Lucid Dreaming as a Learnable Skill:  
Empirical and Clinical Findings

By

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Abstract

The efficacy of a lucid dream induction (LDI) technique was evaluated. The results indicated that, among previously non-lucid dreamers, a significantly greater proportion of subjects who had access to the technique reported a lucid dream. This group also reported more lucid dreams overall than the control group. For prior lucid dreamers, the technique was found to increase the number of such dreams reported, relative to baseline levels. The LDI technique was incorporated into a treatment procedure for recurrent nightmares. This treatment method was found to be effective in three individuals, although not all of them achieved a lucid dream state. The empirical and clinical findings reported are discussed with respect to previous findings and future research directions are suggested.
Résumé

L'efficacité d'une technique d'induction de rêves lucides (IRL) a été examinée. Les résultats indiquent qu'une proportion significative de sujets qui auparavant n'avaient pas de rêves lucides ont rapporté de tels rêves suite à l'utilisation de la technique. Ces mêmes sujets ont aussi rapporté dans l'ensemble un nombre plus élevé de rêves lucides que le groupe contrôle. L'utilisation de la technique a aussi produit une augmentation du nombre de rêves lucides chez des sujets qui auparavant avaient déjà ce genre de rêves. La technique IRL a été incorporée dans un traitement des cauchemars récurrents. La technique s'est avérée efficace dans trois cas qui, cependant, n'ont pas tous atteint un état de rêves lucide. Les résultats empiriques et clinique sont discutés en tenant compte de la littérature, et des avenues pour la recherche à venir sont proposées.
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Introduction

A person may realize that he or she is dreaming while still in the dream state. Such dreams have been called Dreams of Knowledge by Oliver Fox (1962). Paul Tholey, a German psychologist who first began to study conscious dreaming in 1959, called the phenomena *Klarraum*, a German word meaning "clear dream". These dream experiences, however, are more commonly known as "lucid dreams", a term first introduced by van Eeden (1913). References to lucid dreaming date back at least to the time of Aristotle, and have appeared in a variety of contexts, ranging from a letter written in A.D. 415 by St. Augustine, to the writings of Friedrich Nietzsche, and ancient Tibetan Buddhist texts (Gillespie, 1988; LaBerge, 1985). Though several works on the phenomenon appeared in the 19th and early 20th century (e.g., Arnold-Forster, 1921; Brown, 1936; Saint-Denys, 1982/1867; van Eeden, 1913), it is really only in the past decade that lucid dreaming has become the subject of scientific inquiry.

The goals of this thesis are to investigate the extent to which lucid dreaming is a learnable skill, and to explore the potential benefits of this dream state in the treatment of recurrent nightmares. The thesis begins by examining various definitions of lucid dreaming. The literature indicating the utility of lucid dreaming in various areas is summarized. These areas include the study of the psychophysiological correlates of dream content, and the use of lucid dreaming in the clinical domain, with a particular emphasis on nightmares. This is followed by a review of the literature concerning techniques for lucid dream induction.

The second section of this thesis reports an experiment in which the efficacy of a technique for inducing lucid dreams was empirically evaluated. The results of this experiment are explored with respect to previous findings, and possible clinical applications. The third section presents the results of a test of one potential clinical application. A new treatment procedure based on lucid dreaming is outlined and its relative efficacy discussed in light of results obtained in three case studies. Finally, some general
conclusions are offered with respect to both the previous literature and the experimental and clinical findings presented in this thesis.

Definitions of Lucid Dreaming.

What exactly is a lucid dream? Various definitions of the experience have emerged in the literature. The simplest of these states that lucid dreams are those in which the subject is aware that he or she is dreaming (e.g., Green, 1968). It is this basic definition which appears most frequently. Other researchers, such as Hearne (1981; 1987), have added a qualifier: that one has to become perfectly or fully aware that one is dreaming. Exactly what is meant by the terms "perfectly" or "fully" is not explicitly stated, but it appears that Hearne considers the ability to consciously exert control over events in the dream scenery to be an important aspect of dream lucidity. It should be noted, however, that even though lucidity in dreams is often accompanied by varying degrees of dream control, this ability is not in itself a sufficient indicator of lucidity. This point is clearly made by Tart (1988) and is evident in one of the case studies presented at the end of the thesis. A broader and more precise definition of what constitutes a lucid dream is given by LaBerge (1980) who suggests that the consciousness experienced by a lucid dreamer is not unlike that which is experienced during the waking state. Thus LaBerge (1980) writes that "the lucid dreamer can reason clearly, remember freely, and act volitionally upon reflection, all while continuing to dream vividly" (p.1039). Similarly, Tart (1979) states that a lucid dream consists of more than just having the dreamer realize "This is a dream." Like LaBerge, he suggests that in a lucid dream "the 'higher' mental processes that we think of as characterizing waking consciousness, such as memorial continuity, reasoning ability, volitional control of cognitive processes, and volitional control of body actions (at least for the dream body), all seem to be functioning at a lucid, waking level" (Tart, 1979, p. 256). Tholey (1988) and van Eeden (1913) have also adhered to this conceptualization of the lucid dream state.
It would appear then that the lucid dream experience may be best understood if placed on a continuum. At one end we would have what may be called low-level lucidity, in which an individual may realize that he or she is dreaming, but then wake up, or simply relapse into non-lucid dreaming. In the middle of the continuum would fall those lucid dreams in which the dreamer, in addition to knowing that he or she is dreaming, can also exert some degree of control over the dream environment and retain some but not all of his or her waking mental faculties. Thus a person in this situation may be able to move about in the dream scenery as he or she pleases, but may be unable to alter some aspects of the dream, remember what day it is, or remember what their agenda for the following day consists of. At the high end of the continuum are those dreams in which an individual can exert a considerable amount of control over the dream content and, most importantly, is in possession of his or her mental faculties to the same extent as if the person were fully awake.

To this continuum should also be added what Green (1968) has termed "pre-lucid dreams" as well as the phenomenon of "false-awakenings". The former refers to those dreams "in which the subject adopts a critical attitude towards what he is experiencing, even to the point of asking himself 'Am I dreaming?' but without realizing that he is in fact doing so" (Green, 1968, p.23). The latter refers to those dream experiences in which one dreams that one has woken up, usually in their normal sleep environment. Both of these phenomena are known to occur in lucid dreamers, especially novices (Blackmore, 1988; Green, 1968; LaBerge, 1985; van Eeden, 1913).

The notion that lucid dreaming may best be conceptualized as encompassing a range of "lucidity", as well the aforementioned dream experiences, is reflected in Stewart and Koulack's (1989-1990) recent attempt to devise a coherent system for scoring lucid dreams. The scale they propose, called the Lucid Dream Rating System (LDRS), consists of a seven-point scale ranging from 0-6, with each point applicable to a different type of dream report. A score of zero is indicative of no dream recall; 1 = a nonlucid dream; 2 = a
false awakening; 3 = a prelucid dream; 4 = a lucid dream; 5 = a lucid dream with control perceived but not exercised; and 6 = a lucid dream with control both perceived and exercised. The authors reported shortcomings in the inter-rater reliability scores for some of the categories but suggested modifications (i.e., collapsing some categories) which should result in a more reliable instrument.

The following are some examples of lucid dreams taken from various sources. These should make clear what is meant by lucid dreaming and "degree of lucidity". The first example comes from a subject who took part in the experiment described in the second part of the thesis. This dream is an example of "low-level lucidity."

I dreamt that I was at a party at a friend's place. There are a lot of people around, some of whom I don't know. I go to the kitchen to get a snack. I open the fridge and get myself a beer and grab a bag a chips. As I'm returning to the living room, I realize that I am dreaming (I don't know how I came to this conclusion but I was certain that it was a dream). As I enter the living room, I notice more people coming into the apartment and some guy starts to get sick in his chair. Then I woke up.

A more complex use of one's faculties of reasoning and logic are in evidence in the following dream, reported by Moers-Messmer (1938) (cited in LaBerge, 1985).

From the top of a rather low and unfamiliar hill, I look out across a wide plain towards the horizon. It crosses my mind that I have no idea what time of year it is. I check the sun's position. It appears almost straight above me with unusual brightness. This is surprising, as it occurs to me that it is now autumn, and the sun was much lower only a short time ago. I think it over: The sun is now perpendicular to the equator, so here it has to appear at an angle of approximately 45 degrees. So if my shadow does not correspond to my own height, I must be dreaming. I examine it: It is about 30 centimeters long. It takes considerable effort for me to believe that this almost blindingly bright landscape and all of its features to be only an illusion (pp.38-39).

Finally, the ability to successfully direct lucid dreams through volition is exemplified in this dream from Saint-Denys (1982/1867).

I dream I have discovered great magical secrets by means of which I can call up the shades of the dead and also transform men and things according to my desires and will. First, I call up two people who died several years ago, whose images now appear in faithful detail and with the utmost clarity. I wish to see an absent friend and immediately see him lying asleep on a sofa. I change a porcelain vase into a rock-crystal fountain, from which I desire a cooling drink—and this immediately flows out through a golden tap.
years ago I lost a particular ring whose loss I felt deeply. The memory of it comes into my mind, and I should like to find it. I utter this wish, fixing my attention on a piece of coal that I pick up from the fireplace—and immediately the ring is in my fingers (p.57).

Lucid Dreaming in the Sleep Laboratory

In 1953, Aserinsky and Kleitman made the serendipitous discovery that dreams tended to occur during periods of regularly occurring rapid conjugate eye movements (REM). Following this major breakthrough, REM sleep quickly became the focus of intensive scientific investigation. It was hoped that the objective study of this particular stage of the sleep cycle would give rise to a new and better understanding of the dream process. Though much knowledge concerning the nature and function of REM sleep emerged from such research efforts, the attempt to find specific physiological correlates of dream content yielded very limited results (see LaBerge, 1985). Until recently, such research had been severely limited by the inability of experimenters to ensure that a subject would engage in desired dream activities and by the fact that researchers had no way of knowing what the dreamer was doing in their dream or when it was being done.

As was mentioned earlier, dreamers who find themselves in a lucid state can recall events from their waking life (i.e., their memory faculties remain largely intact), can retain their capacity for reason, and move their dream bodies as they desire. These characteristics led LaBerge and his colleagues (1981) to investigate the possibility that "lucid dreamers could signal that they were dreaming by means of intentional dream actions having observable physiological correlates" (p.728). Based on previous observations made by Rechtschaffen (1973), LaBerge concluded that the most promising dream actions for the task at hand would be volitional eye movements (recorded by electro-oculograms) and forearm muscle contractions (recorded by electromyogram). As will be discussed below, this new approach to dream research proved to be methodologically sound and resulted in several notable experimental findings.
It should be noted that, unknown to LaBerge, Keith Hearne of the University of Hull in England had, a few years earlier, begun to investigate physiological correlates of dream content in a manner similar to that suggested by LaBerge. Alan Worsley, a proficient lucid dreamer and a subject in Hearne's initial investigations, is credited with having been the first lucid dreamer to send a polygraphically observable signal from within a dream (LaBerge, 1985; Worsley, 1988).

Some researchers had suggested that lucid dreams occurred either during periods of brief awakenings (Schwartz and Lefebvre, 1973) or during non-REM (NREM) sleep (Antrobus and Fisher, 1965). Recent empirical evidence, however, has lent clear support to the position that lucid dreams largely take place during unequivocal REM sleep (Brylowski, Levitan, & LaBerge, 1989; LaBerge, Nagel, Taylor, Dement, & Zarcone, 1981; Ogilvie, Hunt, Kushnirik, & Newman, 1983).

The use of signalling in the psychophysiological study of REM sleep has been applied successfully to investigate the extent to which dreamed patterns of respiration are paralleled by actual patterns of respiration (LaBerge and Dement, 1982a); to examine lateralization of alpha activity during specific dream activities (LaBerge and Dement, 1982b); in determining the extent to which dreamed sexual activity is reflected in physiological measures (LaBerge, 1985; LaBerge, Greenleaf and Kedzierski, 1983); in linking dream speech to the expiratory phase of the respiration cycle (Fenwick et al., 1984); to examine the relation between EMG activity and various dreamed limb activities (Fenwick et al., 1984); and in determining how close dream time estimates resemble real clock time (LaBerge, 1985). The findings of these studies indicate that there exists a close parallel between the physiological effects of various dreamed activities and the corresponding effects that would be observed if such activities were carried out during the waking state.

For example, in the previously mentioned experiment on dreamed sexual activity by LaBerge, Greenleaf and Kedzierski (1983), the subject, a proficient lucid dreamer, had been instructed to make three eye-movement signals in her lucid dream. The first signal
was to be made when the subject became lucid; the second at the onset of dreamed sexual
activity; and the third signal when she experienced orgasm. Sixteen channels of
physiological data were recorded in the laboratory including EEG, EOG, EMG, respiration
rate, skin conductance levels, heart rate, vaginal EMG, and vaginal pulse amplitude. All
autonomic physiological measures, with the exception of heart rate, corresponded
significantly with dreamer's subjective report of sexual activity and orgasm.

The similarities in brain activity between cognitive tasks performed in REM sleep and
during wakefulness are evidenced in another experiment, that of by LaBerge and Dement
(1982b). Singing and counting are tasks that typically engage the two brain hemispheres
differentially in terms of alpha activity. The former results in relatively greater engagement
of the left cerebral hemisphere, while the latter results in relatively greater engagement of
the right cerebral hemisphere. Four subjects, 2 male (one right-handed and one left-
headed) and 2 female (one right-handed and one left-handed) took part in the study. All
subjects were first monitored during wakefulness while performing the two activities.
Then, once in the sleep laboratory, they were instructed to signal, by means of eye-
movements, the onset of lucidity; to then sing a predetermined song in their dream; to
signal again when the singing was completed; to count from one to ten; and to signal a final
time after the second task had been performed. In all cases, the brain displayed the same
patterns of lateralization of alpha activity during these tasks as had been observed in the
subjects while performing them during wakefulness.

The findings from these and other such experiments have been reviewed by LaBerge
(1988a) and have led him to suggest that:

All of these results support the conclusion that the events that we experience
while asleep and dreaming produce effects on our brains (and to a lesser
extent, bodies) remarkably similar to those that would be produced if we were
actually to experience the corresponding events while awake. The reason for
this is probably that the multimodal imagery of the dream is produced by the
same brain systems that produce the equivalent perceptions (c.f. Finke,
1980). Perhaps this is why dreams are so real: To our brains, dreaming of
doing something is equivalent to actually doing it (p.151).
The Incidence of Nightmares

Traditionally, the term "nightmare" has been used to refer to two distinct types of sleep disorders, namely, actual nightmares, and what are known as night terrors. Several studies, however, have clearly differentiated these two experiences (Broughton, 1968; Ficher, Byrne, Edwards & Kahn, 1970). As mentioned by Hartmann (1984; 1989), nightmares and night terrors are both biologically and psychologically different. For example, nightmares are characterized by the presence of visual imagery (frequently situations in which the dreamer is in danger) and strong negative affect (e.g., intense fear, anxiety, guilt and horror). These dreams are usually remembered in detail, typically end with the subject's waking up, and are are known to occur largely, though not exclusively, in REM sleep (Hefez, Metz & Peretz, 1987). On the other hand, night terrors (also known as pavor nocturnus in children and incubus attack in adults) are marked by the relative absence of recall of dream imagery and the presence of intense autonomic activation, and tend to occur in slow-wave sleep (stage 3-4 sleep). For a more detailed account of the differences between these parasomnias, see Erman (1987), Thorpy and Glovinsky (1987), and Hartmann (1984).

Nightmares have been documented to occur as a concomitant of numerous traumatic experiences. For example, the occurrence of nightmares has been reported in subjects with post-traumatic stress disorder (Hefez, Metz, & Lavie, 1987; van der Kolk, Blitz, Burr, Sherry & Hartmann, 1984); combat veterans (DeFazio, 1975); survivors of the Holocaust (Krystal & Neiderland, 1971); Latin American survivors of torture (Hefez, Allodi & Moldofsky, 1985); survivors of natural disasters (Lifton & Olsen, 1976); young victims of kidnapping (Terr, 1981; 1983); the sexually abused (Garfield, 1987); and in refugees (Cernovsky, 1988; 1990).

Studies which have attempted to investigate the prevalence of nightmares have yielded different estimates depending on the methods employed and populations studied. According to the American Psychiatric Association's (1987) most recent Diagnostic and
Statistical Manual of Mental Disorders, current complaints of nightmares are said to occur in 5% of the general population with another 6% reporting a past complaint. These figures are consistent with the findings reported by Bixler, Kales, Soldatos, Kales and Healy (1979) and Klink and Quan (1987). This figure, however, reflects the incidence of complaints of nightmares, rather than the general rate of occurrence in the population as a whole.

With respect to the incidence of nightmares in sub-classes of the general population, several pertinent studies can be found in the literature. In his study of over 650 people, Cason (1935) investigated the occurrence of nightmares in six different types of individuals. His findings indicated that the percentage of subjects in each of the categories reporting one or more nightmares were: 32% for normal children; 24% for crippled children and adults; 19% for normal adults (described as summer session students); 18% for blind students; 13% for "feeble-minded" patients; and 7% for psychiatric patients. Among college and university students, findings indicate that between 76-86% of the subjects report having had at least one nightmare in the past year, while 8-25% of them report having had nightmares at least once or more a month (Belicki, 1985; Belicki & Belicki, 1982; Belicki & Belicki, 1986; Feldman & Hersen, 1967; Haynes & Mooney, 1975). Recent studies by Cernovsky (1985; 1986) have indicated that approximately 25% of both chronic male alcoholics and female alcohol and drug users report having nightmares every few nights (item 31 of the MMPI).

In assessing the prevalence of nightmares, the studies reviewed above have made use of retrospective self-reports in order to obtain their data. The findings reported in a recent study by Wood and Bootzin (1990) have indicated that such a method may be underestimating the prevalence of nightmares. By using retrospective self-reports with 220 students, the investigators obtained levels of nightmare incidence for the past year and past month similar to the ones reviewed earlier. In contrast, by using two week dream log reports, the estimated frequency of nightmares became significantly greater than those
obtained through retrospective methods. The results of this experiment are noteworthy in that nightmares may well be more prevalent than is suggested in previous reports.

**Clinical Applications of Lucid Dreaming.**

In recent literature, several authors have suggested various psychological benefits that may be obtained through lucid dreaming (e.g., Kelzer, 1989; LaBerge, 1985; Malamud, 1988; Tholey, 1988). The notion that lucid dreaming may be of benefit in a clinical context, especially in the treatment of nightmares, is not new. Arnold-Forster (1921), in her book *Studies in Dreams*, recounts how she eliminated her "bad" dreams by means of lucid dreaming and writes on the feasibility of treating children's nightmares in a similar fashion. In the past 10 years, several papers have been written concerning the clinical utility of lucid dreaming. Unfortunately, controlled studies on this issue remain to be conducted. Thus, the evidence presented below is based on personal accounts and documented case studies.

Both Saint-Denys (1982/1867) and LaBerge (1985) have reported on nightmares in which they became lucid and then subsequently proceeded to change the course of the dream in a positive direction. Similar anecdotal accounts are contained in LaBerge and Rheingold's (1990) *Exploring the World of Lucid Dreaming*. This process (i.e. using lucidity to alter nightmares) has also been utilized by the present author.

Halliday (1982; 1988) has reported two case studies in which he successfully treated recurrent nightmares by having the clients become lucid in their nightmares and attempt small alterations to the dream scenery. In a recent article, Brylowski (1990) reported the case of a client presenting with a history of borderline personality disorder, major depression, and nightmares, which were experienced one to four times a week. By using training in lucid dreaming within the therapy, Brylowski was able to assist his client in reducing the frequency and intensity of the nightmares. Galvin (1991) is currently
investigating the utility of hypnotic induction of lucid dreams in life-long nightmare sufferers, and has reported positive results in two subjects thus far.

Tholey (1988) describes what he calls a "self-healing program" based on lucidity training. The program "contains guidelines on (1) in the techniques for inducing and ending lucid dreams, (2) on methods for incubating and manipulating the contents of lucid dreams, (3) on the appropriate behavior regarding resistance (such as 'defense' or 'avoidance' mechanisms), and (4) on helpful principles for interaction with other dream figures" (pp.272-273). By using this program within the context of psychotherapy, Tholey reports having successfully treated clients with recurrent nightmares as well as improving the conditions of clients with other symptoms such as anxiety, shyness, and social adjustment difficulties.

Anecdotal evidence suggesting other benefits of dream lucidity has also appeared in various sources including two recent books on lucid dreaming. The following dream, taken from LaBerge and Rheingold's (1990) *Exploring the World of Lucid Dreaming*, suggests how this dream state may be useful in alleviating performance anxiety:

I am studying to become a professional musician (French horn), and I wished to remove my fear of performing in front of people. On several occasions I placed myself in a state of self-hypnosis/daydreaming by relaxing my entire body and mind before going to sleep. Then I focused on my desire to have a dream in which I was performing for a large audience by myself but was not nervous or suffering from any anxiety. On the third night of this experiment, I had a lucid dream in which I was performing a solo recital without accompaniment at Orchestra Hall in Chicago (a place where I have performed once before, but in a full orchestra). I felt no anxiety regarding the audience, and every note that I played made me feel even more confident. I played perfectly a piece that I had heard only once before and never attempted to play, and the ovation I received added to my confidence. When I woke up, I made a quick note of the dream and the piece that I played. While practicing the next day, I sight-read the piece and played it nearly perfectly. Two weeks (and a few lucid dream performances) later, I performed Shostakovich's Fifth Symphony with the orchestra. For the first time, nerves did not hamper my playing, and the performance went extremely well (p.4).

A similar example, this one related to a fear of insects, is contained in Gackenbach and Bosveld's (1989) *Control Your Dreams*:
I used to be petrified of bugs: insects, spiders, nasty crawly things... So, one night I resolved that I was going to dream myself into a talk with bugs. I dreamt that I became very small, so small that cockroaches became ten feet tall. You would think that the very idea of a ten-foot cockroach would send me into hysterics, but I was in control of the dream and I wasn't afraid. So I had a conversation with this cockroach. And I looked at him up close. He really didn't look all that repulsive like bugs usually do when they blow up photos of them for Smithsonian or National Geographic magazines. We had a nice talk, and while I was at it, I dreamt myself into being a bug so I could see what it was like... It wasn't really scary anymore, just different. I could look at him and say, "Yeah, that's a cockroach" with as little emotion as I could say, "Yeah, that's a poodle." Then when I woke up I wasn't afraid of bugs anymore. I don't go around talking to them, but I could pick one up if I had to. I can handle them now, where before I couldn't even look at them (pp. 91-92).

The examples and case studies above should not be construed to indicate that lucid dreaming is a panacea for psychological disorders. Some negative experiences with dream lucidity have been reported (e.g., Gackenbach & Bosveld, 1989; MacTiernan, 1987). What it does indicate, however, is that lucid dreaming may be of benefit to some individuals with certain disorders. The issue of when it may be considered appropriate to attempt to use this dream state with a clinical population is a controversial one, and will be dealt with in more detail in the final section of the thesis.

**Lucid Dreaming Induction Techniques**

We have seen that the ability to become lucid in one's dreams has been useful in both the sleep laboratory and within a clinical context. One problem that arises however, is that therapists and researchers alike require techniques that will reliably induce such dreams. For example, one may want to have a client who had never before experienced a lucid dream become lucid during a nightmare. In this situation the task is to induce a lucid dream in a subject who is experientially unfamiliar with this dream state. Similarly, psychophysiological studies of REM sleep typically require lucid dreamers to have such dreams within the limited time period available in the sleep laboratory. The task here will likely involve an attempt to increase the frequency with which an habitual lucid dreamer already experiences lucid dreams. The problem of how to reliably induce lucid dreams is
also important in view of the fact that the ability to dream lucidly is relatively a rare phenomenon. Based on their review of the literature, Snyder and Gackenbach (1988) conclude that a little more than half of the general population has experienced at least one lucid dream in their lifetime with only 21% reporting the experience at a frequency of one or more times a month.

Numerous techniques for lucid dream induction have been suggested in both the scientific and popular literature. Readers familiar with the works of Carlos Castaneda (1972; 1974) will recall Don Juan's suggestion of looking at one's hands in a dream. This technique was supposed to set up dreaming, a reference to what we have called lucid dreaming. Though the authenticity of Castaneda's "non-fictional" works has been seriously questioned (e.g., de Mille, 1976), the technique suggested appears to have some validity and has been used to induce lucid dreams by some researchers (e.g., Zadra, 1990).

The following is a review of some of the most frequently mentioned lucid dream induction (LDI) techniques that appear in the lucid dreaming literature. One of the first procedures developed for inducing lucid dreams was autosuggestion (Garfield, 1974; Saint-Denys, 1982/1867; Tholey, 1983). This method involves telling yourself that you will have a lucid dream, preferably in a relaxed state, immediately prior to sleep onset. Using this method of self-suggestion, Garfield (1976) reports having obtained "a classical learning curve, increasing the frequency of prolonged lucid dreams from a baseline of zero to a high of three per week" (p. 183). Using the same procedure, LaBerge (1980) obtained similar results, reporting an average of 5.4 lucid dreams per month over a 16 month period. The frequency of these dreams ranged from 1 to 13 lucid dreams per month with a maximum of two per night.

Following his initial investigation in lucid dream induction by means of autosuggestion, LaBerge (1980) developed a procedure which he called "mnemonic technique for the
voluntary induction of lucid dreams" (MILD). This technique consists of the following steps:

1. During the early morning, the subject awakens spontaneously from a dream.
2. After rehearsing the dream, the subject engages in 10 to 15 min. of reading or other activity demanding full wakefulness.
3. Then, while lying in bed and returning to sleep, the subject says to himself, "Next time I'm dreaming I want to remember I'm dreaming."
4. The subject visualizes his body lying asleep in bed, with rapid eye movements indicating he is dreaming. At the same time, he sees himself being in the dream just rehearsed (or any other, in case none was recalled upon awakening) and realizing that he is dreaming.
5. The subject repeats Steps 3 and 4 until he feels his intention is clearly fixed (p.1041).

By using this new procedure over a non-consecutive 6 month period, LaBerge (1980) reports having experienced an average of 21.5 (range: 18 to 26) lucid dreams per month, with as many as 4 in a single night.

Tholey (1983) has presented an excellent summary of other techniques for inducing lucid dreams. These techniques were developed following a decade of lucid dream research by Tholey and his colleagues involving over 200 subjects. These methods for inducing lucid dreams include the reflection technique, the intention technique, and the combined technique.

In the reflection technique, the subject begins to pay careful attention to his or her environment during the waking state. While examining the surroundings in a critical fashion, the subject asks him or herself "Is this a dream?" or "Am I dreaming or not?" The subject should ask this "critical question" as Tholey has called it, as frequently as possible, particularly in those situations which resemble some aspect of the subject's own dream experiences. Asking oneself the critical question ("Am I dreaming or not?") close to the time when one goes to bed or while falling asleep is also useful.

The reflection technique is based on the Tholey's (1983) assumption that:

If a subject develops while awake a critical-reflective attitude toward his momentary state of consciousness by asking himself if he is dreaming or not, then this attitude can be transferred to the dream state. The unusual nature of
the dream experience makes it possible for the subject to recognize that he is dreaming (p.80).

In the intention technique, the subject resolves to achieve lucidity in a future dream. In order to accomplish this, the subject should imagine as vividly as possible that "he is in dream situations which would typically cause him to recognize that he is dreaming" (p.80). For example, if you frequently dream of flying, then you should visualize such a flying dream while reminding yourself that partaking in such an activity (in this case, flying) is itself a cue to the fact that you are dreaming. The subject should also resolve to carry out a specific action in a dream. The aforementioned suggestion by Don Juan (i.e. to look at one's own hands) is an example of such a task.

Finally, Tholey recommends the combined technique for lucid dream induction. This method combines aspects of intention and suggestion while stressing the development of a critical-reflective frame of mind (i.e. the reflection technique). The technique is described as follows:

1. The subject should ask himself the critical question ("am I dreaming or not?") at least five to ten times a day.
2. At the same time the subject should try to imagine intensely that he is in a dream state, that is, that everything he perceives, including his own body, is merely a dream.
3. While asking himself the critical question the subject should concentrate not only on contemporary occurrences, but also on events which have already taken place. Does he come upon something unusual, or does he suffer from lapses of memory? A minute suffices to answer the question.
4. The subject should ask himself the critical question as a rule in all situations which are characteristic for dreams, that is, whenever something surprising or improbable occurs or whenever he experiences powerful emotions.
5. It is especially helpful in learning how to dream lucidly if the subject has dreams with a recurrent content. For example, if he frequently has feelings of fear or often sees dogs in his dreams, then he should ask himself the critical question concerning his state of consciousness whenever he finds himself in threatening situations or sees a dog in the daytime.
6. If the subject often has dream experiences which never or rarely occur in a waking state, such as floating or flying, then he should, while awake, try intensely to imagine that he is having such an experience, telling himself that he is dreaming.
7. If the subject has difficulty recalling his normal dreams, he should employ methods for improving dream recollection such as are described in recent literature on dreaming. In most cases, however, practice in attaining
the critical-reflective frame of mind will improve the subject's ability to recall his dreams.

(8) The subject should go to sleep thinking that he is going to attain awareness of dreaming while in this state. Any conscious effort of will must be avoided while thinking this thought. This method is especially effective when the subject has just awakened in the early morning hours and has the feeling that he is about to fall asleep again.

(9) The subject should resolve to carry out a particular action while dreaming. Simple motions are sufficient (Tholey, 1983, pp. 81-82).

Other, less accessible, methods for the induction of lucid dreams have been explored. These have included the use of external tactile cues (Hearne, 1983a); external auditory cues (LaBerge, Owens, Nagel, & Dement, 1981); waking fantasy training (Sparrow, 1983); hypnotherapy (Klippstein, 1988); posthypnotic suggestions (Dane, 1984); techniques for retaining consciousness while falling asleep (LaBerge & Rheingold, 1990; Tholey, 1983); and a portable computerized "lucid dream induction" device called the DreamLight (LaBerge, 1988b; LaBerge & Rheingold, 1990).

The results contained in the doctoral dissertations by Dane (1984) and Sparrow (1983) support the effectiveness of posthypnotic suggestions and waking fantasy training, respectively. Initial reports by LaBerge (1988b) and his colleagues (LaBerge, Levitan, Rich, & Dement, 1988; Levitan, 1989) suggest that both the MILD technique as well as the newly developed DreamLight are effective tools in increasing the rate of lucid dreams. Tholey (1983) conjectures that by following the techniques for achieving lucidity which are presented in his article, "subjects who never previously experienced a lucid dream will have the first one after a median time of 4 to 5 wk., with great interindividual deviation" (p.82). Though some support for other LDI techniques has also been presented (e.g., Price & Cohen, 1983), it should be noted that controlled studies designed to investigate the relative efficacy of lucid dream induction techniques are practically non-existent (see Price & Cohen, 1988). Moreover, a review of literature indicates the absence of any such study in refereed journals to date.
**Research Hypotheses**

The purpose of the present study was to investigate the efficacy of Tholey's (1983) combined technique for lucid dream induction in subjects both with and without past experience with this form of dreaming. The following hypotheses were tested:

**Hypothesis I.** Among subjects reporting no past experiences with lucid dreaming, a significantly greater proportion of those who received the LDI technique will experience one or more lucid dreams, than those counterparts who did not receive the technique.

**Hypothesis II.** Among subjects reporting no past experiences with lucid dreaming, those receiving the LDI technique will experience a greater number of lucid dreams than counterparts who did not receive the technique.

**Hypothesis III.** Among those subjects exposed to methods for lucid dream induction, the techniques will be more efficacious in those subjects having some previous experience with lucid dreams.

**Hypothesis IV.** For those subjects with past experiences in dream lucidity, having access to the LDI technique will significantly increase the number of lucid dreams reported over their estimated baseline frequency.

Given that studies on sex differences and lucid dream ability have yielded mixed results (e.g., Blackmore, 1982; 1983; Hearne, 1978), the possibility of gender-linked differences in our study was also explored.

In addition to the above hypotheses, the possibility of differences existing between lucid and non-lucid dreamers in terms of amount of attention paid to dreams, personal meaning attributed to one's dreams, degree of vividness of one's dream experiences, and number of nightmares reported over the past year were also investigated.
Method

Subjects

Seventeen male and 30 female university students, aged 19-26, participated on a volunteer basis. Subjects were selected on the basis of two criteria: recalling five or more dreams per week, and meeting inclusion criteria for either a lucid or non-lucid dreaming group. The latter criteria are described in further detail below.

Procedure

Subjects were given a Sleep/Dream Questionnaire (see Appendix I) designed to evaluate various aspects of their dreams, dream recall, and general sleep habits. Subjects were asked to estimate their dream recall, number of nightmares experienced over the past year, total number of lucid dreams experienced, the number of lucid dreams experienced in the past year, and the number of lucid dreams experienced in the past six weeks. Subjects who claimed to have experienced at least one or more lucid dreams were instructed to submit a record of such a dream so that content validity could be assessed. The questionnaire also included questions in Likert format regarding dream vividness, attention paid to dreams, and degree of personal meaning attached to one's dreams.

Based on the questionnaire results, subjects reporting no past experience with lucid dreaming were divided into two groups (group A and group B) matched for dream recall and containing an approximately equal number of male and female subjects. A third group (group C) was formed by subjects who were judged to have understood the concept of lucid dreaming (as assessed through their lucid dream reports), who reported having had at least 10 such dreams, and who reported at least one lucid dream experience within the past year.

Group-A was comprised of 6 male and 9 female participants. Subjects in this group (n=15) were given a brief talk (prepared in advance) on lucid dreaming and and were told that what was being tested was the facility with which one could learn to have lucid
dreams. They were asked to keep a weekly dream journal for the ensuing six weeks and provided with booklets in which they were to record their dreams. In order to help participants who might find themselves in a prelucid dream, the subjects were given a copy of Hearne's (1982) Ten-Tests for State Assessment (see Appendix II). This form contains several criteria which the dreamer can use to determine whether or not he or she is in fact dreaming. Subjects were instructed to try to have as many lucid dreams as possible. All pertinent questions raised by subjects were answered except in the case of those which concerned the topic of how to go about having lucid dreams (i.e., no overt instructions or techniques for lucid dream induction were given). From here on, group-A will be referred to as the No Experience, No Technique group (NENT).

Subjects in group-B consisted of 6 male and 10 female participants. This group will be referred to as the No Experience, Technique (NET) group. Group-C was comprised of 5 male and 11 female participants, and will be called the With Experience, Technique (WET) group. Subjects in NET (n=16) and WET (n=16) received the same speech on lucid dreaming as that which was given to the members of NENT. In addition, they were told that what was being tested was a) the facility with which one could learn to have such dreams and b) the reliability of a presleep lucid dream induction technique. Subjects in these two groups were given an additional talk on techniques believed to be useful when learning lucid dreaming. Tholey's (1983) intention and reflection techniques were discussed with respect to their roles in his combined LDI technique. A handout summarizing Tholey's combined technique was given to each subject (see Appendix III). As was the case with NENT, participants in NET and WET also received a copy of Hearne's (1982) Ten-Tests for State Assessment. Both groups were also asked to keep a weekly dream journal for the ensuing six weeks and were provided booklets in which to record their dreams. Subjects were instructed to try to have as many lucid dreams as possible and to make extensive use of Tholey's (1983) combined technique.
To assure anonymity with respect to dream journal submissions, all subjects were assigned alphanumeric codes indicating the sex of the subject and his or her group condition.

All journals were evaluated independently by two raters both blind as to the subjects' group condition. Each subject's dream journal was evaluated for the following: a) the number of dreams recalled; b) the number of pre-lucid dreams reported; c) the number of lucid dreams reported; and d) dream content accompanying the emergence of lucidity.

For scoring purposes, dreams were classified as being pre-lucid if they met the definition proposed by Green (1968) which states that these are dreams "in which the subject adopts a critical attitude towards what he is experiencing, even to the point of asking himself 'Am I dreaming?' but without realizing that he is in fact doing so" (p.23). Lucid dreams were defined as those in which the subject realized that he or she was dreaming while still in the dream state. The evaluation of dream content accompanying the onset of lucidity was undertaken to see which types of dream events or emotions, if any, gave rise to lucidity. Categories included nightmares or dream anxiety, recognition of dream inconsistencies (including flying in one's dreams), strong positive emotions, and spontaneous lucidity (without an apparent reason).

Results

Both raters agreed on the number of dreams reported for all 47 subjects. The percent agreement for the categorization of dream reports was based on an item by item comparison over the entire sample of dreams reported by these 47 subjects and found to be 98.82%.

A total of 1860 dreams were collected, of which 135 were lucid and 42 pre-lucid. The total number of dreams reported per group as a function of time is presented in Figure 1. The number of dreams, lucid dreams, and pre-lucid dreams reported for each of the three groups are presented in Table 1.
Figure 1. Number of dreams reported per group as a function of time.
Table 1.
Number of dreams, lucid dreams, and pre-lucid dreams reported for each group and their respective means and standard deviations.

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Dreams recalled</th>
<th>No. lucid</th>
<th>No. pre-lucid</th>
</tr>
</thead>
<tbody>
<tr>
<td>NENT</td>
<td>15</td>
<td>599</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>39.93</td>
<td>0.13</td>
<td>0.40</td>
</tr>
<tr>
<td>S.D.</td>
<td></td>
<td>19.98</td>
<td>0.35</td>
<td>0.63</td>
</tr>
<tr>
<td>NET</td>
<td>16</td>
<td>624</td>
<td>23</td>
<td>13</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>39.00</td>
<td>1.44</td>
<td>0.81</td>
</tr>
<tr>
<td>S.D.</td>
<td></td>
<td>19.56</td>
<td>1.93</td>
<td>0.75</td>
</tr>
<tr>
<td>WET</td>
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<td>637</td>
<td>110</td>
<td>23</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>39.81</td>
<td>6.88</td>
<td>1.44</td>
</tr>
<tr>
<td>S.D.</td>
<td></td>
<td>17.91</td>
<td>6.62</td>
<td>1.32</td>
</tr>
</tbody>
</table>

Note: NENT = no experience, no technique. NET = no experience, technique. WET = with experience, technique.
A one-way analysis of variance carried out on the mean number of dreams reported for each group revealed no significant differences between groups in terms of dream recall (F(2,44) = 0.011, p > .05). In addition, no significant differences were found between groups in terms of dream vividness (F(2,44) = 3.08, p > .05), amount of attention paid to one's dreams (F(2,44) = 1.47, p > .05), degree of meaning attached to one's dreams (F(2,44) = 0.23, p > .05) and estimated nightmare frequency (F(2,44) = 2.68, p > .05), though the one-way ANOVA for dream vividness approached significance (p = .0558).

The number of subjects in each group reporting a lucid dream as a function of time is presented in Figure 2. Figure 3 illustrates the number of lucid dreams reported by each group as a function of time.

Nonparametric tests were used to compare the number of lucid and pre-lucid dreams reported by the NENT and NET groups. The results obtained indicated a significantly greater number of lucid dreams reported by the NET group (Mann-Whitney U(15,16) = 64.5). No significant difference was found between the two groups for the number of pre-lucid dreams reported (Mann-Whitney U(15,16) = 82.5).

Among subjects with no past experience with lucid dreaming, only 2 of 15 subjects who did not have access to the LDI technique reported a lucid dream, while 9 of the 16 who did receive the technique reported having dreamt lucidly. Of the 16 subjects who claimed to have had lucid dreams in the past, all experienced a lucid dream during the course of the study.

Separate Yate's corrected chi-square analyses of these values were performed to determine whether access to the LDI technique, or past experience with lucid dreaming, affected the number of subjects who reported such dreams. The results indicate that whether subjects experienced lucid dreams was significantly influenced by access to the LDI technique ($X^2 (1) = 4.50, p < .05$), as well as by past lucid dream experience ($X^2 (1) = 6.58, p < .02$).
Figure 2. Number of subjects per group who reported one or more lucid dreams as a function of time.
Figure 3. Number of lucid dreams reported per group as a function of time.
Four participants in the NET group, and five in the WET group, reported dreams that were initially pre-lucid in which some of Heane's (1982) Ten Tests for State Assessment were found to be useful in allowing to them to conclude that they were in fact dreaming. These tests included attempting to fly, examining their surroundings for incongruities, and attempting to alter a detail in the scenery. Thus, the criteria suggested by Heane for determining whether or not one is dreaming appeared to be useful in changing some pre-lucid dreams into lucid ones.

A t-test comparing the mean number of lucid dreams reported by the WET group during the 6-week study (mean = 6.88, S.D. = 6.62) with the mean number of lucid dreams estimated by this group immediately prior to the study, for an equivalent period of time (mean = 4.19, S.D. = 6.31), indicated a significant increase in the number of lucid dreams experienced (t (31) = 3.55, p < .002).

In order to assess the possibility of sex-linked differences in lucid dreaming ability among those subjects who had claimed no previous experience with this dream state, subjects from the NENT and NET groups were combined. The NENT group was included since two of the subjects in this condition had reported having dreamt lucidly. Comparison of female and male subjects on relative proportions of those who reported having had no lucid dreams and those who reported at least one such dream during the study revealed no significant gender-linked differences ($\chi^2 (1) = 1.58$, p > .05).

To allow for comparisons between lucid and non-lucid dreamers, data obtained from the NENT and NET group were combined and compared to those obtained from the WET group. One-way ANOVAs with special contrasts revealed no significant differences in terms of dream recall (t(44) = 0.06, p > .05), amount of attention paid to one's dreams (t(44) = 1.35, p > .05), and degree of meaning attributed to one's dreams (t(44) = 0.35, p > .05). Dreamed vividness, however, was found to be significantly higher for non-lucid dreamers (t(44) = 2.46, p < .02). Lucid dreamers reported a significantly greater number of nightmares than did the non-lucid dreamers. Specifically, the lucid dreaming group
reported an average of 24.75 (S.D. = 31.35) nightmares over the past year, compared to the non-lucid dreamers' estimate of 9.81 (S.D. = 13.53). To reduce the differences in observed variance, nightmare values were transformed by taking their square root and a t-test performed on these values. The t value obtained (t(44) = 2.39, p < .05) supports the preceding statement.

When lucid dreams were analyzed for content accompanying the emergence of lucidity, it was found that in 28.07% of the cases, lucidity appeared spontaneously or for no apparent reason. The observation of incongruities within the dream gave rise to lucidity in 43.86% of the lucid dreams reported, nightmares or anxiety dreams accompanied the onset of lucid dreaming in 22.80% of dreams, while positive emotions accounted for the remaining 5.26%.

**Discussion**

In order to allow for a coherent evaluation of the various findings reported in this study, the results obtained are discussed under two separate headings. First, the implications of the findings concerning the efficacy of the combined lucid dream induction technique are explored. The second section focuses on the differences observed between the lucid and nonlucid dreamers in this study.

**Efficacy of the LDI technique**

The results of the present study supported our hypotheses concerning the efficacy of Tholey's (1983) combined LDI technique for subjects without previous experience with this form of dreaming. Specifically, it was found that among subjects reporting no history of lucid dreaming, a significantly greater proportion of those who received the LDI technique experienced one or more lucid dreams, than those counterparts who were not instructed in the technique. During the six weeks of this study, 56% (n=9) of the subjects in the NET group reported one or more lucid dreams. This finding is consistent with Tholey's (1983) suggestion that such subjects would experience their first lucid dream
after a median time of four to five weeks. The results also indicated that among subjects reporting no history of lucid dreaming, those who received the LDI technique experienced a greater number of lucid dreams than counterparts who did not receive the technique. Taken together, these findings provide empirical evidence supporting the hypothesis that lucid dreaming is a learnable skill, and that the combined technique for lucid dream induction is an effective method for achieving this skill. Given that no gender-linked differences were found with respect to which participants were able to learn lucid dreaming, these conclusions appear to be equally applicable to both male and female subjects.

Several explanations may account for the fact that 13% (n=2) of the participants in the NENT group reported having dreamt lucidly. First, simply being introduced to the possibility of lucid dreaming may in itself cause some individuals to become lucid in their own dreams. This, according to Gackenbach (1988a), is not an uncommon occurrence. Secondly, the subjects in this group (as in the other two groups) had been instructed to try to have lucid dreams during the study. Since the participants in this group did not have any LDI techniques at their disposal, it is not unlikely that these subjects made use of auto-suggestive methods in their attempts to achieve lucidity. Finally, the possibility exists that the mere act of paying attention to one's dreams and keeping a dream diary may have been sufficient to trigger lucid dreaming.

As had been expected, the LDI technique employed in this study was found to more efficacious in those subjects having some previous experience with lucid dreams. This finding is not surprising given the fact that these subjects had had several lucid dreams in the past, including at least one in the previous year, and were therefore already familiar with the dream state they were trying to achieve. If this rationale is correct, then subjects in the NET group who experienced their first lucid dream during the study would be expected to have more of such dreams in the future through continued use of the LDI technique. This hypothesis however, presupposes that the effectiveness of the combined
Luo technique is similar for both subjects who had their first lucid dreams through the use of a Luo technique, and those who spontaneously developed the ability to dream lucidly (i.e., without the aid of any techniques). Whether or not this is the case has yet to be empirically tested.

The results obtained also supported the last hypothesis: namely, that for those subjects with past experience in dream lucidity, having access to the Luo technique would significantly increase the number of lucid dreams reported over their estimated baseline frequency. The conclusions that may be drawn from the confirmation of this prediction, however, are limited by the nature of the relevant data. The number of lucid dreams reported by subjects during the study were obtained through an evaluation of their dream journals. In contrast, the baseline frequency data was obtained through retrospective estimation. It has been shown that nightmare frequency is often underestimated when retrospective estimates are compared with more objective measures (Wood & Bootzin, 1990). The possibility exists, therefore, that subjects may similarly have underestimated the number of lucid dreams they had during the six weeks that preceded the study. Thus, though the results appear to suggest that the combined Luo technique was effective in significantly increasing the number of lucid dreams experienced by subjects who were already lucid dreamers, this conclusion is tentative at best.

More conclusive evidence regarding relative increases in lucid dream frequency could have been obtained via two modifications to the experimental design employed. First, in order to obtain more reliable baseline data, subjects in the WET group could have been instructed to keep a record of their remembered dreams for a six week period prior to their exposure to the Luo technique. This design was impractical, however, because few of the participants in the WET group were willing to keep a dream log for an entire twelve week period. A second possibility would have involved separating the subjects in this group into two sub-groups, matched for dream recall and lucid dreaming ability. One group would then have kept a six week record of their dreams and not given the Luo
technique. The second sub-group would also have kept a dream log for an equivalent period of time, but would have received the LDI technique. The efficacy of the technique could then have been determined by comparing the number of lucid dreams reported by the two groups. This design was not used in this study for two reasons. First, only 16 subjects met the inclusion criteria for the WET group, and separating them into two sub-groups would have resulted in a small \( n \). Secondly, and of greater importance, was the fact that there was considerably variability in the reports of lucid dreamers' ability to dream lucidly. This made the task of matching the two sub-groups in terms of dream recall and lucid dreaming ability a difficult and possibly unreliable process.

The examination of dream content found to accompany the onset of lucid dreaming revealed that the majority of these dreams (43.86%) occurred following the observation of dream incongruities. Examples of such inconsistencies included flying in one's dreams, interacting with individuals who were no longer alive, finding oneself in the wrong city or in a setting unknown to the dreamer, and dreaming of having items not possessed in real life. The finding that most lucid dreams arose from the observation of incongruities within the dream environment is consistent with the results obtained by Hearne (1983b), but not with the data of Gackenbach (1978; 1982). In addition to dream inconsistencies, the emergence of lucidity was found to be accompanied by anxiety or nightmares (22.80%) or by strong positive affect (5.26%). In the remaining 28.07% of the cases, dream lucidity appeared spontaneously for no apparent reason. Although lucid dreaming was once thought to emerge predominantly from nightmares or anxiety dreams (Green, 1968), our results confirm those of others which have shown this assumption to be incorrect (Gackenbach, 1978; 1982; Hearne, 1983b). Subjects' reports of lucid dreams varied across the six week period, as shown in Figures 2 and 3. The number of subjects who reported having a lucid dream was highest at the beginning and end of the study for both the NET and WET groups. Similarly, the total number of lucid dreams reported by subjects in each of the aforementioned groups was greatest at the beginning and end of the
six weeks. This pattern cannot be attributed to overall dream frequency, since the number of dreams reported by each group was fairly consistent over the six week period (see Figure 1), and showed no systematic tendency to increase coincidentally with increases in the reported number of lucid dreams. It has been frequently reported that the two important factors in experiencing lucid dreams are high dream recall (e.g., Belicki, Hunt, & Belicki, 1978; Gackenbach, 1978; Heame, 1978; LaBerge, 1985) and high levels of motivation (Garfield, 1974; Heame, 1978; LaBerge, 1980; 1985). Given the lack of correspondence between the number of lucid dreams experienced and overall dream frequency in this study, the distribution observed for both the number of participants having dreamt lucidly and the number of lucid dreams reported over the six weeks may have been related to motivational levels. Specifically, it may be that the subjects were, on the whole, more motivated at the beginning and towards the end of the study as compared to the middle weeks. This explanation is supported by the fact that the majority of the participants had mid-term exams during weeks 2 and 3 of the study. Such scholastic concerns may well have distracted some subjects and interfered with their performance regarding lucid dreaming.

Lucid vs. Non-lucid Dreamers

When lucid dreamers were compared to non-lucid dreamers, no significant differences were found in terms of dream recall, amount of attention paid to one's dreams, and degree of meaning attributed to one's dreams. These results are consistent with those previously reported by Belicki, Hunt, and Belicki (1978).

In terms of dream vividness, non-lucid dreamers rated their dreams as being significantly more vivid than did lucid dreamers. At first, this finding may appear to be counterintuitive since habitual lucid dreamers typically report their lucid dreams as containing crisp imagery, lifelike sensations, and intensification of color (see Green, 1968). However, subjects in this study were not asked to rate the vividness of their
dreams differentially with respect to lucid and non-lucid dreams. Instead, a rating for
dream vividness was given based on the participants' experiences with dreams in general.
Also, the extent to which dreams are rated as being vivid can vary depending on whether it
is assessed through questionnaires (as was the case in this study) or through morning-after
dream reports (Gackenbach, 1988b). Though several authors have explored various
perceptual differences in lucid vs. non-lucid dreams (see Gackenbach, 1988b), no studies
on general dream vividness between lucid and non-lucid dreamers were found in the
literature. The implications of the finding obtained in this study remain unclear and will
require further research.

When lucid and non-lucid dreamers were asked to estimate the number of nightmares
they had experienced in the past year, lucid dreamers were found to have reported a
significantly greater number of such dreams than had non-lucid dreamers. Several lines of
reasoning may help explain this particular finding.

Recently, Hunt (1989) has suggested that lucid dreams and nightmares are linked along
a dimension of affect modulation which is present in all dreams. What joins these
particular types of dreams is the enhancement of affect which typically accompanies both
dream lucidity and nightmares. In the former, this element is experienced as terror. In the
latter, this increased affect is experienced as extreme joy or bliss. Some individuals may
be more likely to possess a proclivity towards an intensification of the dreaming process.
In other words, some individuals may be naturally inclined towards having very vivid,
emotionally intense, and kinesthetically realistic dreams. These individuals, in turn, are
more likely to experience lucid dreams and/or nightmares. Hunt further suggests that
whether this intensification results in positive or negative dream states may be related to
various cognitive dimensions. This hypothesis has received empirical support in a recent
two-part study by Spadafora and Hunt (1990).

The first study reported by Spadafora and Hunt (1990) revealed that estimates of lucid,
archetypal, and nightmare dreams all correlated significantly with each other and with
dream recall. Their research further indicated that not all lucid dreamers experienced nightmares and vice versa. That is, in their second study, the authors were able to select and group subjects on the basis of their reporting primarily one kind of the aforementioned dream types. This categorization of dreamers allowed for an evaluation of various skills in each of the groups formed. The latter study revealed that nightmare sufferers, as compared with lucid and archetypal dreamers, scored significantly lower on measures of imagination, proclivity to mystical experience, spatial skills, and physical balance.

In light of the results obtained in the Spadafora and Hunt study, it is suggested that the lucid dreamers that comprised the WET group in this study possessed certain cognitive skills and physical capacities (i.e., physical balance) which fell in between those found to characterize primarily lucid or nightmare types of dreamers. In other words, the lucid dreamers in this study where prone to intensified dreaming, but the mediation of this process by various cognitive dimensions resulted in both lucid and nightmare experiences.

Based on previous literature, several psychological characteristics which appear to be shared by subjects who experience either lucid or nightmare dreams have been outlined by Galvin (1990). Specifically, Galvin states that:

... it seems that both lucid dreamers and nightmare dreamers are: especially sensitive in perceptual ways, more androgynous, more focused on the self, and more open to inner change and to higher arousal states than most other people. Both of these dreamer types appear to have more permeable and less rigid perceptual boundaries, sex-role boundaries, and boundaries around intense self-experiences than do others (p. 73).

These traits are part of what Hartmann (1984) has called "thin boundaries," as opposed to "thick boundaries," which refer to a personality dimension characterized by the degree of overlap ("thin-ness") or separateness ("thick-ness") between various mental states. Nightmare sufferers have been described by Hartmann (1984) as having, in various ways, particularly "thin" or "permeable" boundaries. For example, they are prone to experience false-awakenings, or dreams within dreams, are overly open and trusting towards others, tend to view themselves as a mixture of masculine and feminine, and are
more likely to experience episodes of depersonalization. A more detailed account of the concept of boundary characteristics and their pertinence to nightmare sufferers is contained in Hartmann's (1984) *The Nightmare: The Psychology and Biology of Terrifying Dreams*.

Galvin (1990) used Hartmann's (1985) Boundary Questionnaire (BQ) to investigate the boundary characteristics of relatively nightmare-free lucid dreamers and nightmare sufferers, and compared them to a control group. The two experimental groups were found to have scores indicative of significantly thinner boundaries than ordinary dreamers. Galvin (1990) also created a new subscale of the BQ, which he called the Self-Coherence Subscale. This subscale was comprised of "those items indicating a clear threat to the coherence or intactness of one's psychological sense of self and those items indicating a dissolution or alteration of one's body, or the identity of the self, or of the identity of another person" (pp. 74-75). Nightmare dreamers were found to score significantly higher on this subscale than did lucid dreamers, where a high score indicates less self-coherence. This finding supported Galvin's hypothesis that lucid dreamers have a more coherent psychological sense of self than nightmare dreamers.

Hartmann's (1984) concept of a personality dimension consisting of psychological boundaries of varying permeability, and the findings reported by Galvin (1990), may be of use in explaining why the lucid dreamers in this study reported significantly more nightmares over the past year than did the non-lucid participants. Galvin's (1990) findings suggest that the lucid dreamers may have had boundary characteristics similar to those which have been found to characterize nightmare sufferers. There is no evidence to suggest that lucid dreamers necessarily must have a stronger sense of self than nightmare sufferers, only that individuals who suffer from nightmares have less self-coherence than individuals who are relatively nightmare-free. Thus, it is quite possible that the lucid dreamers in the current study may have possessed a psychological sense of self that was closer to that which was found to exist in Galvin's nightmare subjects. This issue cannot
be resolved without further empirical research. Our data suggest the necessity of extending Galvin's research into boundary characteristics and psychological self-coherence. In addition to the lucid dreamers who are nightmare free, and the nightmare sufferers who do not experience lucid dreams, a group of lucid dreamers who are also nightmare sufferers need to be included.

The observation that our lucid dreamers reported more nightmares than non-lucid dreamers raises another interesting question. Namely, why is it that lucid dreamers do not become lucid in their nightmares? If this occurred, it is assumed that dream anxiety would decrease once the subject realized that he or she was actually safe in bed sleeping. Moreover, lucid dreamers could attempt to alter certain elements in the nightmare in order to render the dream more positive. It is possible that certain lucid dreamers may require a technique designed specifically to allow them to become lucid in their anxiety dreams.

The issue of using lucidity as a method for reducing nightmare frequency is discussed below. Also, a treatment procedure for recurrent nightmares, based on lucid dream induction, is presented and its relative efficacy discussed in light of results obtained in three case studies.

**Lucid Dreaming and Recurrent Nightmares: Clinical Findings**

In the introduction, it was noted that the ability to dream lucidly may be useful in a clinical context, and that some investigators had reported positive results from using lucid dreaming in the treatment of nightmares (e.g., Brylowski, 1990; Halliday, 1982; Tholey, 1988). Based on previous literature, Zadra (1990) has proposed a tripartite procedure designed specifically for the treatment of recurrent nightmares. The technique, presented below, is based on exercises in progressive muscle relaxation, guided imagery, and lucid dream induction.
The procedure begins by training subjects in progressive muscle relaxation (see Bernstein & Borkovec, 1973). Once a relaxed state has been achieved, subjects then rehearse (i.e., imagine) their recurrent dream in as much detail as possible while verbally describing it to the therapist. The subject is guided through this imagery process by the therapist, who may question the subject about the presence of various elements in the dream and bring relevant details to the subject's attention. During this process, the subject is instructed to select a part of their recurrent dream which is either emotionally and/or visually salient to them. At this point the subject forms the intention to carry out a particular task in their dream. They then proceed to imagine performing this task in their dream while telling themselves that they are dreaming, that is, that they are now lucid. When performed in their actual dream, this action is to serve as a cue indicating that they are dreaming. Typically, this task will be a simple action such as looking at one's hands. Once the subject has successfully completed the relaxation and imagery exercises, they are instructed to practice them in their own home, especially while lying down prior to sleep onset.

The rationale behind this exercise is as follows: by repeatedly rehearsing one's recurrent dream, along with a specific task which is intentionally carried out at a significant and precise point in the dream, the subject will eventually remember to carry out the action the next time the recurrent dream actually occurs. The action or task performed then serves as a pre-rehearsed cue to remind the subject that he or she is dreaming. At this point, the subject is dreaming lucidly and can consciously choose the manner in which he or she wishes to deal with the recurrent dream. This procedure may be considered as a variation of the intention technique suggested by Tholey (1983), and shares similarities with LaBerge's (1980) MILD technique.

Following these exercises, the therapist, in consultation with the subject, suggests an appropriate manner in which the subject may interact with the dream environment once they become lucid in their nightmare. Various approaches which can be taken including

The ability to become lucid in one's nightmares plays an important role in this treatment procedure. If the subject is unfamiliar with the concept of lucid dreaming, then the therapist should carefully explain this dream state to them. In addition, the subject should be made aware of the fact that being lucid in one's dreams also offers the possibility of exerting some control over the dream content. A discussion of case studies found in the literature in which dream lucidity enabled clients to eliminate their nightmares may be beneficial. The therapist can also suggest some general readings on the topic, such as Garfield's (1974) Creative Dreaming or LaBerge's (1985) Lucid Dreaming.

In order to allow the client to become lucid in his or her recurrent nightmare, an LDI technique should be employed. In the currently proposed treatment procedure, Tholey's (1983) "combined technique" was selected over other methods for two reasons. First, the results presented earlier in the thesis lend empirical support as to the efficacy of this technique. Secondly, Tholey's technique literally combines several aspects of many other LDI techniques into one integrated method. That is, although his "combined technique" focuses primarily on the development of a critical-reflective frame of mind, elements of intention and suggestion commonly found on other techniques are also included. A description of the combined technique for lucid dream induction has been presented earlier in the thesis.

It should be noted that this treatment procedure incorporates all nine points put forth by Tholey (1983) in his combined LDI technique. Zadra's (1990) method, however, modifies points 6 and 9 of Tholey's combined technique and includes the use of progressive muscle relaxation. This latter aspect of the procedure is added in order to allow subjects, whose
recurrent dream is by its very nature anxiety inducing (e.g., recurrent nightmares), to imagine the dream in a more relaxed and focused manner.

Three case studies in which this treatment procedure was utilized are presented below. All three subjects reported recurrent nightmares of varying duration. These nightmares tended to be related to some traumatic event, but only one of the subjects met the diagnostic criteria for post-traumatic stress disorder. The therapy offered was geared towards treating the nightmares, and did not focus on other potential complaints the subjects may have had. This approach was undertaken in order to allow for a better evaluation of the specific treatment procedure, and the nature of the therapy was made clear to all subjects. It should also be noted that none of subjects were referred by hospital services. All three subjects were brought to our attention by colleagues or friends familiar with the author's research interests.

Case Reports

Case 1. G.V. was a 52 year-old Italian homemaker who had come to Canada with her husband in 1957. With the exception of her recurrent nightmares, the subject did not have any other complaints and did not present with any formal DSM III disorders. G.V. reported having had the same nightmare for over twenty years with a frequency ranging from once a week to once every several months. As a young child, the subject had witnessed several bombings during the second world war. Most clear in her mind were recollections of sirens, running to bomb shelters, and aerial attacks. The occurrence of her nightmares appeared to be unrelated to the presence of any day-time stressors.

The subject's nightmare was reported as being extremely vivid and emotionally disturbing. The dream consisted of her being in her home in Canada when loud sirens would begin to sound. The subject would immediately begin to panic and begin to look for her two children who, in her dream, were much younger than in real life. Once in the kitchen, she would look through the window and see a bomber which appeared to be
headed straight for her home. The subject would then hide beside the window while calling frantically for her children. The plane would stop by the kitchen window and the pilot would peer into the home looking for her and her children, presumably in order to kill them. At this point in her dream, G.V. would wake up, sometimes in a cold sweat and frequently with heart palpitations.

During the guided imagery, a target point in the dream was selected in which G.V. was to look at her hands. This action was to occur at the moment in which the pilot looked into the window, as this appeared to be the most emotionally salient part of her dream.

Once the relaxation and imagery exercises were completed, a discussion was undertaken to examine what she would like to do in her dream if and when she became lucid. Several options were explored and G.V. decided that if she were to command the scenery to disappear, the imagery would fade away or be replaced by a more pleasant dream. Because G.V. was very religious, she suggested that she use the phrase "In the name of God, I command you to go away." By using this phrase, the subject was convinced that the nightmare could be altered successfully.

This subject was already familiar with lucid dreaming, and reported having had such dreams in the past. She explained that she would at times become aware that she was dreaming either when she flew in her dreams or when she found herself talking to a character who was no longer alive in real life.

G.V.'s response to the idea of becoming lucid in her nightmare was very enthusiastic. Tholey's combined technique for lucid dream induction was explained to her, and she was given a copy of the technique. G.V. was instructed to practice the relaxation and imagery exercises at home, especially prior to going to sleep. She was also asked to keep a daily dream log which she would bring to future meetings, and given a copy of Garfield's (1974) Creative Dreaming. The entire session lasted a little over two hours.

When we met the following week, the subject reported having had one lucid dream and one nightmare. The lucid dream occurred on the first day following our initial session, and
was unrelated to her recurrent nightmare. The anxiety dream took place on day four, and was experienced no differently than usual. As had been required, G.V. had kept a dream journal and she reported having carried out the exercises as instructed on a daily basis.

During weeks two and three, G.V. continued her home assignments but reported no nightmares or lucid dreams over this period. On week four, the subject twice experienced her recurrent nightmare. On the first occasion, the nightmare was relived as usual. On the second occasion, G.V. successfully remembered to look at her hands and became lucid. Upon saying the phrase "In the name of God I command you to go away," the dream scenery shifted and she found herself in a church that she used to attend in Italy. She reported that with this change in dream content came a powerful feeling of both joy and peace. She began to examine various details in the "dream church" and woke up shortly thereafter.

This subject's progress was followed over a two year period. During this time, she did not have a recurrence of her nightmare, though three separate anxiety dreams were reported. In addition, she reported an increase in the frequency of her lucid dreams as well as in her ability to manipulate some aspects of dream scenarios.

One of the her anxiety dreams is noteworthy in that a particular element of the treatment procedure (i.e., looking at one's hands) resurfaced, albeit in a different manner. In this dream, her brother's feet had somehow become stuck on a railway track. A train was quickly approaching and both the subject and the dream character became extremely agitated. When the train was no more than 100 meters away, the subject raised her hands and yelled "Stop!" At that moment, the train came to a screeching halt and thus was prevented from hitting her brother. G.V. could not really explain why she had raised her hands in the dream. At no point in this dream had she been lucid. All she could say was that she noticed her hands while trying to rescue her brother, and that something made her realize that her hands contained some sort of magic or power.
Case 2. The second subject, P.A., was a 43 year-old female. She had previously worked as a clerk in a small store but was forced to quit her job due to severe reactive depression. The depression resulted from the suicide of her 21 year-old son, whose body she found in the basement of her home. The affective disorder had been persisting for two and a half years, and the subject refused to take any medication for her condition. P.A. also harbored intense feelings of guilt over not having "felt" that something such as this was about to happen.

Following this tragedy, P.A. experienced frequent nightmares with varying content over a 7-8 month period. These nightmares typically involved situations related to the suicide, such as finding her son's body or having the paramedics arrive. Following this initial time period, a particular recurrent nightmare began to be experienced to the exclusion of her previous anxiety dreams. On average, the nightmare was reported as occurring one to three times per week, and was sufficiently anxiety provoking to cause her to awaken. These nightmares had now been taken place for close to three years.

The recurrent dream was described as follows: the subject is in her home in the living room when she notices her son walking by on the sidewalk. She begins to yell his name and pound on the windows but the dream character does not appear to notice anything and continues walking. She then runs out into the street screaming his name but her son is nowhere in sight. At this point, the subject wakes up.

P.A. had never had a lucid dream, and was intrigued by the possibility of becoming lucid in her nightmare. The concept of dream lucidity was explained to her in greater detail. The treatment procedure used with this subject was otherwise identical to the one mentioned in the previous case study.

During the guided imagery exercise, P.A. recalled having sometimes seen a mansion in her dreams which was located on the right side of the street (near her own home) but which did not exist in waking life. When asked who she thought lived in the mansion, the client answered that she didn't know but that maybe that was where her son was going.
The suggestion was made that she might want to go into this house and find out who resided inside. P.A. was agreeable to this suggestion, and a target point from the dream was selected for her to become lucid. Specifically, P.A. was instructed to pay attention to her hands and to look at them when she found herself pounding on the windows in her dream.

In the first week that followed the session, P.A. experienced her recurrent nightmare once and did not become lucid. During the second week, she reported having had the nightmare on two consecutive nights. On neither occasion did she become lucid. An interesting development occurred, however, on the second night. After P.A. had run out onto the street looking for her son, she noticed the mansion and remembered that she was supposed to see who lived there. She went up to the house and rang the doorbell. A beautiful young lady wearing a white gown answered the door. P.A. asked if her son was inside and the lady took her by the hand and led her to a room. At that moment, the lady spoke for the first time and said simply "Your son is in here." P.A. opened the door and found the room to be filled with white flowers. P.A. was deeply moved. At this point the dream ended and she awakened.

The "white flowers" dream described above had great symbolic value for P.A. She explained that she understood the dream as a message telling her that her son, although in another world, was fine. It is interesting to note that P.A. never actually became lucid in her dream. What she did do, however, was remember that it was important for her to go to the mansion. P.A. was seen for two more weeks. During this time period, she experienced no nightmares or lucid dreams.

Six months after the last session, P.A. was contacted for a follow-up study. At this time, she reported that since the "white flowers" dream, she had not experienced any type of nightmare, nor had she ever become lucid in one of her dreams. Though P.A. was still depressed, her condition was less severe than it had been in the past. Since our last
encounter, she had become more active, participating in some social events, and had begun to work in a small business that she had helped set up.

Case 3. S.B. was a 19 year-old undergraduate student who had been the victim of sexual assault from an unknown assailant. She had been diagnosed as suffering from post-traumatic stress disorder, and had been in counselling at the university health services. S.B. had been brought to our attention fourteen months after the incident took place. Her current complaints included insomnia, difficulty concentrating on her school work, and fear when walking home or riding the subway alone late at night. In addition, she reported having recurrent nightmares once or twice a week following the traumatic incident.

In her nightmare, S.B. would be walking in a park at night. She would begin to feel extremely anxious believing herself to be lost. As she walked, trying to find a way out of the park, she would be grabbed by behind and attacked. S.B. could never see who the attacker was, and would struggle fiercely to free herself. Invariably, she would awaken at this point in the nightmare.

S.B. had never had a lucid dream, and was apprehensive about becoming lucid in her dreams. She wondered whether "controlling one's dreams" was a good thing, and felt that maybe one should not "mess around" with dream content. It was explained to her that though negative experiences in lucid dreams can occur, the majority of these dreams are reported as being quite pleasant. The procedure and initial results obtained with G.V. were also discussed. S.B. stated that before entering therapy, she would like to know more about lucid dreaming, and inquired about the availability of any books on the topic. The general content of several works was discussed, and she decided to read Stephen LaBerge's (1985) Lucid Dreaming. Three weeks after the initial meeting, S.B. called to confirm her intention to take part in the therapy.
When the session began, S.B. had reported difficulties relaxing, and required a second exposure to the progressive muscle relaxation procedure. During the guided imagery, S.B. described a row of trees and lamps that were in her dream. She stated that the lamps were peculiar in that, even though they were clearly lit, they did not appear to give off any significant amount of light. It was suggested to her that these were "dream lights" and that she should think of the park as being a "dream park." S.B. was asked to try to associate the "dream park" and the images of these "dream lights" with the fact that she was dreaming. S.B. proceeded to imagine these aspects of her nightmare while telling herself "This is only a dream."

When S.B. was asked what actions she would want to take in her dreams if she ever became lucid, she stated that she wanted to be able to successfully defend herself and take out her anger on the aggressor. Garfield's (1974) approach of "confronting and conquering" a hostile figure was explained to her. Other possible ways of dealing with the dream were also discussed. S.B. felt that the "confront and conquer" approach was best suited for the situation, and incorporated these actions into her dream imagery. All subsequent instructions and assignments were the same as in the previously mentioned case studies.

During the five weeks that followed the initial session, S.B. reported a total of three nightmares. In week six, S.B. became lucid in her dream but this actually made the nightmare worse. She reported having realized that she was dreaming immediately prior to the attack, but that this realization did not help. Her anxiety actually increased and she was unable to defend herself as had been planned. Moreover, S.B. reported having felt even more helpless in this dream than in her non-lucid nightmares, and the nightmare lasted longer than usual since she also experienced difficulties waking up from the dream.

Though S.B. was quite distraught by this experience, she was willing to continue her attempt to change the nightmare through lucid dreaming. S.B. did not want to try the "confront and conquer" method again, and other approaches were again explored. S.B.
S.B. did not think that she could successfully engage in any sort of dialogue with the dream character, nor did she think that she could alter any aspects of the dream scenery. Because S.B. had frequently experienced flying in her dreams in the past, the suggestion was made that she should visualize herself becoming lucid early on in the nightmare (e.g., when she notices the "dream lights") and then see herself flying above the "dream park."

Two weeks after this suggestion had been made, S.B. had a dream in which she completed the task successfully. The nightmare began as usual with her walking in the park, feeling anxious and thinking she was lost. When she saw the "dream lights," she became lucid and began to fly. She reported that as she flew, her feelings of anxiety dissipated. She then met an old high-school teacher with whom she began a conversation. At this point she lost her lucidity (i.e., she no longer remembered that she was dreaming) and continued her conversation, which she reported as being quite pleasant. S.B.'s recollection of the dream content beyond this point was unclear.

S.B. was seen for another four weeks, during which she reported no nightmares and one lucid dream. In order to address her other complaints, she was encouraged to resume her counselling sessions at the university health center, and she eventually did so.

S.B. was seen informally at the university over a three month period, and a six month follow-up study ensued. At this time, S.B. reported having had one anxiety dream, which had taken place several weeks prior to the meeting. In this dream, she was walking alone in a park, but this park was different from the one present in her recurrent nightmare. S.B. reported having felt anxious in the dream, and woke up after hearing a dog bark. She also recalled a dream in which she was walking in a park very similar to the one in her recurrent nightmare. In this dream, she felt no anxiety and became lucid for reasons that were not clear to her. She then dreamt that she met a fellow student, forgot the fact that she was dreaming, and proceeded to walk towards the university campus with the other student. S.B. also mentioned having had two other lucid dreams, both very pleasant, in which she engaged in flying activities. S.B.'s experiences with lucid dreaming were also
reported as being helpful in making her realize that she had considerable control over her waking life, and served to increase her interest in dreams in general.

**Discussion**

Several comments and suggestions can be made with respect to clinical findings reported above. For the purpose of clarity, these have been grouped under three headings. First, the efficacy of the technique is examined in light of the results obtained in these and other pertinent case studies. An examination of various elements contained in the technique which may account for the success reported then follows. Finally, some concluding comments and suggestions are made with regard to the appropriateness of using dream lucidity in the treatment of nightmares.

**Efficacy of the Technique**

The successful elimination of recurrent nightmares in the three cases presented parallels the findings reported by other authors who have attempted to use lucid dreaming as a vehicle to treat nightmares (e.g., Brylowski, 1990; Galvin, 1991; Halliday, 1982; Tholey, 1988). Thus, the findings reported above lend further support to the idea that the ability to become lucid in one's dreams can be of therapeutic value.

All three case studies presented involved the presence of traumatic nightmares, defined by Halliday (1987) as being "aversive dreams which repeat in sleep a negative experience that happened in life." The technique, however, can be also be used for the treatment of other types of nightmares. A modified version of the treatment was recently found to be effective in treating nightmares in a seven year-old boy (Zadra, 1990). This procedure also appears to have been effective in eliminating non-traumatic recurrent nightmares in a 21 year-old student, although follow-up data on the latter subject is not yet available.

Several features of the treatment procedure are noteworthy. First, the treatment method can be carried out in the course of a single session, which, depending on the subject, can
last anywhere from one to two hours. Secondly, the induction of lucid dreaming allows the subject to interact with the nightmare in a creative fashion while in the dream. As mentioned by Tholey (1988), the ability to become lucid in one's anxiety dreams can lead to important insights for both the client and the therapist. Finally, as was reported by S.B., dream lucidity can give rise to positive psychological elements which can carry over into waking life. Similar effects have been reported by Tholey (1988) and Brylowski (1990). Similarly, based on his research findings, Galvin (1990) has suggested that by turning nightmare sufferers into lucid dreamers, the former group may develop "a more coherent psychological sense of self through the experience of a degree of mastery in the dream state..."

One important issue that arises in attempting to have nightmare sufferers become lucid in their anxiety dreams, is the action the subject should take if and when they become lucid. As was seen in the third case study, certain actions may backfire, leading to even greater anxiety. Though various methods for dealing with nightmare content have been suggested, their relative applicability and utility remain to be determined. Tholey (1988) has produced some pioneering work related to this issue, and continued research efforts in the area need to be pursued.

**What Accounts for the Effectiveness**

Based on these and other case studies, it remains unclear whether the principal factor responsible for the alleviation of nightmares is lucidity itself or rather the ability to exert some sort of control over the dream content. In the case of P.A., the ability to remember to perform a certain action in her nightmare resulted in a positive outcome. At no point in her nightmare, however, had she ever been lucid. One of the dreams reported by G.V. makes a similar point. In this non-lucid dream, G.V. was able remember that her hands contained some sort of "magic" or "power," and successfully used this "power" to stop a train from hitting her brother. Conversely, S.B. reported a nightmare in which she
became lucid but was unable to exert any control over the dream. In this case, lucidity without the element of control actually worsened the nightmare. A similar case has also been reported by Halliday (1988). Based on these preliminary findings, it is suggested that a crucial aspect in the treatment of recurrent nightmares lies in the dreamer's ability to alter some detail in the otherwise repetitive dream content. This reasoning is congruent with Halliday's (1988) suggestion that such case studies "may imply that therapy should sometimes aim for control rather than just lucidity per se." However, given the limited number of case studies that have appeared in the literature to date, an adequate delineation of the relative importance of these two dream elements requires further investigation.

The treatment procedure utilized in this investigation is eclectic in nature, and thus contains several approaches found in other treatment methods. Specifically, this procedure is comprised of exercises in progressive muscle relaxation, guided imagery, and lucid dream induction. Although this technique does not involve the standard procedure of formally constructing hierarchies for disturbing dream images, it nevertheless shares some similarities with desensitization, and other behavioral procedures. The therapeutic effectiveness of such approaches in treating nightmares has been reported in a number of case studies (e.g., Cautela, 1968; Geer & Silverman, 1967; Roberts & Gordon, 1975; Shorkey & Himle, 1974; Silverman & Geer, 1968).

This technique also bears some resemblance to what Halliday (1987) has termed story line alteration procedures, in which an attempt is made to change some aspect of the nightmare content, typically through waking imagery exercises. This approach has also been reported as being effective in some case studies (e.g., Eichelman, 1985; Handler, 1972; Marks, 1978).

Given the findings above, no adequate assessment can be made concerning which of the elements (or combination thereof) of the technique were most useful in alleviating the traumatic nightmares. Although case studies can be useful in providing some information on the matter, what is clearly required are controlled case studies in which the therapeutic
benefits of each of these elements can be separately evaluated. Surprisingly, only two controlled studies on the therapeutic effectiveness of nightmare treatment approaches have been conducted to date.

Cellucci and Lawrence (1978) compared three groups of subjects who had reported an average of two to three nightmares per week. One group was treated with a systematic desensitization procedure which incorporated the repetition of the self-statement "It's only a dream" into the hierarchy. The second group consisted of a nightmare discussion placebo group, while the remaining subjects served as a control group. The desensitization procedure was found to be significantly more effective in reducing the number of nightmares reported than the discussion placebo group, which in turn reported fewer nightmares than the control group.

In the other study, by Millar and Di Pilato (1983), a comparison was made between the effectiveness of desensitization combined with relaxation and the effects of relaxation alone. A control group was also included. Miller and Di Pilato's results indicated that both treatment conditions were equally effective in reducing nightmare frequency, suggesting that no added benefits occurred from the addition of desensitization in the treatment procedure. More studies of this sort are required in order to better understand the nature of the therapeutic benefits that can arise from various treatment approaches.

Using Lucid Dreaming in a Clinical Context

Various stances have been taken concerning the appropriateness of teaching individuals how to become lucid in their dreams, either through workshops, in psychotherapy, or via books on the topic (e.g., Belicki, 1989; Dane, Craig, & Schatzman, 1987; Gackenbach, Bonime, Garfield, King, Gendlin, & Lewis, 1990; Hunt, Gackenbach, Moffitt, Kelzer, Craig, & LaBerge, 1988). The present discussion focuses on difficulties that may arise when using dream lucidity in a clinical context.
Though the experimental results reported earlier in the thesis suggest that lucid dreaming is a learnable skill, there is no evidence to suggest that everyone can learn how to dream lucidly. Furthermore, even if one does become lucid in one's dreams, it does not necessarily guarantee that the individual will be able to carry out previously suggested activities in his or her dream. These two potential limitations must be kept in mind when considering the use of dream lucidity as part of a treatment procedure.

Becoming lucid in one's dreams, especially for the first time, can be an extremely powerful experience. More often than not, such dreams are reported as being highly pleasant and emotionally charged. Aversive consequences of becoming lucid in one's dreams, however, have been reported (e.g., Gackenbach & Bosveld, 1989; MacTiernan, 1987). Dream lucidity, also entails that one is capable of differentiating the real world from that of the dream. Thus, lucid dreaming should only be used with individuals who either already report and enjoy these experiences, or whose sense of reality is firmly grounded. For these reasons, the induction of lucid dreams should not be attempted with severely disturbed individuals, such as schizophrenics, psychotics, and those who suffer from paranoid ideation. In addition, some individuals may be quite apprehensive about learning lucid dreaming, and may therefore not be suitable candidates for treatments that rely on the induction of this dream state.

Finally, it should be noted that there exist several direct psychological therapies for nightmares, and dream lucidity is but one of them. For an excellent review of these various treatment approaches, see Halliday (1987). Ultimately, the appropriateness of using the lucid dream state in a clinical context will depend on the skills of the therapist, the nature of the client's complaint, and a final decision on the part of both.

Summary

In the first part of the thesis, two groups of subjects were introduced to Tholey's (1983) combined technique for lucid dream induction. One of these groups reported
having had lucid dreams in the past, while the other had never experienced this dream state. A third group comprised of non-lucid dreamers served as a control group. The lucid dream induction technique was found to increase the rate of lucid dreaming in the already lucid dreamers, relative to their self-reported baseline rate, and to result in a significantly greater number of lucid dreams in the inexperienced group relative to the controls. These results lend support to the hypothesis that lucid dreaming is a learnable skill, and that Tholey's combined LDI technique is effective in achieving this skill.

A procedure for the treatment of recurrent nightmares, consisting of exercises in progressive muscle relaxation, guided imagery, and lucid dream induction was outlined. The results obtained in three separate case studies suggest that this treatment method may be effective in alleviating recurrent nightmares. It is not clear from this study, however, which aspects of the treatment method were most important in obtaining the positive results.

It has therefore been shown that lucid dreaming is a skill that can be learned in both the normal and, to some extent, the clinical population. Furthermore, the case studies presented, combined with previous reports, suggest that the lucid dream state may have valuable clinical applications. Research into the phenomenon of lucid dreaming is still in its infancy; however, mounting evidence indicates that a great deal of knowledge stands to be gained from the continued empirical and clinical investigation of this unique dream state.
References


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Appendix I

Dream Questionnaire

Participant Code:  
Current Age:  
Sex: M F

1. Do you normally wake up with an alarm? YES NO

2. Have you ever kept a dream diary? YES NO  
If yes, for how long? ____________________________

3. Estimate the number of nightmares you have had in the past year: ______

4. On average how many dreams do you usually remember per week? ______

5. Do you remember your dreams every morning? YES NO

6. Rate on the following scale the consistency of your dream recall (e.g., do you go through periods of good and poor dream recall) - circle one:

very consistent..............................................................very inconsistent

1 2 3 4 5

7. Do you ever fly in your dreams? YES NO

8. Do you feel that there exists a specific reoccurrence of themes in your dreams?  
YES NO NOT SURE

9. Have you ever had a "falling dream" (a dream in which there typically is little or no visual imagery and during which you experience a sensation of falling usually ending with an abrupt awakening)?  
YES NO NOT SURE

10. Have you ever remembered specific smells or tastes from a dream?  
YES NO If yes, which: tastes smells both

11. Have you ever been able to dream of a specific topic you had previously planned to dream about? YES NO

12. Do you ever exert any "control" over your dreams (i.e., can you change dream sceneries or command things to happen at will)?  
YES NO RARELY
13. Do you recall ever having tried to read a passage (e.g., parts of a book, lecture notes, a text, etc.) in one or more of your dreams?
   YES____ NO____ If yes, were you successful? YES____ NO____
   SOMETIMES____

14. Have you ever had a lucid dream (one in which you know beyond a doubt that you are dreaming while still in the dream)?*
   YES____ NO____ NOT SURE____
   If yes: (i) How many such lucid dreams have you had in total? ________
   (ii) How many lucid dreams have you had in the past year? ________
   (iii) How many lucid dreams have you had in the past six weeks? ________
   (iv) When was the most recent? ______________________
   (v) In such dreams, did you ever attempt to use your lucidity to alter the dream's course? YES____ NO____ If yes, were you successful?
   YES____ NO____ PARTIALLY____

*If you have ever had a lucid dream, please include a description of such a dream on the back of this sheet.

15. Do you consider dreams to be generally meaningful or that they may convey some important messages? YES____ NO____

16. How often do you discuss your dreams with family or friends?
   (circle one)
   Very Often  Often  Sometimes  Almost Never  Never

17. Rate the amount of attention you typically pay to your dreams:
   (circle one)
   very much...........................................................................very little
   1  2  3  4  5

18. Rate the usual vividness of your dreams: (circle one)
   very vivid ...........................................................................non-vivid
   1  2  3  4  5

19. Rate how meaningful you judge your dreams to be: (circle one)
   very meaningful........................................................................meaningless
   1  2  3  4  5

20. Generally speaking, are your dreams:
   pleasant____ unpleasant____ not sure____
Appendix II

Hearne's Ten-Tests for State Assessment

(1) Switch on an electric-light in the dream scenery. If it does not work or there is a malfunction of any kind, or light-switches cannot be found where they should exist, suspect very strongly that you are dreaming. The same applies for any other electrical appliance.

(2) Attempt to fly or "float" in mid-air.

(3) Jump off an object such as a chair or a bed. If you descend slowly you know you are dreaming.

(4) Look carefully at your surroundings. Is there anything which should not be there?

(5) Look at your body (e.g., hands, arms, feet) and your clothes. Is it your body and are the clothes yours in reality?

(6) Look out of a window. Is the environment accurate? Is the season correct?

(7) Attempt to alter a detail in the scenery, or make something happen by will power.

(8) Attempt to push your hand through solid looking objects.

(9) Pinch your skin. Is the texture as it should be?

(10) Look in a mirror. Is there some alteration to your face?

(Hearne, 1983, p.7)
Appendix III

Tholey's Combined Technique for Lucid Dream Induction

(1) The subject should ask himself the critical question ("am I dreaming or not?") at least five to ten times a day.

(2) At the same time the subject should try to imagine intensely that he is in a dream state, that is, that everything he perceives, including his own body, is merely a dream.

(3) While asking himself the critical question the subject should concentrate not only on contemporary occurrences, but also on events which have already taken place. Does he come upon something unusual, or does he suffer from lapses of memory? A minute suffices to answer the question.

(4) The subject should ask himself the critical question as a rule in all situations which are characteristic for dreams, that is, whenever something surprising or improbable occurs or whenever he experiences powerful emotions.

(5) It is especially helpful in learning how to dream lucidly if the subject has dreams with a recurrent content. For example, if he frequently has feelings of fear or often sees dogs in his dreams, then he should ask himself the critical question concerning his state of consciousness whenever he finds himself in threatening situations or sees a dog in the daytime.

(6) If the subject often has dream experiences which never or rarely occur in a waking state, such as floating or flying, then he should, while awake, try intensely to imagine that he is having such an experience, telling himself that he is dreaming.

(7) If the subject has difficulty recalling his normal dreams, he should employ methods for improving dream recollection such as are described in recent literature on dreaming. In most cases, however, practice in attaining the critical-r eactive frame of mind will improve the subject's ability to recall his dreams.

(8) The subject should go to sleep thinking that he is going to attain awareness of dreaming while in this state. Any conscious effort of will must be avoided while thinking this thought. This method is especially effective when the subject has just awakened in the early morning hours and has the feeling that he is about to fall asleep again.

(9) The subject should resolve to carry out a particular action while dreaming. Simple motions are sufficient (Tholey, 1983, pp. 81-82).