an individual difference variable, whereby high recallers typically demonstrate increased "state interdependence" between waking and sleeping (Purcell, 1987), and as such may demonstrate enhanced DC relative to low recallers with less waking and sleeping "state interdependence". However, as the present sample was largely homogeneous in initial self-reported dream recall rates, examining potential differences in the self-reported frequency of recall were not appropriate.

While there was a trend noted towards differences in Dream Recall rates during the study wherein the Schema condition subjects recalled fewer dreams, these subjects continued to have higher Dream Control scores. In examining the most extreme group differences in Dream Recall, that being Dream Recall rates for Male subjects in the Schema (mean = 6.5 dreams recalled) and Attention (mean = 13.8 dreams recalled) conditions, the results demonstrated that despite wide variations in Dream Recall, Male Schema subjects continued to maintain significantly greater DC (mean = 5.4) than those subjects in the Attention group (mean = 4.6). The latter difference in Dream Recall may be suggestive of increased attention or motivation to recall dreams in the Attention group. However, despite possible differences in motivation between the Schema and Attention groups, the Dream Control for Schema subjects continued to be significantly greater than

the Attention group. This finding provided further support that waking training of cognitive skills designed to enhance awareness of behavioral options during dreaming, is possible for a group of subjects with moderate dream recall and a willingness to learn, and that these learned skills function largely independent of attentional and motivational variability.

5.1.2. The impact of exposure time (Weeks) and gender on dream control

Further evidence in support of teaching specific cognitive entrainment strategies to enhance dream control was examined in the context of the pattern of changes in Dream Control scores across Treatment Conditions and Time (Weeks). While no significant differences were noted across Time in Dream Control for any of the three conditions, the graphic depiction of the change in Dream Control for each Treatment Condition across the three-week period did occur in a predicted pattern. It was predicted that Attention and Baseline subjects would have lower mean DC than the Schema condition, and that DC would fluctuate across Time in accordance with the attention and motivation of the participants. Alternatively, it was anticipated that the Schema condition would demonstrate an upward trend in DC, as the waking strategies continued to be consolidated by the participants, and thus the Schema group would be less affected by changes in motivational factors.

Specifically, it was found that the Baseline and Attention group demonstrated some increases in Dream Control between Week 1 and Week 2, but that a decline in Dream Control occurred in Week 3. This trend was explained as being consistent with

subjects' attention and motivation increasing as they entered the second week of the study and began to discuss more aspects of dreaming. The noted decrease in DC from Week 2 to 3 was thought to be related to the reduction in the novelty effect of the study consistent with the passage of time. These findings are largely congruent with those of Purcell (1987).

Alternatively, while the Schema condition had significantly greater DC than the other conditions overall, Week 1 scores were found to be high (significantly different than Attention Control), decreases were noted in Week 2 such that there were no significant differences between the Schema and other conditions, before DC again increased in Week 3. Interestingly, while DC decreased in the control conditions from Week 2 to Week 3, the Schema condition increased to its maximal value, and was found to be significantly greater than both the Attention and Baseline condition. The differential in mean Dream Control scores between the Schema and Control conditions was also greatest during Week 3. However, despite the interesting trends described above, no interactions between Treatment Conditions and Week attained significance. Therefore, although the Attention and Baseline Condition decreased in mean DC from week 2 to Week 3, this difference was not considered to be significant.

Dream Control for subjects in the Schema condition was found to be the highest in Week 3 (mean = 5.3) suggesting that despite the possibility of reduced or variable attention and motivation as the experiment continued (reduced novelty effect), skills learned by the dreamers continued to be of a magnitude which was sufficient to maintain high DC scores. This finding is consistent with Doyle (1984) who found that following

Senoi type dream teachings, measurable dream differences in subjects who received these interventions continued to be present at follow-up six months later.

5.1.3. Gender and dream control

Within the present study, Males (mean = 5.0) across groups, were found to have significantly higher DC than Females (mean = 4.6). No significant interactions were found. Equivocal results with respect to Dream Control differences related to gender have been found in past research. Purcell study 1 (1987) found that Males had significantly higher DC than Females, and in an effort to explain this result suggested that the increased level of aggression and greater dream dominance demonstrated in male dreams may enhance their DC scores (Sheldrake & Cormack, 1974). Brenneis' (1970) examination of Dream Control revealed that females had higher Dream Control, in that women's dreams were less likely to contain events beyond the dreamer's control. However, this difference in dream control within the context of the current study may be artifactual, in that Brenneis scored the actions of the central dream character, which in the case of females was often not the dreamer. In Purcell study 2 (1987), no significant Dream Control differences were found attributable to Gender despite a comparable methodology to study 1.

While Gender differences were noted and no interactions were identified, it appears that these differences may relate to male/female ego style differences (Carlson, 1971) despite the attempt by Purcell (1987) to incorporate aspects typically associated with sex role orientation and ego style differences into the Dream Control scale. Specifically in developing the Dream Control scale which subsumed a number of the ego

style dimensions outlined by Brenneis (1970) including centrality/involvement, effort/exertion and feeling expressiveness/assertiveness it was anticipated that gender differences would be minimized. The DC scale was able to incorporate coping styles typically associated with both genders at comparable levels of Dream Control [ie. increased assertiveness (more common with males) would relate to increased DC, while increased feeling expressiveness (more typically associated with females) would also increase in a concomitant manner with DC scores].

In general, it was found that Males had higher DC than Females regardless of Treatment Condition, and despite efforts to ensure that the DC scale encapsulated possible gender-specific tendencies with respect to coping strategies. In an effort to explain the noted Gender differences in DC it may be that as consciousness is a 24-hour construct, waking Gender differences may transfer into differences in how dreamers respond to the dreaming environment (Purcell, 1987). It may also be that the narrative style of recording dreams, whereby subjects typically attempt to identify what dream events occurred by describing the dream events in terms of who, where, why, what and how the dream ensued, may be more amenable to typical Male dreams demonstrating aggression (e.g. "and then I knocked him down" - high DC). This may contrast with the nuances of increased feeling-expressiveness in women's dreams which may be less obvious in this context. This supposition has not been analyzed with dream control, but Kahan (1994) did provide support that narrative dream reports examining Self-Reflectiveness by independent raters, underestimated the degree of subjects' self-reflectiveness when additional instruments were utilized which asked specific questions designed to ascertain

the level of reflective behaviour during dreams. However, regardless of the exact rationale for the noted gender differences in Dream Control both sexes remain equally available to waking entrainment and the consequent transfer effects of this form of cognitive training on their dreams. In addition, as the experiment continued, the Gender effects decreased from significant differences in Week 1, to non-significant differences in Week 2 and Week 3 suggesting that increased attention, motivation and the experimental manipulations began to remove whatever initial gender differences in DC were present.

5.1.4. Dream control and word count

Results examining Word Count in dreams revealed that this variable was found to be positively related to Dream Control ($r = .42$), in that dreams which were scored as higher in DC were more likely to have a greater number of words than dreams scored as lower in Dream Control. The alternative view, that subjects necessarily record more words in dreams as a result of having exercised greater DC is also feasible. It is noteworthy that following the removal of the impact of Word Count on Dream Control from the regression analysis, it was found that the main effects for Treatment Conditions and Gender continued to be present. Therefore, it would appear that although there is an increased probability that subjects will become aware and act upon behavioral options in dreams which require the subjects to utilize more words, it would appear that the noted main effects on DC for Treatment Conditions and Gender are not explainable based on differences in Word Count across these conditions.

It is of further interest, however, that in past research (Purcell, 1987) as well as the present study, a trend has been identified whereby the number of words utilized by

subjects to record their dreams decreases as the experimental period continues. By way of explanation it is assumed that Word Count may be related, in part, to attentional and motivational factors. Moreover, while no significant Treatment Condition differences in Word Count were found in the present study, greater Word Count scores were found in the Schema condition, followed by the two control conditions (Attention and Baseline). Despite the significant relation between Word Count and Dream Control, results indicated that although Word Count decreased significantly over time, Dream Control did not differ over weeks.

Therefore, while attentional and motivational factors (as demonstrated by differences in Word Count and Dream Recall) may vary and have had some influence on DC, the overall impact of attention and motivation alone would appear to not be as salient or pervasive especially for those subjects receiving waking cognitive entrainment (Schema group). While the decrease in Dream Control from Week 2 and 3 in the Attention and Baseline Conditions may be related, in part, to decreases in Word Count and/or Dream Recall, results indicated that Schema group DC did not show a downward trend, suggesting that the above factors were not significant.

The present results are consistent with past conceptualizations espoused by Purcell, Moffitt and Hoffman (1993) and Rossi (1986) whereby it has been stated that waking entrainment to facilitate dreaming attention and intention increases "state interdependence", thus enhancing an individuals ability to attend to, and act upon behavioral options during dreaming. Extending this notion of state interdependence between waking and dreaming, suggests that there are varying degrees to which "dream

residue", or the impact that dream events may have on waking function may occur.

Nightmare research has outlined that increasing "state interdependence" through recording or re-writing nightmares during waking has resulted in decreased nightmare recall, and consequent decreased waking distress (Neidhardt, Krakow, Kellner, & Pathak, 1992). Similarly, Brylowski (1990) found that upon teaching his subject to engage in lucid dreaming, nightmare frequency decreased, but moreover, these dreaming experiences transferred to waking life and contributed to increased self-esteem, decreased depression and an overall greater sense of personal development and well being. Other research has noted that dreams may contribute to an affective response in subjects (Kramer, 1993), and these waking responses or mood, may contribute to the degree to which subjects can perform certain waking activities (Johnson et al., 1990).

5.2. Mood change from evening to morning

In an effort to determine if dreams have an influence on waking function, the wake-sleep-wake paradigm has often been used in conjunction with scales designed to assess mood (Cohen & Cox, 1975; Koulack, 1992; Kramer, 1993). Kramer and his colleagues have demonstrated that mean mood intensity typically decreases from Evening to Morning when collapsed over days. Therefore, while there is considerable variability within each mood scale as to whether mood on a given day will increase or decrease from Evening to Morning, across time, the mean Morning aspects of mood are typically less intense than mean Evening values (Kramer, 1993). Past studies have provided evidence that some aspects of mood appear to be related to sleep physiology; (Sleepiness, Clear Thinking and Jittery), while other aspects including Friendliness, Aggression and

particularly Depression, appear to be related to dreaming variables (Roth, Kramer & Lutz, 1976).

As Kramer and his colleagues had researched changes in mood from evening to morning and noticed systematic changes, presumably relating to the sleeping interval, it was decided that a study would be performed to see if the demonstrated changes in mood were attributable to the passage of time and not the sleep interval itself. Roth, Kramer and Lutz (1976) had subjects complete Clyde Mood scales at their typical bed time, before having subjects participate in a period of sleep deprivation. Mood scales were re-administered at normal "wake up" times to determine what aspects of mood were affected. The results indicated that Sleepiness increased, Clear Thinking decreased and Jittery increased with the passage of time. The other mood scales did not demonstrate any substantial changes as a result of sleep deprivation. Therefore, it was concluded that the sleeping interval is related to systematic changes in the Sleepiness, Clear Thinking and Jittery mood scales, based on characteristics of sleep physiology and not simply the passage of time.

As it was found that some aspects of mood appear to be affected more by sleep while other mood facets remained relatively unchanged, it was hypothesized that the scales of Depression, Friendliness and Aggression may be related to dreaming variables. To examine this, subjects completed Clyde Mood scales each Evening and Morning and recorded their recollected dreams following REM awakenings. Mood change scores (Evening - Morning) were calculated and correlated with dream content variables. Results indicated that dream content variables were found to be correlated with mood changes

specifically for Depression, Aggression and Friendliness, but not for the other aspects of mood. Taken together these results suggest that mood does change from evening to morning, and that some aspects are related to sleep physiology, while other are related to the psychological process of dreaming (Roth, Kramer & Lutz, 1976) .

The present study found that Evening to Morning mood change averaged across the 21-day period, revealed decreases in four of the six mood scales, specifically the Friendly, Depressed, Aggression and Sleepy scales. Two mood scales demonstrated significant increases in mean intensity from Evening to Morning, namely the Jittery and Clear Thinking scales.

While levels of Friendliness, Depression, Aggression, and Sleepiness all decreased showing consistency with much of the past research (Kramer, 1993), only Friendliness decreased significantly in mean intensity from Evening to Morning. However, as the degree of change in Clyde Mood Scale scores necessary to result in any functional difference has not been ascertained, Kramer's supposition that the sleeping interval serves a function of decreasing (not necessarily significantly) mood intensity and that this mood decrease may have ramifications on waking function through morning mood, or performance factors (Johnson et al., 1990) remains feasible.

As indicated, both the Clear Thinking and Jittery scale were noted to significantly increase in mean intensity from Evening to Morning across the 21 day period. This pattern of results has only been found in one prior study which, interestingly, was also a home dream diary study (Lysaught, Kramer & Roth, 1979) . It may be that the different environment of home versus the sleep lab, may have some subtle effects on subjects'

mood. While home, it is more likely that subjects would receive regular and more restful sleep. Thus, it would be anticipated that subjects would perceive themselves to be more alert following waking up from a restful, presumably uninterrupted night's sleep. By contrast, subjects required to sleep in the lab would routinely be hooked up to the sleep equipment, as well as having their "sleep and wake up time" dictated to them. This could reasonably result in reduced quality and quantity of rest. If this was the case, then feeling less alert (decreased Clear Thinking) in the Morning relative to the Evening would not be surprising. Furthermore, despite Kramer's assertion that mood is unaffected by the sleep lab or the waking of subjects following REM periods, the analyses from the present study, compared to his summary data (Kramer, 1993) provide evidence that subjects who were awakened following each REM period reported significant increases in Sleepy scores, and significant decreases in their degree of Clear Thinking (from Evening to Morning). This contradicts the present findings, and other findings within Kramer's lab (that Clear Thinking and Jittery scales typically decreased in intensity from Evening to Morning).

While in the past home mood study (Lysaught, Kramer & Roth, 1979) subjects demonstrated a non-significant increase in their Jittery ratings (non-significant), despite corroborating results from the present study, this finding cannot be easily explained. These Evening to Morning differences may be attributable to the adjectives which define this scale such as "Dizzy", "Sick to one's Stomach" etc, which may relate to more visceral factors such as time since last meal, or lifestyle factors (ie. alcohol intake etc.) of the subjects.

As the variable of most interest to the present study concerned the magnitude and

direction which mood changes from Evening to Morning on a daily basis, mood change was examined daily for each of the six mood scales. It was found that some aspects of mood decreased much more frequently than other aspects of mood. Specifically, Friendliness decreased from Evening to Morning 60.7 % of the time. Following this the mood scales of Sleepy 58.0 %, Depression 51.7 %, Aggressive 50.5 %, Jittery 40.7% and Clear Thinking 35.9% decreased from Evening to Morning accordingly. Taken together Friendliness, Depression, Aggression and Sleepiness all decrease from Evening to Morning over 50% of the time. Conversely, the remaining mood scales revealed that subjects perceived level of Clear Thinking and Jitteriness increase from Evening to Morning approximately 64.1% and 59.3% respectively.

In examining the daily and overall mood results, it is evident that following a night of sleep, subjects were typically less friendly, less depressed, less aggressive and sleepy than they were the prior evening. With the possible exception of the reduction in friendliness, being less depressed, aggressive and fatigued would appear to be very functional attributes needed in preparing to meet the demands of the day. In a similar vein, the noted significant increases Clear Thinking also are supportive of the idea that subjects would better be able to function cognitively following an evening sleep. These results are also consistent with Johnson et al., (1990) whereby subjects' levels of self-perceived sleepiness were a better predictor of performance than that of objective sleep measures.

Inconsistent mood results stem from the finding that the Jittery mood subscale was found to significantly increase from Evening to Morning some 59.3 % of the time. While

increases in Jittery mood do not appear to be functional, these results are inconsistent with all of the past research in this area with the exception of Lysaught, Kramer and Roth's (1979) study. As stated these differences may be related to visceral factors such as time since last meal, or lifestyle factors (ie. alcohol intake etc.).

While there is not a great deal of research examining how subjective perceptions of subjects' mood influence subsequent outcomes, Johnson et al. (1990) provided support that subjects' performance was better predicted based on their perceived mood, more so than more objective factors such as number of hours slept. Clinical work in examining individuals diagnosed as suffering from depression, also implies that individuals' ability to engage in daily activities and perform effectively is often intricately related to emotional status (Beck, 1979), and that such a finding may be generalizable to the relative impact of an individuals' daily perceived mood on their subsequent functioning during the day. However, as the Clyde Mood scale has not been utilized as a diagnostic instrument, the ecological validity of a high or low "Depression" score from this instrument in relation to an individuals' waking function is difficult to ascertain. It does seem consistent with clinical work, however to surmise that decreases in Depression, Aggression, Sleepiness, and increases in Clear Thinking are all positive changes which may contribute to an individual having an increased capacity to deal with daily stressors. Changes in Jittery scores may be related to more visceral factors. Decreases in Friendliness, while the most consistent finding, may represent subjects' level of inclination to participate in social activities. While Kramer (1993) has posited that this change may be related to the relative social isolation of the dreaming experience, present conceptual models to explicate how

decreases in Friendliness may have a positive functional effect on individual have not been offered to this author's knowledge.

Taken together, the present research with respect to pre and post-sleep mood changes represents a replication of many of the findings of Kramer and his colleagues (1993). While significant decreases in mean mood intensity have only been found for Friendliness, downward trends in mean Evening to Morning mood scores across Weeks were found for the Aggression, Depression and Sleepiness mood scales. In general, mood is less intense following a night's sleep. The increase in mean mood intensity in Clear Thinking may also be viewed as a positive and functional change in individuals, as elevations in this scale represent an increase in individuals' perceived level of alertness. Only the increase in the Jittery scale from Evening to Morning remains somewhat inconsistent with the premise that the sleeping interval serves some type of assimilative function, which serves to better prepare the individual for the events of the day to follow (Cohen, 1979).

5.3. Dream control and mood change

Past research by Roth, Kramer and Lutz (1976) has proposed that some aspects of mood are related to and affected by sleep physiology (Sleepy, Clear Thinking and Jittery scales), while other aspects appear to be related to the psychological process of dreaming (Depressed, Aggression and Friendliness). Kramer (1993) has indicated that the pattern of dreaming which subjects engage in across the night is related to subsequent changes in Evening to Morning mood. Specifically, Kramer has hypothesized that mood change is related to the effectiveness of the emotional problem solving of daily events which

occurred in the previous night's dreams (French & Fromm, 1964). Kramer indicates that there are two discernable patterns of dreaming which subjects engage in, the Progressive-Sequential and Repetitive-Traumatic dream patterns. Kramer argues that positive affective change from pre-sleep to post-sleep occurs when subjects engage in Progressive-Sequential dreams whereby an emotional problem is presented, and subsequently dealt with throughout the night's dreams. Thus, Kramer asserts that emotional problem solving within dreaming results in positive changes in some aspects of mood (Depression).

Alternatively, Kramer indicates that when subjects engage in dreaming where problems are continually re-stated without any clear resolution (Repetitive-Traumatic), this leads to a lack of emotional problem solving which coincides with decrements in waking mood. Kramer states that there is considerable variability within and between subjects as to whether they will dream in a Progressive or Repetitive pattern on a given night, and this variability is consistent with the variability in mood change on a daily basis. Based on correlational work examining mood change to dream content variables, Kramer (1993) found that the number and type of characters within the dream correlated with changes in Depression. In attempting to explain these correlations Kramer has suggested that positive waking mood may ensue following a progressive-sequential dream which consisted of the "appropriate type" of dream characters to facilitate the solving of the presenting issue.

As research including the present study has provided support that information (be in cognitive or affective) may transfer from waking to sleeping (LaBerge, 1985; Purcell, 1987; Zadra, Dendori & Pihl, 1992), and from sleeping to waking (Brylowski, 1990;

Halliday, 1992; Purcell, 1987), it was hypothesized that the degree to which the dreamer exercised volitional control within the dream milieu may relate to the magnitude and direction of aspects of mood change (increase or decrease) on a given day.

Indeed, higher order Dream Control is consistent with the general principles of Kramer's progressive-sequential dream pattern, in that a problem is presented presumably as a metaphoric representation of a current issue of importance to the dreamer (Delaney, 1990; French & Fromm, 1964; Kramer, 1993). It has been proposed that the subject's subsequent mood may then be related to the degree to which the individual was efficacious in exercising an adequate degree of DC which facilitated the dreamer's successful mastery of the presenting emotional issue. Such transfer effects in waking affect relating to high DC during dreaming have been demonstrated by Brylowski (1990) with a nightmare sufferer and by Purcell (1987) in subjects who reported having had at least one lucid dream. The alternate dream pattern described by Kramer, the repetitive-traumatic dream patterns in which dream problems are repeatedly presented throughout the night without any clear action or resolution are fairly consistent with low levels of DC, corresponding to 4 or less on the 9-point Dream Control scale used in this study. Thus, the hypothesized dream patterns may be consistent with different degrees of dream ego competence encapsulated within the Dream Control continuum.

Results from the present study indicated that when the mean DC of subjects over the 21-day experimental period, which essentially reflects an individual difference variable of Dream Control (as daily variability is collapsed across), was compared with overall residual mood change scores for each of the six mood variables, no significant relationship

were found for any of the mood scales. Of interest, however, was that the greatest relation was found between mean Dream Control and residual mood change score for the Depression scale. This corresponds to Kramer's (1993) past work in which he found that Depression had the strongest relation to dream content variables.

Past correlational work examining mood changes (specifically the Depression scale) and dream content variables, have indicated that many more significant correlations than would be expected by chance alone have emerged (Kramer & Roth, 1973). In the present study although the overall correlations between Dream Control and Mean mood were not found to be significant, mood has been shown to vary considerably, and much less predictably on a daily basis. Further analyses were undertaken to determine if any relation between mood and DC on a daily basis existed. Of particular relevance to the present study was the examination of whether daily changes in mood from Evening to Morning were related in any significant fashion to the DC exercised by the dreamer during the sleeping interval. Correlations between DC scores and mood change were calculated for each of the DC scores and residual mood change values for each day of the 21-day experimental period. These daily correlations were performed independently across each of the six mood scales. With the inclusion of Bonferroni corrections to protect against Type 1 errors, no significant correlations were found between daily DC scores and mood change scores for any of the six mood scales. Thus, initially these results are suggestive that DC, as assessed by two independent judges, was not predictive of the magnitude or direction of any affective change in aspects of subjects mood from Evening to Morning.

However, it was interesting that the means of the daily correlation coefficients

were found to be higher when the daily correlation coefficients were averaged compared to the overall relationship across the entire experimental period. Specifically, while the omnibus analysis between mean DC and mean residual change scores (Evening - Morning) indicated that there were no significant findings, and that the relationships ranged from essentially non-existent, to a high of $r = .20$, the daily analyses provided some tentative support that daily Dream Control may be a factor in predicting the direction and magnitude of change in mood scores from Evening to Morning. The highest mean of the correlation coefficients was with the Friendly scale at $r = .26$. Although with the Bonferroni corrections no daily correlations attained significance, it was of interests to note that over the 21 days, a number of correlations between DC and mood change did approach or attain significance at the less conservative ($\alpha = .05$) level. Specifically, 4/21 correlations for Friendly, 2/21 for Depression, 2/21 for Aggression and 1/21 for Sleepy were found. As 21 correlations were performed for each mood scale, at α equal to .05, roughly 1.1 correlations would be expected to attain significance through chance alone. Therefore, it may be that aspects of mood, particularly Friendliness, Depression and Aggression are related to the degree of DC demonstrated by the subject during the sleeping interval. It is of further relevance that the level of power within the present study was limited based on the small sample size ($N = 39$), and that issues with respect to power were further attenuated within the correlational analyses as the number of usable dreams to be correlated with mood change on a given day varied from a high of 34, to a low of 9. Thus, due to decreased power it would be increasingly difficult for any relationships which might exist to obtain significance.

5.4. Evaluating the hypothesized adaptive function of dreaming

In considering the generally proposed adaptive function of dreams whereby it is hypothesized that individuals are required to metaphorically deal with a presenting issue(s), and, to the degree that he/she is successful, it is proposed that mood will change to reflect the efficacy of the dream, the present DC factor may not, in itself be able to account for the totality of the dreaming experience, or subsequent mood changes observed.

In reviewing the Report Skills Questionnaires of the Attention Control subjects (following the completion of all data analysis) it was found that subjects often answered "No" when responding to the questions as to whether they were experiencing any thoughts or emotions in their dreams. Further to this, it has been found in past studies that subjects' emotionality or distress is not always noted within objectively scored dream reports (Hartman, 1984). Therefore, it may be that mood is not only affected by factors such as volitional control while dreaming, but it may also depend on the subject's mood and overall emotional response to the dream events, while dreaming. Thus while a positive change in waking mood would be expected in the patient of Halliday's (1992) who was able to alter the traumatic dream, in instances where the subject is less cognitively involved or emotionally caught up within the dream, DC, regardless of the degree may not have a significant transfer effect from dreaming to waking. In a comparable fashion to our waking responses to life events, dreaming perceptions of the perceived impact which accompanies the dream events may mediate whether Dream Control results in any changes in waking affect.

This supposition is consistent with Purcell's (1987) transfer effects for subjects who experienced lucidity. Contrary to expectations, Treatment Condition differences were not found. Despite the Schema condition having higher overall DC than Controls (even in the absence of lucidity), transfer effects were only found for subjects who had experienced the significant emotional dream experience which often accompanies dream lucidity.

Consistent with past work, Friendliness, Depression, Aggression and Sleepiness moods demonstrated the greatest relationship in comparing DC to mood correlations. Therefore, it would appear that these aspects of mood are related, in some manner, to the dreaming period. However, as stated, the "meaning" which the dreamer applies to the dream, may be related to a multitude of emotional factors which in turn relate to the degree and direction of subsequent mood change. These findings are reminiscent of past studies exploring the possible adaptive functions of dreams (Cohen & Cox, 1979, Koulack & DeKoninck, 1985). Within these studies it was found that in some instances incorporation of pre-sleep stressful stimuli related to positive morning mood, while in other instances, incorporation related to waking mood decrements. It is suggested here, that future studies within these areas need to identify and account for possible mediating factors such as the importance or interpretations subjects put on their dreams, or as above, on the meaning or degree of distress that they attach to the pre-sleep stimuli.

Work from social psychology into psychological hardiness (Bandura, 1986) has provided strong support that comparable life events may have significantly different impacts on individuals based on subjects' perception, interpretation and overall ability to

cope with these events. It may be that differences in DC may more likely be correlated to waking mood change in instances where it is expected that the subjects will be personalizing and attempting to deal with perceived significant events. Indeed, this appears to be true of nightmare sufferers and with others undergoing significant life events. Cartwright (1989) found that individuals involved in divorce, who incorporated their spouses into their dreams early on following separation, were found to be coping much more effectively at one year follow-up than those individuals who did not incorporate their ex-spouse in recorded dreams. These results may be suggestive that daily functioning and mental health may be closely related to dream content and process, when individuals are dealing with emotionally salient issues.

With respect to the present study, although subjective scores of the relative "importance" of the dream to the dreamer were not assessed, the lack of strong positive relations between mood change and DC may also in part be related to the fact that "normal" subjects were utilized, whereby it would be expected that these subjects would be dealing with a variety of life stressors, but not of the magnitude of the issues dealt with by more clinical populations (divorced individual, nightmare sufferers).

Future studies examining possible adaptive functions of dreams in terms of the wake-sleep-wake paradigm continue to be of significant benefit, however, in attempting to delineate differences in dreaming variables related to waking functions, further steps may need to be considered. As outlined it may be useful to consider the possible impact of emotionality or subjective interpretation which occurs within the dream itself. It may be that subjects demonstrate adequate DC within a dream, but if this dream was not salient or

important to the dreamer, waking transfer effects may be attenuated. In a similar vein, a further possible methodological issue may be to develop a comparable measure of DC to that used within this study which subjects could use to evaluate their personal efficacy within the dream. Such a measure would provide interesting information with respect to whether subjective and objective assessors of Dream Control demonstrated comparable results, as well as providing the subjects with a forum via the Dream Control scale, to identify the degree of emotionality or salience of the dream events. It is possible that in instances where subjects are perceived by raters as being efficacious, the actual subjects' perceptions and interpretation of the dream including their perceptions of the degree of effort and the relative success of the dream, may differ between the subject and the independent judges.

CHAPTER 6: Implications

Taken together, the present results demonstrate that self-regulating capabilities are present during dreaming, and cover a breadth of variation ranging from instances where there is little volitional control, to instances ranging from moderate to maximal control in and over the dream. Moreover, results suggest that Dream Control may be influenced, in part by attentional and motivational factors, but to a more significant and sustainable degree through the use of specific cognitive waking entrainment strategies (Schema condition). Furthermore, while Dream Control appears to fluctuate in normal subjects relating to variation in attention and motivation, following waking entrainment, these subjects do not appear to be affected in a significant fashion by this variation in attention and motivation.

The pattern of decreases in mood intensity from Evening to Morning was replicated within the present study for the Aggression, Depressed, Friendly and Sleepy mood scales, with the Friendly score decreasing significantly. Significant increases were found in the Clear Thinking and Jittery scales. The results, including the increase in Clear Thinking support Kramer's proposal that sleeping and dreaming serve a functional purpose to regulate mood which has a subsequent positive affect on waking functioning.

Efforts to explain overall and daily variations in Evening to Morning mood scores according to differences in the Dream Control of subjects were not successful. No significant relations were found for overall DC and overall mood changes during the

experimental period. Daily correlations did not attain significance following statistical corrections, but interestingly the mean of the daily correlation coefficients was higher, and a number of significant correlations were noted at less conservative alpha levels. These findings may be suggestive of a relationship in consideration of the small sample size of the present study, and even more so in considering that the number of subjects available for correlational analyses further decreased based on instances in which subjects recalled dreams (thus sample size in correlations ranged from $n=34$, to $n=9$). Therefore, possible relationships could remain undetected due to sample size of the present study.

Overall the results are suggestive that DC may contribute to differences in Friendliness, Aggression and Depression mood scores. Such a finding would be consistent with a number of past studies in the nightmare literature wherein subjects upon demonstrating increased DC, were able to reduce or rid themselves of nightmares, which correlated with positive measures of mental health (Brylowski, 1990, Halliday, 1992). However, in considering individual differences in coping style and the attributional process that individuals make during waking, future studies may wish to examine the degree of perceived emotionality experienced by the subject during the particular dream in question. Moreover, garnering some type of subjective perception of how effectively subjects felt they dealt with presenting issues may provide further clarity as to what aspects of dreaming, if any, relate to subjects' mood change.

With respect to the proposed adaptive function of dreams, the data presented suggest that most aspects of subjects' mood decrease from Evening to Morning, and thus would likely enhance the subjects' ability to function upon waking. While the mood

differences are suggestive of functional changes, the research has yet to demonstrate that these differences are of a sufficient magnitude to influence waking functioning or that these differences are explainable in terms of dream content or processes. Future work in this area will be required to further delineate these issues.

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Appendix A

Baseline Groups Package

Instructions to Group B:

1. Keep a pen, your dream log forms and your Clyde forms by your bed. When recording a dream record one dream per dream log form. You can write the dream in the middle of the night or in the morning when you awake.
2. If you have a vague recollection of a dream that becomes clearer later in the day, write it down at that point and transfer or staple the additional information to the proper dream log form when you get home.
3. Always remember to include information pertaining to your ID number, the date and time of the dream. As well remember to include the dream number if you recalled multiple dreams on a given night. For example, the first dream (earliest) on a given night would be referred to as dream #1, while the second would be dream #2. **Please remember to include your ID number, the date and time on EACH dream log form.**
4. If you run out of dream log sheets or Clyde Scales call me to arrange to come to the sleep lab and get some. If neither of these options is immediately available write the information on a regular piece of paper including all information relating to your ID number, the date, the dream number, and the categories on the Clyde Scale. Running out of forms should be avoided if at all possible, thus forms will be kept at the sleep lab and you will be able to contact Craig Manley at 728-2600 ext. 2667 or 728-8253.
5. I am interested in dreams as they actually occur, so please do not edit or refine the dream reports in any way to make it more sensible or readable for my benefit. The interest of the experiment will be best served by you writing out your dream as accurately as possible with no more and no less information than needed to accomplish this.
6. Please do not discuss any aspect of the experiment with others until after the experiment is over.
7. When completing the Compliance questions on the bottom of each dream log report, the numbers should be circled as follows:
  3. **Completely** Circle this if you completed your mood sheets immediately before bed and upon awakening. Completed all information regarding I.D. number, date and proper completion of Evening or Morning Mood Scale. Recorded all dreams upon waking and order the dreams if you recalled more than one.

2. Somewhat Circle this if you completed most of the steps but there may have been something that did not meet exactly what was asked. Thus, if you could not remember or approximate the order of your dreams, or you recorded your dreams before your mood forms.

1. Little Circle this if you were not able to comply with the requests of the study. If you did not complete a mood scale or dream reports (if you recalled a dream) you would circle 1. As well, if you forgot to date your forms or to identify between the evening and morning mood forms you would circle 1.

8. Please return your dream log forms each week at (date and time). Remember to pick up more forms at this time.

Appendix B

Package for Attention Group

Instructions to Group A:

1. Keep a pen, your dream log forms and your Clyde forms by your bed. When recording a dream record one dream per dream log form. You can write the dream in the middle of the night or in the morning when you awake.
2. If you have a vague recollection of a dream that becomes clearer later in the day, write it down at that point and transfer or staple the additional information to the proper dream log form when you get home.
3. Always remember to include information pertaining to your ID number, the date and

completed the Report Skills Questionnaire on the back of the dream log.

2. Somewhat Circle this if you completed most of the steps but there may have been something that did not meet exactly what was asked. Thus, if you could not remember or approximate the order of your dreams, or you recorded your dreams before completing your mood forms. As well, if you did not completed the Report Skills Questionnaire for each dream you would circle 2.

1. Little Circle this if you were not able to comply with a number of requests of the study. If you did not complete a mood scale or dream reports (that you remembered) you would circle 1. As well, if you forgot to date your forms or to identify between the evening and morning mood forms you would circle 1.

8. Reread the dream after it is written and then fill out the Report Skills questionnaire on the others side of the dream log form for each and every dream. Come next week (date and time) and bring in your dream reports and mood scales completed thus far.

Appendix C

Package for Schema Intentionality Group

Instructions to Group Sc:

1. Keep a pen, your dream log forms and your Clyde forms by your bed. When recording a dream record one dream per dream log form. You can write the dream in the middle of the night or in the morning when you awake.
2. If you have a vague recollection of a dream that becomes clearer later in the day, write it down at that point and transfer or staple the additional information to the proper dream log form when you get home.
3. Always remember to include information pertaining to your ID number, the date and time of the dream. As well remember to include the dream number if you recalled multiple dreams on a given night. For example, the first dream (earliest) on a given night would be referred to as dream #1, while the second would be dream #2. **Please remember to include your ID number and date on EACH dream log form.**
4. If you run out of dream log sheets or Clyde Scales call me to arrange to come to the sleep lab and get some. If neither of these options is immediately available write the information on a regular piece of paper including all information relating to your ID number, the date, the dream number, the questions on the back of the form and the categories on the Clyde Scale. Running out of forms should be avoided if at all possible, thus forms will be kept at the sleep lab and you will be able to contact Craig Manley at 728-2600 ext. 2667 or 728-8253.
5. I am interested in dreams as they actually occur, so please do not edit or refine the dream reports in any way to make it more sensible or readable for my benefit. The interest of the experiment will be best served by you writing out your dream as accurately as possible with no more or no less information than needed to accomplish this.
6. Please do not discuss any aspect of the experiment with other participant until after the experiment is over.
7. When completing the Compliance questions on the bottom of each dream log report the numbers should be circled as follows:

3. Completely Circle this if you completed your mood sheets immediately before bed and upon awakening. Completed all information regarding I.D. number, date and proper completion of Evening or Morning Mood Scale. Recorded all dreams upon waking and order the dreams if you recalled more than one. Upon waking you completed

the Behavioral Options Questionnaire on the back of the dream log and reviewed your most recent dream and your new Behavioral Scenario before bed. You used your bracelet to remind you to assert to yourself behavioral options at least 3 times during the day.

2. Somewhat Circle this if you completed most of the steps but there may have been something that did not meet exactly what was asked. Thus, if you could not remember or approximate the order of your dreams, or you recorded your dreams before completing your mood forms. As well, if you did not practice your schema's from your bracelet at least 3 times per day or review your most recent dream before bed then you would circle 2 on your dream log compliance measure.

1. Little Circle this if you were not able to comply with a number of requests of the study. If you did not complete a mood scale or dream reports (that you remembered) you would circle 1. As well, if you forgot to date your forms or to identify between the evening and morning mood forms you would circle 1. If you did not practice your schema for Behavioral Options at least once a day or if you did not complete the Behavioral Options Questionnaire when you recalled dreams you would circle one.

8. Reread the dream after it is written and then fill out the questionnaire on the others side of the report sheet for each and every dream. Come next week (date and time) and bring in your dream reports and mood scales completed thus far.

Appendix D

Group Treatments for Experimental Period

Group Specific Instruction for each session:

Cover Story: Subjects will be informed that the purpose of the present study is twofold. First, I am interested in examining dreams as they actually occur, therefore, having accurate dream reports containing what they recall is of prime importance. The second purpose of the study is to see if there is any relation between mood and the sleep, thus it is imperative that all remembered dreams and mood scales be completed each day.

Baseline Group (B): The baseline group will come to the sleep lab at a set time each week (for three weeks). At this time they will drop off their completed dream reports and Clyde scales and pick up enough for the next seven days. The experimenter will be available should they need to ask any questions.

Attention Control Group (A)

Session 1

1. The purposes of the study will be stated as 1) examine dreams as they actually occur and 2) to see if there is a relation between mood and sleep, to this group.
2. Subjects will be informed that we will be meeting for three thirty minute sessions (one per week) where subjects will be asked to hand in their dream report forms and their Clyde Scale forms. The purpose of our sessions will be to answer any questions pertaining to completing the forms or answering the questions on the back of the dream log form. A further purpose of the sessions will be to further educate the subjects on some issues relating to dreams and provide them with details on how to remember dreams better.
3. Will then go over ways to better recall dreams. Example will be getting up earlier, completing dream logs, and increasing awareness about dreams, where one way to do this is to form a dream study group (like this one).
4. We will then go over the dream log forms demonstrating how to complete the front. Next the Report Skills questionnaire on the back will be reviewed. Finally, the Mood sub-scale will be discussed. A simulation of what would happen to complete one "night" of dreaming will be run through where we complete the Clyde, sleep, Complete Dream Record, then Clyde Morning and finally the dream Report Skills Questionnaire.
5. Stress the importance of having I.D. number, date, and time on all forms. Further, point out that the mood scales are distinguishable from one another by a highlighted "E" for evening, and an "M" for morning. To ease confusion, all forms should be dated

according to the nights date and the mornings date. Therefore, going to bed on Christmas Eve would be dated December, 24/25 (Dec 24 for night, Dec 25 for morning).

Session 2.

1. Collect past weeks dream reports, questionnaires and mood scales.
2. Ask if there are any questions regarding the procedure.
3. Will then talk about some further recall methods (?).
4. Begin a discussion into what are some different type of dream experiences people have had? Ask if some of these dream experiences are easier to recall then others? Why might this be?
5. Will ask group questions on why they feel we dream? Note that there are a number of different theories some of which are quite dichotomous. To illustrate I will discuss the

5. Use one dream to go over how to complete the forms as well as how to answer the questions regarding dream competency on the reverse. If they struggle to think of behavioral options which may have influenced their centrality, their autonomy, their expressiveness of their feelings or how the outcome of the dream turned out, ask them how they would handle the dream situation differently if this occurred when they were awake?

Dream Example 1.

"I was inside some type of spacecraft resembling a Zeppelin blimp. I am with a number of other passenger and the captain informs us that we have been hit badly and that crashing is imminent. I have an awareness based on our altitude that this will not occur for twenty minutes or so.

Few passengers seem really shaken by the news. I hear some mutterings of world wide implications because our craft appears to be spilling out radiation everywhere we go. I am considering the chances of surviving if we land successfully given that there is radiation. An attractive women with brown hair is standing across from me. She looks pensive, and neither of us speak".

1. **Were you the main character in the dream?** Yes, the entire drama circled around the implications of the crash to me.
2. **How could you have been more involved?** I could have went to see the Captain to see what I could do about stopping our aircraft from crashing.
3. **How might this have influenced the dream story?** I would have been more involved in trying to prevent the crash and maybe could have saved some lives.
4. **Did you make your decisions independently or as a group?** My decisions were made by me alone thus independently.
5. **If you made a group decision(s) how might the dream have differed if you had made a independent decision?** At no time did I make a group based decision.
6. **Choose a point in your dream where you made, or could have made a different choice? How might this have influenced the dream story?** When I heard about the impending crash I listened and then thought about how I might escape, but I chose not to act. If I had chosen to try to fix the problem I could have maybe saved the plane.
7. **What feelings did you express in this dream?** I expressed some resignation when I heard the news.
8. **What feelings could you have been more expressive in enacting in your dream?** I

could have displayed more panic at dying, more drive towards finding a solution and more compassion and sadness for the people that may be lost due to the crash.

9. **How might these have effected the dream story?** More panic could have led to a stressful dream as panic is not productive. More drive towards finding a solution may have helped me to find one. More compassion and sadness also may have helped to motivate me to try to fix the problem.

10. **How much effort did you exert to influence the dreams outcomes?** Not very much, I was resigned to the fact that we were going to crash although, I was trying to find ways to survive upon landing.

11. **If you had exerted more effort to influence dream outcomes, how might the dream have turned out?** If I had really attempted to fix the craft then it may not have crashed so people would not have needed to die.

An alternate view - stressing that there is no correct way to answer is that, by trying to fix the craft I may have set off a reaction that led the craft to explode.

OR

I attempted to fix the craft but could not fix it as the damage was to great.

This has just been one example of possible responses to the questions asked relating to this dream. There are no right or wrong answers. The focus of this exercise is to consider how these different aspects of the dream experience could influence how the dream unfolds and {how paying attention to these details may related to dream recall}.

Bracelet - Each of you will be asked to where a leather bracelet for the duration of this study. The purpose of the bracelet is to serve as a memory cue. Any time that you notice the bracelet you should ask yourselves a number of questions. The purpose of these questions is to help you form a link between waking and dreaming so that dreams will be more important to your life (which may influence recall) They questions are:

1. **Think of what you have done in the last twenty minutes.**
2. **How could you have been more central or effortful in your actions or expressive of your feelings so that your activities would be deemed to have turned out more successfully.**
3. **If you had acted differently, imagine how things may have turned out differently?**
4. **Assert to yourself that you can also be more competent in your thoughts and actions in your dreams.**

Example of Schema Use:

1. Notice bracelet.
2. **What have I done in the past twenty minutes?** I left from home a few minutes later than I had hoped. I rushed to Carleton carrying the materials for this group. I tried to park in the library parking lot and had to wait until some cars left. I was feeling quite agitated and self reproaching as the time slipped away. I finally got to park and I ran to the sleep lab in time (barely).
3. **How could you have been more central or effortful or expressive of your feelings?** To be more central or effortful I could have been aware that time might be short (central) so that I would have to make a concentrated effort (effort) to leave home early so that I could get a parking spot. I could have been more expressive of my feelings to the parking attendant ("Please!!! let me in its an emergency ...") which may also have contributed to a different outcome.
4. Thus, like in waking life where and how I make my presence felt by how central I am, or how the amount of effort that I use influences the outcome of what follows. Dreams can be like this as well. The degree to which I am involved or attempting to influence the outcome, often does change the story accordingly. I will remember tonight that dreams can be affected by how I choose to act, much like waking life.

Remind participants to go over summary page of instructions and a dream from past morning. Have subject rehearse actual dream, and then changes in dream from back questionnaire. Have subjects assert to themselves that by changing behaviors in a dream they can change the outcome and recall dreams better.

Session 2

1. Collect all forms.
2. Ask participants if they have any questions concerning the completing the dream log forms, the Clyde Forms, or the questions on the back of the dream log forms. Are there any issues relating to recall in general. Can give some suggestions regarding setting alarm earlier, rehearsing the dream while getting reporting tools etc.
3. Ask general questions about how long the forms are taking to complete and if there are any concerns over how they are completing them. Reiterate in the scenarios at the back that **there are no right or wrong scenarios or outcomes**, and that the purpose of the forms is to increase the subjects awareness that their are different behavioral options and that these may effect the dream outcome (much like waking decisions influence outcomes).

4. Go over another dream. Focus on back questionnaire unless there are questions about Clyde or front of the dream log, encourage if there is a question to ask as others likely have similar questions.
5. Go over another dream by completing options, ask for a volunteer if interested.
6. Ask subjects to read over materials of what they are to do (complete Clyde, record dreams on separate pages etc, Clyde and questionnaire) as well as reviewing one dream from prior night. By actual dream and with revised behavioral options. Assert that changes in actions in dreams can effect outcome and make dreams easier to recall.

Session 3.

1. Hand in forms.
2. Any questions on form completion or others.
3. Review what subjects have been doing and why (for recall, and associations with mood based on paying more attention to their dreams).
4. Read some more of Garfield and Wallin and ask subjects what they think. Does it make sense that this might increase dream recall (given that all people dream each night).
5. Remind subjects to read dreams and instructions before bed.

**Report Skills, Behavioral Options Questionnaire
and Dream Log forms**

Appendix E

Report Skills Questionnaire

1. Was there any speaking or talking in your dream?

Yes _____ No _____

2. Were you experiencing any emotion?

---

3. Were you experiencing any thoughts?

---

4. Was there anything in the dream that struck you as peculiar?

Yes _____ No _____

5. Were you watching the experience? Actively participating?

Yes _____ No _____ Yes _____ No _____

6. Both watching and participating?

Yes _____ No _____

6. Was there any colour in your experience?

Yes _____ No _____

7. Were there any other sensory attributes to your experience?
(eg: touch, smell, taste, non-speech sounds?).

Yes _____ No _____

8. Was the experience vivid and striking? _____, normal and ordinary _____, or
vague? _____.

Behavioral Options Questionnaire

1. Were you the main character in the dream?

Yes _____ No _____

2. How could you have been more involved?

_____

3. How might this have influenced the dream story?

_____
_____

4. Did you make your decisions independently or as a group? If you made a group decision(s) how might the dream have differed if you had made a independent decision?

_____
_____

5. Choose a point in your dream where you made a choice, or could have made a choice. How might your dream have changed if you made a choice here (or a different choice where you actually did make one.)

_____
_____

6. What feelings did you express in this dream?

_____

7. What feelings could you have been more expressive in enacting in your dream?

_____

8. How might these have effected the dream story?

9. How much effort did you exert to influence the dreams outcomes?

10. If you had exerted more effort to influence dream outcomes, how might the dream have turned out?

Dream Log

I.D. Number: _____

Date (night/morn) _____

Dream Number _____

Record dream below, please remember to fill in all of the information above, and on your Clyde Scales.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Compliance Measure:

To what degree did you complete all of the activities asked of you for this study before going to sleep and upon waking?

1
Little

2 Somewhat

**3
Completely**

Appendix F

Dream Intentionality Scale and Scoring Manual

APPENDIX B

Dream Intentionality/Control Scale

This scale attempts to measure the ordinal process along which dream control progresses. It begins with the dreamer's having no role in the dream, passes through minimally to well developed role with increasing effectiveness, and ends with the dreamer's being lucidly aware of dreaming and exercising conscious control over his own role and/or dream content. The following are examples of lowest, mid-range, and highest scoring dreams on the control dimension.

(lowest) The police chased a man down an alley.

(mid-range) The police were chasing me for something I didn't do and they were getting closer the faster I ran.

(highest) As soon as I realized I was dreaming all the anxiety of this chase left me. I turned and faced the policeman and changed them all into butterflies.

The scale scores ascend with the progression of several strands of the 'control' construct, specifically, the dreamer's activity level, his/her centrality to dream events, his/her emotional expressiveness, behavioral autonomy and assertiveness, the cognitive level of his/her intentions and choices, and his/her effectiveness or mastery. Since the dreamer's mastery and control of dream situations implies his cognitive and behavioral autonomy, activity and centrality are achieved at lower levels of the scale than are mastery and emotional fulfillment. Thus, activity that is peripheral to main dream events does not score as high as activity which affects dream outcomes, and a dreamer who is the main protagonist but cannot seem to act scores lower than a dream ego which struggles to deal with the dream situation.

While the scale is ordinal in that dream control is rated from none through a little, to a lot, each level (category) is described by combinations of elements which are nominal in nature. This is done to aid the raters and their reliabilities, and to avoid the tendency to make inferences, interpretations, approximations, guesses, or subjective estimates as to where on the scale a dream fits.

For nearly all dreams, disagreements in the first round of independent ratings are easily reconciled by discussion. Usually a rater has simply not noticed certain information which would have affected his scoring. However, in the event that an unresolvable disagreement should occur, a form of

arbitration (such as using the middle score) should be used. Discrepant ratings are usually only one category apart. Exact agreement from two raters is therefore an overly stringent criterion. A criterion of exact agreement by 2 out of 3 raters is therefore recommended.

Instructions to Judges.

What to Score

Score the dreamer, his role, his control over his role and its effects on dream events and outcomes. Within the context of each dream report, evaluate the dreamer's participation in terms of its centrality to dream events and its effectiveness in bringing about a desirable outcome. Evaluate the extent to which the dreamer is emotionally expressive to other dream characters, and the extent to which he is able to assert himself behaviorally. Sometimes dreams present a problem or conflict which requires the dreamer to take cognitive control or find a solution by seeing a way out of the difficulty, developing a plan, or deducing an answer through clues.

Activity is referred to in a broad sense and includes reflective activities such as feeling, talking, thinking, and empathizing. The importance of these dreamer activities is of course relative to the dream situation, that is, are they central or peripheral, successful or not.

Centrality refers to the relative importance of the dreamer's role to the main drama. When s/he is predominantly the observer, the dreamer's role is peripheral (category 3 or lower). When s/he is essential to the main dream drama, the dreamer's role is central (category 4 or higher, depending on outcome). When the dreamer's thoughts and feelings constitute the main dream events, category 4c is scored. When these thoughts are peripheral to the main dream action observed by the dreamer, 3a is scored. Sometimes the dreamer's thoughts and feelings as he observes a drama are developed enough in the dream report such that both aspects seem equally central. Such a dream will ultimately be rated in accordance with majority opinion.

Autonomy is sometimes difficult to evaluate due to the easy confusion of dependency with mutuality and reciprocity. The issue often pivots on the use of 'I' or 'we' and these pronouns must be studied carefully in order to assess whether the dreamer simply has company while he does something, or whether his autonomy is entirely submerged into that of the group. If the dreamer uses 'we' more frequently, the text may offer little justification for assuming the dreamer's autonomy of action.

Expressiveness is an aspect of how the dreamer impacts on his dream environment. Feeling expression in the description of the dream shows the meaning of events for the dreamer. Without it, the rater sees only a series of meaningless actions which score low in terms of dream control.

Scoring Ambiguity

Each dream gets one score which reflects the category of dream control most applicable to it. The score is for the most part a global one, although some of the category descriptions weight outcomes more heavily than beginnings. Indicate the subcategory which guided your score. You are always seeking a best fit. In cases which are difficult to decide pay special attention to ending or outcome in a dream which has relative narrative coherence.

Remember to score what actually occurs in the dream rather than in the history or background to it which the dreamer might include in the report. This is necessary to avoid a spurious evaluation of level of dream control. For example, some reports might include a characterization of the dreamer as Superman, yet attention to dream action shows that Superman is inert or dependent and not at all masterful.

Multiple Dreamer Roles

The heroic efforts of other dream characters are irrelevant to the control dimension as it is defined here. Score only the dream ego. On occasions where the dream ego becomes one of the other dream characters, any dream influence from that character that occurs during the period of identification, and that period only, accrues to the dream ego. Dreams in which there are two or more dream egos for the duration of the dream are scored on the basis of the highest scoring dreamer identity. When the dreamer is watching himself, for example, often the observed self is engaging in higher scoring activity than the self which is simply observing.

Inference

It is important that the rater not infer the level of dreamer control but rather depend directly on what is explicit in the dream report in accordance with the category descriptions which follow. Inference is commonly a problem with very brief dream reports which are not explicit about the dreamer's role, although some short reports are quite explicit. Information which is not manifestly in the report cannot be scored.

THE SCALE (To aid in clarification, the first example for each level [in brackets] is always a version of the police chase dream cited above.)

1. The dreamer is not present in the dream. [The police chased a man down an alley.]

e.g. A horse galloped across a field.

e.g. Just this strange music playing.

e.g. A scene of the bedroom I had when I was little.

e.g. An angry crowd was going to lynch some poor man.

2. The dreamer is present in the dream as an observer and reporter of events. He does not participate, nor does he report his own thoughts and feelings on dream events. [I watched the police chase a man down an alley.]

e.g. I sat in a theatre and watched a movie about India.

e.g. I came around the corner of my house to put out the garbage and witnessed a terrible scene .....

3. The dreamer is present predominantly in the role of observer, but is more involved personally than the 'objective reporter' of the level 2 dream. [I watched the police chase a man down my alley and wondered if he were innocent or guilty.]

3a. The dreamer in a peripheral role may register thoughts and feelings regarding main dream events which s/he does not act on or express to any other dream characters.

e.g. From the beach we saw a girl who seemed to be drowning. When the lifeguard was trying to resuscitate her I could hear a radio blaring and thought how incongruous it sounded.

3b. The dreamer's role is mostly that of observer, although s/he may engage in some activity which is peripheral to or does not influence main dream events.

e.g. I moved the chair over to the window so I could see them quarrelling as well as hearing it. When he accused her of seeing other men she threw her coffee at him and he lunged at her as though to hit her. In the end he threw down something in an envelope and stormed out.

3c. The dreamer seems central but is so passive or inactive as to really be in the role of observer, with other characters creating the action. The dreamer may function almost like a stage prop in the dream drama.

e.g. A famous stylist was doing my hair. He told me he would make me beautiful for my boyfriend.

3d. The dreamer acts as part of a group; at no point in the dream does s/he act individually or have a separate autonomous role.

e.g. We all stood there watching the man kill this girl. We went up to her after but she was already dead.

e.g. My friends and I drove around. First we went to the beach and saw some pretty girls so we convinced them to come with us...

4. This category marks the beginnings of the dreamer's role in effecting and affecting events. The dreamer is central or is a protagonist of the dream action but control or expressiveness is low, minimal. The dreamer participates but is weak, ineffectual or dependent. His/her participation typically lacks effort or courage or the attempt to find alternatives. [The police were chasing me. I was cornered in an alley with no chance of escape.]

4a. The dreamer is a victim without recourse or lives with the consequences of the acts of others. The dreamer may seem paralyzed to act.

e.g. A man was going to kill me and I couldn't do a thing to stop him. Thank goodness I woke up.

e.g. They were so slow I couldn't do anything but just wait there and I thought, "They really ought to have their act more together."

4b. The dreamer participates in central events and has his own role beyond that of observer but is usually passive or dependent; another character makes the decisions or pulls the dreamer through things. The dreamer's actions may be limited to obedience. This differs from category 3c in that the dreamer is more active.

e.g. My older brother and I decided to leave home in the middle of the night. He had packed our stuff. I had lost the tickets but he found them under the bed.

4c. The dreamer and his thoughts and feelings are central but not shared or expressed to other characters; there is no resolution; the dreamer may handle bad feelings by running away, avoiding confrontation.

e.g. The scene made me terribly depressed so I just got in my car and drove.

4d. The dreamer knows what he wants and may express this to another character but s/he does nothing to get it; the dreamer intends to act but then does not.

e.g. I was just about to try to jump in and save her but the marble statue rescued her instead.

4e. The dreamer is central but the situation is inert, requiring little of the dreamer, who does little to activate the dream or enhance his role. Occasionally the dream has an elaborate potential situation, but very little really happens.

e.g. I was hanging around outside the drugstore.

e.g. I was a cop on a stakeout. End of dream.

4f. The dreamer does not describe his dream action enough to imply a higher level of dream control. Such dreams often (not always) seem trivial. Often (not always) the report follows the simple pattern "I.....(did something)" with little indication of intentionality or outcome. Conversation is banal or trivial

e.g. I dreamt I blew my nose.

e.g. I dreamt about cutting the grass.

e.g. I dreamt my job was to intercept certain information from the KGB.

e.g. I asked her a question.

5. Control in dream situations is moderate due to various mixtures of effort and success/failure. The dreamer's impact is more expanded than at level 4, because the dreamer is trying (often unsuccessfully) to be more autonomous, expressive, involved or effective. Typically, the dreamer's participation is more effortful than at level 4. [The police were chasing me for something I didn't do and they were getting closer the faster I ran.]

5a. The dreamer is active and shows some focused behavior but

is only partially or occasionally effective or the results are ambiguous. The dreamer may fluctuate between adequacy and inadequacy; between effectiveness and ineffectiveness; action and inaction.

e.g. Somehow, every problem child in the whole school ended up in the class I was to teach. Miss Clough came in and agreed that I had every problem. I wanted to cry because I was in a portable and no principal would support me out here by myself. I began to discipline the children physically. It felt so foreign to me.

5b. The dream situation outpowers the dreamer's efforts; s/he tries, but does not rise adequately to the situation. Frustration is frequently expressed.

e.g. The waitress would not serve any food to the Black man. I was enraged and went to get some for him myself. They wouldn't let me so I tried over and over to trick them and they took plate after plate of food from me.

5c. The dreamer tries to think but gets confused.

e.g. I was trying to remember the name of the street where Marc lived. The streets on the map didn't seem to match with my memory of the town.

5d. The dreamer is somewhat communicative/expressive of his thoughts, intentions and feelings to another character but is not very effective.

e.g. I tried to talk the guy out of it but he did it anyway.

5e. The dreamer is split, ambivalent or undecided about what to do. Any action taken is not based on a weighed evaluation.

e.g. I was sitting and talking with Jane and chain smoking and having a good time. Part of me was watching and nagging me about the evils of cigarettes.

5f. In carrying out the instructions and intentions of others, (e.g. doing a job) the dreamer is focused and successful.

e.g. I was supposed to be taking all the green socks off the conveyor belt and pairing up the ones of other colours. They were going by quite fast so I had to concentrate but I was doing okay.

5g. The dreamer is successful in a mutual or reciprocal venture. They may talk together, sharing thoughts and feelings.

e.g. My lover and I got along well together.

e.g. George held one end up while I lowered the other end down the stairs. Between the two of us the job got done.

6. The dreamer becomes in control to a large extent. Usually there is a relatively positive outcome from the dreamer's actions. The dreamer is central and effective, but not maximally so. [The police were chasing me down an alley. I hid behind a door.]

6a. The dreamer brings the dream situation under control but solutions are banal, simplistic, incomplete, impulsive, tenuous or temporary.

e.g. The jerk was bugging me so I shot him.

e.g. I gave the stray cat some milk and it began to purr.

6b. Strong good feelings may dissolve into ambiguity.

e.g. I was feeling great, I played so well. I then asked the coach for a job and he said I could be bat boy. I was bewildered.

6c. The dreamer makes a continuous or impressive effort or is fully expressive of thoughts and feelings but the outcome is unclear or ambiguous.

e.g. I practised the "Moonlight Sonata" over and over. I don't remember if I got it right.

6d. The dreamer is effective without any apparent effort, emotional investment, thought, or act of will.

e.g. I fell down the mountain but seemed to land safely.

6e. The dreamer expresses mild good feelings or amusement at a positive outcome; or the dreamer evokes mild/moderate laughter/pleasure in others through his/her wit/talent.

e.g. I was enjoying watching the children play.

e.g. I kidded Joe by asking him if he knew for sure what day it was, and he laughed. (In real life Joe came to work on the wrong day last week)

7. The dreamer gains full control of himself and the dream situation. The dreamer excels, is fully expressive and assertive, or central and effective. His response to the dream situation may be creative, innovative, heroic. [The police were chasing me down an alley. I was able to outrun them all and scaled the wall easily. I laughed when I realized I had lost them.]

7a. The dreamer brings the dream situation fully under control with no unfinished business.

e.g. I dreamt I had successfully defended my thesis and was attending my graduation ceremonies.

7b. The dreamer expresses feelings to their fullest extent with exciting or satisfying or experientially luminous results for the dreamer; strong good feelings; laughter.

e.g. I sang a song of great beauty and it was a wonderful pleasure both to sing and to hear.

e.g. The news was broadcast over the radio that Ricardo Montalban had just come down from 162 days on a flagpole. I laughed and laughed and I was still laughing when I awakened.

7c. The dreamer may execute an explicitly thought-through plan or execute a decision based on choices and/or awareness of the intentionality of others. He may express pleasure or self-congratulation at his course of action.

e.g. All the children were somehow expecting me to get them out of this. I couldn't just leave them there with the guerrillas coming, so I hijacked a plane to come and take them to a safe island I knew, then I paid the pilot. If he brought back trouble we would be gone anyway.

7d. The dreamer may start out weakly but increases power and control as the dream progresses; s/he breaks through from weakness to strength. The dreamer may make a continuous or impressive effort and finally succeed.

e.g. I was supposed to marry Michael Jackson but I didn't want to. The wedding preparations were underway and everyone said I had to do it. Finally I yelled out "NO!" and woke up.

7e The dreamer may solve the dream problem with a flash of insight or deductive process.

e.g. In a flash I finally realized what all the clues meant. The three old ladies whose ages I was to judge were

actually my own relatives! The lady with blue hair was ¹⁶²my grandmother; the plump lady was my mother and the one with the cane was her older sister.

7f. The dreamer has great ability or power over him/herself and is powerfully influential.

e.g. My sister was afraid but I convinced her she could learn to fly as easily as I could. I held her hand and we flew off.

e.g. I finished my song and the crowd went wild with applause.

8. This category goes beyond 'control in' the dream and beyond self-control, to 'control over' the dream. The dreamer has control over the dream content or part of it, or may manipulate dream mechanics as would a film director. This is done without any explicit statement of dream lucidity. [The police were close on my heels. I thought of a secret hiding place which was quite far off. I slowed the dream down to give myself a head start, and I got to safety in plenty of time.]

8a. The dreamer may compose the dream, redream the dream, slow the dream down or stop the action in order to interfere with the course of events, or change the ending. The dreamer may be able to will changes in things and other characters. S/he may be able to materialize objects, or make them disappear.

e.g. I didn't like her dying so I changed it by bringing her back to life.

e.g. She was wearing this hideous green dress. I willed it to be red and suddenly it was red.

e.g. I seemed to be inventing this dream about people on another planet as I went along.

8b. The dreamer may choose to wake up.

e.g. Just when the truck was going to roll over me I suddenly decided to wake myself up and I did.

9. This is the category wherein dream control occurs in the context of explicitly stated dream lucidity, or, of explicitly stated out-of-body experience. The dreamer knows

s/he is dreaming (or asleep and thinking) while s/he¹⁴⁹ is dreaming and consciously attempts to exploit this power. Lucidity in which the dreamer exercises no attempt at dream control does not count. However, the entire range of lucid control is contained in this one category, including low levels. [As soon as I realized I was dreaming, all the anxiety of this chase left me. I turned and faced the policemen and changed them all into butterflies.]

9a. The dreamer attempts to control some aspect of the dream as a direct consequence of recognizing the dream state. He may or may not succeed.

e.g. Because I knew I was dreaming I decided to fly to Hollywood and have sex with my favorite movie star.

e.g. I had an out-of-body experience. I hovered above my body as it lay sleeping in the bed. This was boring after a while so I decided to visit my brother in Vancouver and I flew out the window.

e.g. I was relieved to realize that I was dreaming and that this dreary problem was an unnecessary bore. So I turned my back on the scene and went into another dream.

9b. The dreamer may make an explicit decision not to interfere with dream events or an explicit effort/intention to remember this special dream.

e.g. Then suddenly I realized I was dreaming and decided to conduct a little experiment by not trying to do anything at all, just watching to see what would happen.

e.g. In the dream I thought, "I must remember to tell this dream to Lucy."

9c. The insight of lucidity itself may result in a form of control without further intention by the dreamer. The dreamer may gain self-control or the dream may change/resolve as a direct consequence of recognizing the dream state.

e.g. When I realized this was a dream all my fear evaporated.

e.g. Many small details were wrong and this was puzzling me. Steps were too low or too high. We were in a university course with students I knew to be in high school. Suddenly I realized this was a dream. The steps returned to normal and the students were in their correct classes.

Appendix G

Clyde Mood Scale Background and Scoring Manual

CLYDE MOOD SCALE
MANUAL

Third edition

Dean J. Clyde, Ph.D.

Clyde Computing Service

~~4750 Arsenal Street~~

~~Watertown, Massachusetts 02152~~

1985

PO Box 294.
Key Largo Fla
33

305 451-228

PURPOSE

The Clyde Mood Scale is designed to measure human emotions and behavior which are influenced by certain conditions (such as stress) or by drugs (such as antidepressants).

The rating scale consists of 48 items printed on a sheet of paper. It may be used by a person to describe himself or to describe someone else. Six scores are calculated which show how friendly, aggressive, clearthinking, sleepy, depressed and jittery the person is.

ADMINISTRATION

The exact instructions to be used should be carefully thought out ahead of time and written down. What you say depends upon the purpose of your research.

If a person is to describe himself, say something like: "Please make a check mark after each word to show how you feel now."

If the person is to describe someone else, say something like: "Please make a check mark after each word to show how John Doe is today."

QUALIFICATIONS REQUIRED FOR ADMINISTRATION

The only qualifications necessary for administration are reasonable intelligence and familiarity with the instructions. The scale has been successfully administered by secretaries, nurses and research assistants, as well as by psychologists and psychiatrists.

QUALIFICATIONS REQUIRED FOR INTERPRETATION

A professionally-trained investigator is ordinarily required for interpretation. He must know the purpose of the study and the type of person who made the rating. Scores should not always be taken at their face value. There is evidence, for example, that schizophrenic patients often rate themselves as being very clearthinking, but that doctors and nurses do not agree.

SOURCES OF ITEMS

The author discussed adjective check lists with Vincent Nowlis of the University of Rochester and Harrison Gough of the University of California at Berkeley. Both of these psychologists have explored the possibilities of this type of rating instrument and their experience provided a valuable starting point for our research. In addition, clinical reports of the effects of stress and drugs were scrutinized and adjectives selected which seemed to be relevant. The list was narrowed down to 133 items on the basis of the author's judgment. They were placed in random order and always presented to subjects in the same order. They are listed in Table 1. Practically all of the adjectives in the scale should be understandable to a person with an eighth grade education.

REDUCING THE NUMBER OF ITEMS

It was decided to find out what factors the 133 items seemed to be measuring and to keep the items that were the best indicators of those factors. No attempt was made to select items which were sensitive to the effects of a particular stress or a particular drug, because it was desired to develop a scale which would pick up the effects of many different stresses and drugs under various circumstances.

Five hundred self-ratings, done by a variety of normal subjects and psychiatric patients, were chosen for study. The first of the 133 items was discarded for convenience, and the remaining 132 items were divided into three groups of 44 items each by selecting every third one. Each group of items was intercorrelated, principal axes computed, and rotated by normalized varimax. The 44 items showing the highest factor loadings from these three analyses were selected, and a fourth factor analysis performed on them.

The same stepwise procedure was followed with 500 ratings which had been made describing not the rater himself but someone else. The factors obtained were compared with those from the self-ratings. The six largest factors appeared to be almost identical for the two groups. Because of this unexpected finding it was decided to develop one scoring key which could be used both for self-ratings and ratings describing others. If self-ratings had yielded quite different factors from the ratings of others, two different scoring keys would have been sought, but that complication did not appear to

133 Items in Original Form of Clyde Mood Scale

1. easygoing	45. considerate	90. sleepy
2. rebellious	46. bitter	91. cooperative
3. light-hearted	47. lonely	92. dizzy
4. clearthinking	48. furious	93. cheerful
5. contented	49. fearful	94. ashamed
6. sluggish	50. complaining	95. dreamy
7. ambitious	51. efficient	96. good-natured
8. sulky	52. frustrated	97. alert
9. skeptical	53. sick to the stomach	98. grouchy
10. friendly	54. tense	99. worried
11. carefree	55. daring	100. genial
12. gloomy	56. slow	101. humorous
13. sexy	57. self-conscious	102. sad
14. worthless	58. unhappy	103. affectionate
15. agreeable	59. businesslike	104. dependable
16. excited	60. quiet	105. able to work ha
17. impulsive	61. kind	106. adventurous
18. withdrawn	62. violent	107. amused
19. serious	63. resentful	108. helpless
20. stubborn	64. careful	109. independent
21. critical	65. afraid	110. nagging
22. obedient	66. suspicious	111. downhearted
23. unreal	67. trouble with sleeping	112. sick
24. excitable	68. boastful	113. inactive
25. able to concentrate	69. bossy	114. pleasant
26. touchy	70. sociable	115. energetic
27. troubled	71. pleased	116. jittery
28. defiant	72. demanding	117. fatigued
29. timid	73. impatient	118. confused
30. vigorous	74. depressed	119. playful
31. earnest	75. satisfied	120. sarcastic
32. enthusiastic	76. angry	121. wide awake
33. talkative	77. optimistic	122. irritable
34. calm	78. weary	123. absent-minded
35. restless	79. moody	124. warm-hearted
36. careless	80. confident	125. refreshed
37. shy	81. bored	126. annoyed
38. emotional	82. active	127. tired
39. shocked	83. lazy	128. shaky
40. selfish	84. relaxed	129. lively
41. quarrelsome	85. happy	130. drowsy
42. nervous	86. rude	131. bold
43. reckless	87. anxious	132. unpredictable
44. dull	88. forceful	133. empty
	89. polite	

be necessary.

Forty-eight items which had high factor loadings for both self-ratings and ratings of others were retained for the current version of the scale.

SCORING SYSTEM

Using all thousand ratings referred to in the previous section, the intercorrelations of the 48 selected items were computed. Pairs of items which correlated highly were added together, yielding 24 pairs. These 24 pairs were intercorrelated, principal axes computed, and rotated by varimax. The optimum weights for each pair of items were estimated by multiple regression procedures. These weights yield six factor scores whose intercorrelations are practically zero. Each pair of items is weighted differentially according to its relevance to each factor. The weights are given in Table 2.

The steps for calculating the "Friendly" score will be used as an example.

(1) Determine in which category the first item, "sad," listed in Table 2 had been marked by the rater. If it was marked in the first category, "Not at all," give this item a value of 1. If it was marked in the second category, "A little," give it a value of 2. The third category, "Quite a bit," would result in a value of 3, and the fourth category, "Extremely," would result in a value of 4. Assign a value to each of the other items in the list in the same manner.

(2) Add the values for the first two items, "sad" and "downhearted." Since the possible values for each item range from 1 to 4, the sum of the two will range from 2 to 8. Add the values for each of the other pairs of items in the same fashion.

(3) Multiply the sum for the first pair by the first weight given in Table 2, .019. Multiply the sum for the second pair of items by .010. Continue multiplying the sum for each successive pair of items by the appropriate weight in the column headed "Friendly." Add up all of these products, which becomes the sum of products for the factor "Friendly."

(4) Multiply this sum of products by the constant A from Table 3, 9.786.

(5) Add the constant B from Table 3, 9.5525. The result is the score for "Friendly."

Weights for Pairs of Items

170

Items	Friendly	Aggres- sive	Clear- thinking	Sleepy	Depressed	Jittery
sad	.019	-.009	.029	-.004	.150	-.079
downhearted						
unhappy	.010	-.006	.030	-.022	.144	-.085
depressed						
fatigued	.013	-.017	.017	.256	.020	.023
tired						
troubled	.030	.003	.022	-.064	.148	-.042
worried						
good-natured	.214	-.001	-.080	-.003	.034	-.033
pleasant						
sleepy	.010	.011	-.005	.540	-.086	-.106
drowsy						
jittery	.043	-.006	-.023	-.112	.055	.250
shaky						
clearthinking	-.085	-.015	.223	-.009	-.015	.071
able to concentrate						
kind	.196	-.009	-.040	.037	.047	-.031
warm-hearted						
rude	-.054	.138	.043	.061	-.014	-.038
sarcastic						
lonely	.033	.000	-.005	-.040	.141	-.070
afraid						
humorous	.168	.071	-.117	-.008	-.052	.031
playful						
bossy	-.036	.125	.059	-.022	-.009	.063
demanding						
impulsive	.111	.111	-.171	-.069	-.011	-.015
reckless						
friendly	.166	.011	-.061	-.011	-.021	.046
sociable						
grouchy	-.093	.106	.114	.071	.024	.014
nagging						
defiant	-.037	.114	.028	.009	.016	-.021
quarrelsome						
daring	.071	.131	-.046	-.012	-.010	-.126
bold						
efficient	-.030	.017	.226	-.068	.044	.051
alert						
dependable	-.013	-.008	.193	.024	.055	-.055
able to work hard						
considerate	.137	-.052	.061	-.008	.099	-.006
polite						
boastful	.024	.146	.023	-.005	-.008	-.014
forceful						
sick to the stomach	-.010	-.033	.012	-.053	-.135	.828
dizzy						
businesslike	-.057	.041	.215	.064	.008	-.050
independent						

Constants Applied to Sums of Products

<u>Constant</u>	<u>Friendly</u>	<u>Aggres- sive</u>	<u>Clear- thinking</u>	<u>Sleepy</u>	<u>Depressed</u>	<u>Jittery</u>
A	9.786	9.838	9.680	9.965	9.716	10.019
B	9.5525	21.8515	16.2546	32.1387	19.0371	36.5415

The other five scores are calculated in a similar fashion, using the weights and constants from the appropriate columns of Tables 2 and 3.

These weighted scores yield a mean of 50 and a standard deviation of 10 for our sample of 1000 cases. A given investigator will usually have a more restricted range of subjects than we used, and will therefore find smaller standard deviations. He will quite likely find different means, also. Schizophrenics, for example, usually obtain higher "Depressed" scores than normals.

VALIDITY

The Clyde Mood Scale was designed to measure the effects of stress and drugs on human emotions and behavior, and its validity may be judged by its ability to do this. In our research we have defined stress or drug effects as the difference between a stressed or a drug group and a control group. A scale valid for measuring stress or drug effects, then, will differentiate a stressed group from a control group, or a drug group from a placebo group. Of course it might do this for one type of stress but not for another, or for one drug but not another, which would indicate that the scale was valid for measuring some stress or drug effects but perhaps not all.

The National Institute of Mental Health organized a nine-hospital collaborative study of the effects of phenothiazines on schizophrenics. The principal rating scales used were doctors' ratings on the Inpatient

Multidimensional Psychiatric Scale (Lorr et al), nurses' ratings on the Ward Behavior Rating Scale (Burdock et al) and the Clyde Mood Scale, used by doctors, nurses and patients. The ability of these scales to differentiate the drug and placebo groups after six weeks of treatment is shown in Table 4.

The most valid scale, by a slight margin, for measuring drug effects in the NIMH Collaborative Study was the Clyde Mood Scale as rated by nurses. The drugs made the patients more friendly, less aggressive and more clearthinking.

Hundreds of scientific articles have reported on the use of the Clyde Mood Scale in research. Table 5 lists some of the conditions and drugs which have been found to affect scores on the Clyde Mood Scale. It can be seen from Table 5 that the Clyde Mood Scale is a valid measure in a wide variety of situations.

RELIABILITY

Reliability of a rating scale may be evaluated by agreement among raters. Some typical figures are given in Table 6.

NORMS

Means and standard deviations for a miscellaneous group of normal subjects are shown in Table 7. These ratings were obtained by seven investigators in various parts of the United States. The subjects were from many walks of life, only a small number of them being college graduates. These figures should be used to get a rough idea of how normals mark the items. A particular investigator's normal group will probably differ in many respects from ours. The table also shows some schizophrenics for comparison.

INTERPRETATION OF SCORES

A higher numerical score means that the subject is described as showing that factor to a greater extent. If a "Friendly" score goes from 40 before drug to 55 after drug, it indicates that the subject became more friendly. To be precise, it indicates that the items weighted in the "Friendly" factor were marked in categories more toward the "Extremely" end of the scale after the drug. The clinical significance of this observation depends upon the circumstances surrounding the rating. It has been the author's experience that it is very difficult to know what clinical significance to attach to a

TABLE 4

Misclassifications of Drug and Placebo Patients
According to Scores Optimally Weighted by Discriminant Functions

(N = 328)

<u>Scale</u>	<u>Raters</u>	<u>Percent of Cases Misclassified</u>
Inpatient Multidimensional Psychiatric Scale	Doctors	24
Ward Behavior Rating Scale	Nurses	25
Clyde Mood Scale	Doctors	25
Clyde Mood Scale	Nurses	20
Clyde Mood Scale	Patients	27

TABLE 5

Validity of the Clyde Mood Scale:
Studies Showing that Scores Were Affected
By Various Drugs or Conditions

<u>Drug or Condition</u>	<u>Reference</u>
Antianxiety drugs	5, 6, 14, 15
Antidepressant drugs	1
Alcohol	11, 13
Amphetamine	12, 18
Estrogens	17
Nitrous oxide	2
Aspirin	8
Methadone	3
Hallucinogen	4
Thyroid function	19
Sleep	7, 12, 15, 16
Schizophrenia	10
Anxiety	6
Herpes	9

TABLE 6

Intraclass Correlation between Raters

<u>Raters</u>	<u>No. of Patients</u>	<u>Location</u>	Clyde Mood Scale Factor					
			<u>Fr</u>	<u>Ag</u>	<u>Cl</u>	<u>Sl</u>	<u>De</u>	<u>Ji</u>
2 nurses	29	Kentucky State Hosp.	.78	.91	.73	.54	.74	.37
2 nurses	46	Malcolm Bliss Mental Health Center, St. Louis	.80	.84	.87	.53	.78	.59
2 doctors	33	Mercy-Douglass Hosp., Philadelphia	.73	.45	.66	.63	.53	.56
2 doctors	38	Rochester State Hosp., New York	.67	.62	.82	.32	.74	.41

TABLE 7

Means and Standard Deviations of Clyde Mood Scale Scores for Several Groups

Group	Rater	No. Cases	Friendly		Aggressive		Clear thinking		Sleepy		Depressed		Jittery	
			M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Normal males	Self	100	53.03	8.85	50.40	7.70	55.03	8.14	50.26	8.05	42.32	4.14	46.66	5.69
Normal females	Self	100	54.93	7.28	46.83	5.67	49.37	7.05	54.00	12.40	42.32	5.04	48.01	6.12
Newly-admitted schizophrenics	Self	303	52.62	11.28	52.50	10.81	52.93	10.02	52.48	10.85	51.03	8.71	53.39	12.45
Newly-admitted schizophrenics	Dr.	446	38.85	10.43	47.55	10.81	40.94	8.56	41.62	8.44	50.76	10.12	45.68	6.39
Newly-admitted schizophrenics	Nurse	430	43.03	10.08	47.37	11.03	41.83	8.65	45.80	9.33	55.17	10.28	42.57	6.97

score unless the rating has been obtained in the context of a controlled experiment. A control group in a drug study usually receives either a placebo or a standard drug. That group, then, serves as a basis for evaluating the effects of the drug. Without a control group to guide our interpretations, we can only speculate on the meaning of scores which go up or down with the passage of time.

To assist in interpreting scores from the Clyde Mood Scale, the four principal items included in each factor are shown in Table 8.

In a previous version of this scale, the fifth factor was named "Unhappy" and the sixth was called "Dizzy." As a result of suggestions from users of the scale, these two names have been changed to ones which perhaps more accurately describe what is being measured: "Depressed" and "Jittery." The items and weights which make up the new "Depressed" and "Jittery" scores are exactly the same as those included in the old "Unhappy" and "Dizzy" scores.

MECHANICS OF SCORING

Clyde Mood Scales are most feasibly scored on a computer. They may be sent to Clyde Computing Service, ~~4300 Alford Street, Tallahassee, Florida 32303~~ for this purpose.

Dean J. Clyde, Ph.D.
CLYDE COMPUTING SERVICE

P.O. Box 2941
Key Largo, Florida 33037

(305) 451-2283

TABLE 8

Principal Items Included in Each Factor

<u>Factor</u>	<u>Four Principal Items</u>
Friendly	good-natured pleasant kind warm-hearted
Aggressive	boastful forceful rude sarcastic
Clearthinking	efficient alert clearthinking able to concentrate
Sleepy	sleepy drowsy fatigued tired
Depressed	sad downhearted troubled worried
Jittery	jittery shaky dizzy sick to the stomach

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IMAGE EVALUATION TEST TARGET (QA-3)

APPLIED IMAGE, Inc
1653 East Main Street
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Fax: 716/288-5989

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