The Relationship Between Waking Fantasy Style and Dream Function Among Male Undergraduate Students Exposed to a Stressful Intellectual Activity

by

Donald W. Stewart

A thesis
presented to the University of Manitoba
in fulfillment of the
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in
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THE RELATIONSHIP BETWEEN WAKING FANTASY STYLE AND DREAM FUNCTION AMONG MALE UNDERGRADUATE STUDENTS EXPOSED TO A STRESSFUL INTELLECTUAL ACTIVITY

BY

DONALD W. STEWART

A thesis submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements of the degree of

DOCTOR OF PHILOSOPHY

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ABSTRACT

This study was designed to investigate the relationship between waking fantasy style and dream function among male undergraduates exposed to a stressful waking event. A sample of male undergraduates reporting frequent dream recall was administered the Short Imaginal Processes Inventory as a measure of waking fantasy style. Following a baseline period of home dream recording, subjects were randomly assigned to either a high or a low stress intellectual aptitude-testing condition. Self-reports of presleep and morning mood, dream content, and dream pleasantness were collected at home over a six-day period following the test administration. It was hypothesized that subjects' reports of negative morning mood, treatment incorporation, and unpleasant dreams would be related to waking fantasy style, presleep mood, and stress condition. The nature of these relationships was also expected to change over time. The results indicated that (a) morning mood was significantly associated with presleep mood over time, (b) positive-constructive daydreaming was associated with pleasant dreams devoid of references to the stressor late in the dream recording period, and (c) subjects in the high stress condition reported more negative presleep affect

and less pleasant dreams over time than subjects in the low stress condition. The results are discussed in terms of the disruption-avoidance-adaptation model of dream function and the literature on waking fantasy style and dreams. Strengths and limitations of the study and implications for future research are also discussed.

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INTRODUCTION

Many contemporary psychological theories of dream function suggest dreams play a role in adaptation to stressful waking events (e.g., Dallett, 1973; Wright & Koulack, 1987). The process by which dreams may facilitate adaptation, however, remains in dispute. At present two seemingly divergent perspectives on dream function -- the mastery hypothesis and the compensatory hypothesis -- dominate research on the role of dreams in adaptation to stress.

The mastery hypothesis suggests dreams may facilitate adaptation to stressful waking events by providing the dreamer with opportunities to integrate stressful new material with earlier solutions to similar problems (e.g., Breger, 1967; Greenberg, Pearlman, Fingar, Kantrowitz, & Kawliche, 1970; Greenberg, Pearlman, & Gampel, 1972). The compensatory hypothesis, on the other hand, suggests dreams may facilitate adaptation by avoiding references to currently stressful material in favor of elements or situations that augment or complement aspects of contemporary waking life (e.g., Hauri, 1970; Newton, 1970).

The disparate data gathered in support of the mastery and compensatory hypotheses have led to an apparent polarization of views on dream function. Wright and Koulack (1987), however, have developed a model of dream function that provides a framework for reconciling the seemingly mutually exclusive mastery and compensatory perspectives.

The disruption-avoidance-adaptation model (Wright & Koulack, 1987) suggests dreams may oscillate between a disruptive mastery function and a pleasant avoidance function as a consequence of individual differences in response to relatively stressful contemporary waking events. This perspective on dream function has proved useful in accounting for many seemingly discrepant findings in the literature (Wright, 1987). There are a number of aspects of the model, however, that have not been adequately explored.

The intent of this study was to provide additional information about the utility of the disruption-avoidance-adaptation model by examining the relationship between dream function and waking fantasy style. This relationship seemed worthy of exploration in that (a) waking fantasy style appears to be related to some aspects of dreaming (Starker, 1974, 1977, 1978, 1985), (b) the disruption-avoidance-adaptation model implies that waking cognitive processes may be related to subsequent dream function, and (c) no previous empirical investigation of the relationship between waking fantasy style and dream function has been undertaken.

Dreams and Dreaming

Dreams have been defined as a high frequency cognitive activity occurring during sleep (Webb & Cartwright, 1978). They are chiefly visual in nature and are often characterized by strong emotion, illogical content, and the perception that they are a "real" sensory experience (Hobson, 1988). Dream events may occur in a sequential, narrative fashion (Foulkes, 1985), involving the dreamer as a participant and/or an observer (Brown & Donderi, 1986), or may be less organized and more fragmentary in nature (Webb & Cartwright, 1978). Dreams have frequently been operationally defined as subsequently reportable mental content occurring during periods of sleep (Klinger, 1971).

Dreaming has been linked to the occurrence of rapid eye movement (REM) sleep (Aserinsky & Kleitman, 1953), which is characterized by conjugate rapid eye movements and a desynchronized electroencephalograph (EEG) pattern similar to that obtained during the waking state (Dement & Kleitman, 1957a). Over the course of a night's sleep, an average adult has about five or six REM periods, which alternate with periods of non-REM (NREM) sleep at about 90-minute intervals. The duration of REM periods increases throughout the night from about 5-10 minutes at the end of the first 90-minute sleep cycle to about 45 minutes at the end of the last (Cohen, 1979). Dreamlike mentation may also occur

during NREM sleep (Foulkes, 1967). The probability of dream recall is enhanced if a dream is highly charged affectively and the dreamer awakes while the dream is in progress (Koulack & Goodenough, 1976). The average probability of dream recall upon awakening spontaneously in the morning is about .37 (Webb & Kersey, 1967). This figure was derived by multiplying the probability of awakening from a REM period in the morning (.45) by the average frequency of dream recall following a REM awakening (.83).

Stress, Adaptation, and Dream Function

The question of dream function has been subject to much discussion. Before describing the predominant theories of dream function, though, some discussion of how the terms "stress," "adaptation," and "function" are typically used by sleep and dream researchers is necessary.

The concept of stress.

The disruption-avoidance-adaptation model assumes the degree of stress experienced by a subject is a function of the intrinsic nature of the stressor, the significance of the stressor to the individual, and the ability of the individual to tolerate stress (Wright & Koulack, 1987). Such a view is consistent with the transactional model of stress, which sees stress as a dynamic transaction between a stimulus and an individual's response to that stimulus based on his or her perception of the stimulus situation and the availability of resources for

dealing with it (cf. Lazarus, 1966; Lazarus & Folkman, 1984; Levitt, 1980; Meichenbaum, 1985). The transactional view acknowledges the importance of cognitive processes in determining the nature and extent of an individual's response to a potentially stressful stimulus.

Most sleep and dream research using stress as an independent variable operationally defines stress as an increase in subjects' reported level of negative affect following a putatively stressful presleep experience (e.g., Cohen & Cox, 1975; DeKoninck & Koulack, 1975; Koulack, Prevost, & DeKoninck, 1985). This approach, which focuses on the subjective consequences of exposure to a stressor, deals with the complex transactional nature of stress by emphasizing the subjects' emotional experience as the "final common pathway" of the stressful transaction. Research attempting to evaluate the disruption-avoidance-adaptation model has successfully used this approach to operationally define stress (Wright, 1987; Wright & Koulack, 1988).

The concept of adaptation. Sleep and dream researchers typically view adaptation as a process involving reduced affective responses to formerly anxiety-provoking environmental stimuli. De Koninck and Koulack (1975), for example, presented subjects with a stressful film prior to sleep and again in the morning. They inferred adaptation to this stressful stimulus from subjects' reduced levels of

negative affect during the second viewing of the film. Procedures such as this, however, require the use of a sleep laboratory, which can influence the content of dreams subjects report (e.g., Domhoff, 1969; Domhoff & Kamiya, 1964). This concern has led other researchers to infer adaptation to stressful presleep experiences from changes in subjects' reported home dream content and morning mood over time. Wright (1987), for example, presented subjects with a stressful presleep intellectual activity and inferred subsequent adaptation to this stressor from the amount of treatment incorporation and negative postsleep affect subjects reported over a week-long period of home dream recording. Procedures such as this have the advantage of assessing adaptation in the "natural" environment (i.e., at home), which may yield more widely generalizable results. Some of the factors that may influence the adaptation process include the subjects' appraisal of the degree of threat posed by the stressor and the efficacy of their coping strategies (cf. Lazarus & Folkman, 1984).

The concept of function. The concept of dream function has been defined in several ways. Breger (1967) states that the term "function" may refer to the purposes or goals of dreaming or to the mode of dream operation. Kramer (1982) has adopted a similar perspective, but draws a distinction between the "how" and the "what" functions of dreams. According to Kramer, the "how" function refers to the

construction and organization of the dream experience. It is typically investigated by examining which presleep elements enter into subsequent dreams. The "what" function, on the other hand, refers to the effects of dreams on subsequent behavior. It is usually assessed by manipulating the dream experience and measuring its consequences. Kramer notes, though, that what is achieved by a dream is often related to how it is constructed and organized. He also acknowledges the difficulties associated with treating dreams as an independent variable. These factors have led some researchers (e.g., Koulack et al., 1985; Wright, 1987) to infer dream function from reported dream content and morning mood measures. Each of these strategies has proved capable of generating testable hypotheses and providing insight into dream function.

Historical Perspectives on Dream Function

Speculation about dream function dates to antiquity. The ancient Greeks, for example, thought dreams provided information on the physical health of the dreamer (cf. Smith, 1984). The ancient Romans, on the other hand, believed dreams could be used to predict the future (Freud, 1900/1965). A similar view, influenced by the Biblical notion of dream prophecy, persisted until the end of the Middle Ages. (See Freud, 1900/1965, or Haskell, 1985, for a more detailed history of early perspectives on dream function.)

The emergence of a mechanistic philosophy of science in the seventeenth century (cf. Berman, 1984; Schultz, 1981) led to a rejection of earlier views on dream function. For the next three centuries dreams were generally seen by scientists as "meaningless hallucinations" (Weiss, 1986, p. 1) reflecting a "lower order of brain functioning" (Anderson, 1982, p. 125). This situation began to change in the early 1900s, however, when Freud proposed what was to become one of this century's most influential theories of dreaming.

In his work, The Interpretation of Dreams, Freud (1900/1965) described how dreams may be seen as compromise formations that function to preserve sleep while permitting drive discharge through symbolic gratification of repressed urges. He also described how the interpretation of dreams may be seen as "the royal road to a knowledge of the unconscious activities of the mind" (p. 647). Freud's view of how dreams may be interpreted laid the groundwork for the first comprehensive modern theories of dream function.

Another influential development in the study of dream function was the discovery of rapid eye movement (REM) sleep (Aserinsky & Kleitman, 1953). The observation that reports of dreaming could be reliably obtained from subjects awakened during REM sleep served to link dreaming with an identifiable physiological state (Dement & Kleitman, 1957b).

This helped establish the scientific legitimacy of dream research (Cohen, 1979) and eventually gave rise to a host of studies in the area of dream function.

Contemporary Psychological Perspectives on Dream Function

Many diverse theories of dream function have been formulated since the discovery of REM sleep (e.g., Fosshage, 1983; Foulkes, 1985; Greenberg et al., 1970). Most of these recent conceptualizations, however, reflect either a mastery or a compensatory hypothesis of dream function (Wright & Koulack, 1987).

The mastery hypothesis. One of the key tenets of the mastery hypothesis is that dreams facilitate the dreamer's adaptation to stressful waking experiences. This is purportedly accomplished by incorporating elements of these experiences into subsequent dreams. Such incorporation is thought to facilitate adaptation by providing opportunities for problem solving, information processing, or ego consolidation (Dallett, 1973).

The problem-solving version of the mastery hypothesis originated with Adler's (1936) belief that dreams serve to arouse the emotions necessary for problem solution. This view was elaborated by Ullman (1959), who felt dreams symbolically express connections between present problems and past experiences, thereby permitting more complete

problem assessments. Similar notions were proposed by Klein (1967) and Fiss (1969), who saw dreams as attempts to complete cognitive or affective tasks unfinished during the day.

The information-processing version of the mastery hypothesis has taken several different forms. Breger (1967), for example, suggested that, during dreams, information pertaining to currently stressful situations is compared with earlier "programs" that have been successfully used to deal with similar situations in the past. Shapiro (1968), on the other hand, felt that dreams may facilitate the processing of information not processed during wakefulness. Other theorists have suggested that dreams may play a role in the organization, storage, and retrieval of information represented in memory (e.g., Dewan, 1970; Foulkes, 1985; Hawkins, 1966).

The ego-consolidation version of the mastery hypothesis has also taken several different forms. Jones (1962), for example, felt that dreams aided in conflict resolution by allowing new material to be related to past experiences. Similar views were proposed by other psychoanalytic theorists, who saw dreaming as an important element in self-concept formation (De Monchaux, 1978) and cognitive development (Fosshage, 1983).

Despite differing terminologies and theoretic rationales, most versions of the mastery hypothesis state that dreaming involves the integration of affectively-charged contemporary material into extant memory stores. In line with this, much of the experimental research explicitly examining the mastery hypothesis involves studying the effects of "dream deprivation" on the integration and retrieval of affectively-charged material.

Greenberg et al. (1970), for example, deprived subjects of REM sleep for three consecutive nights and compared the effects of this with three nights of non-REM (NREM) awakenings. They found no differences between the REM deprivation and NREM awakening conditions on a variety of cognitive-intellectual tasks, but did note differences in projective test protocols obtained after REM deprivation. The most striking finding was that REM deprivation seemed to reduce the subjects' ability to maintain their defenses against consciously unacceptable impulses. This was seen to support the notion that dreams function to integrate new experiences with the unresolved wishes and feelings from the past aroused by the new material. Such a process purportedly enables new experiences to be dealt with (or defended against) in a characteristic way.

Several other investigations have also employed a REM-deprivation approach. Greenberg, Pillard, and Pearlman

(1972) examined the differential effects of REM deprivation and NREM awakenings on adaptation to an anxiety-provoking medical autopsy film. They found that subjects who were REM deprived showed less psychological and physiological habituation to the film on second viewing than subjects who were either awakened during NREM periods or left to sleep undisturbed. A similar pattern was reported by Grieser, Greenberg, and Harrison (1972). These researchers found that subjects who were deprived of REM sleep recalled ego-threatening material less well than subjects who were awakened during NREM sleep. This led Grieser et al. to conclude that the opportunity to dream reduces the need for repression of threatening material. Subsequent research has shown that REM deprivation can also contribute to deficits in the recall of ostensibly nonthreatening but complex material (Tilley & Empson, 1978).

Taken together, these REM-deprivation studies seem to provide support for the mastery hypothesis of dream function. The REM-deprivation approach, however, has been subject to criticism (cf. Greenberg & Pearlman, 1974). Foulkes (1985), for example, argued that it is difficult to equate REM deprivation with dream deprivation. Part of the reason for this is that dreamlike mentation is not necessarily restricted to REM periods, but can occur during NREM sleep as well (Foulkes, 1967). Another concern is that REM sleep deprivation is stressful and may produce changes

in level of arousal that interact in complex ways to disrupt the processes of learning or retention (Horne & McGrath, 1984). This suggests it may be inappropriate to infer that REM deprivation effects are due solely to reduced opportunities to dream. There are other studies, though, which do not use a REM-deprivation approach, that also seem to support the mastery hypothesis.

Breger et al. (1971), for example, conducted two studies that provided some support for the mastery perspective. In the first study, four subjects participating in a group therapy experience each took turns being the focus of group interaction for two sessions. Analysis of the subjects' reported dream content following these stressful experiences indicated that "the material aroused during the focus sessions was represented and worked over in the dreams according to each subject's individual style" (p. 87). This was seen to support the view that dream incorporation reflects an attempt to master currently stressful experiences by integrating them with earlier solutions to similar problems.

In the second study described by Breger et al., dreams from five subjects were collected for several nights preceding major surgery. It was found that surgery-related material was incorporated both directly and symbolically into the preoperative dreams. The researchers also noted

the subjects reported thinking little about their impending operations during the day. This suggests that subjects' dreams did not simply reflect waking experience, but seemed to represent an attempt to deal with emotionally-arousing material that was not dealt with completely during the day. Such an observation is consistent with some versions of the mastery hypothesis (e.g., Fiss, 1969; Klein, 1967).

Another study providing support for the mastery hypothesis was conducted by Cohen and Cox (1975), who sought to demonstrate both the representational and adaptive properties of dreaming. These researchers preselected male undergraduate students for high or low neuroticism and randomly exposed them to positive or negative presleep experiences in a sleep laboratory. They found that subjects in the negative condition who dreamed overtly or symbolically of the laboratory situation reported more positive postsleep affect than subjects who did not incorporate the presleep situation into their dreams. This was seen to support the view that dreaming about a stressful event can aid in adaptation to it, which is one of the key tenets of the mastery hypothesis.

The compensatory hypothesis. The compensatory hypothesis suggests dreams function to augment or complement aspects of the dreamer's waking life. This means that attempts to deal with stressful events while awake may be

compensated for by dreams devoid of references to these stressors. Failure to acknowledge or deal with stressful events while awake, however, may result in dreams that incorporate references to current stressors (cf. Breger et al., 1971). The compensation process purportedly facilitates adaptation to stressful events by fostering a sort of psychological balance between waking and sleeping experience.

The notion that dreams may act to promote psychological homeostasis was first developed by Jung (1945/1960), who felt that dream content had a compensatory relationship with the dreamer's attitude toward waking reality. According to Jung (1945/1960), this compensatory relationship involved "balancing and comparing different data or points of view so as to produce an adjustment or a rectification . . . of the psychic system" (p. 287). Such a view suggests that a dreamer's positively or negatively biased interpretation of waking reality may be compensated for by dreams containing whatever elements are necessary to restore intrapsychic balance. Avoidance of negative aspects of reality during waking life, then, could result in nightmares (or psychopathological symptoms). Attempts to acknowledge negative aspects of waking reality, on the other hand, may reflect more balanced functioning and could result in dreams that promote psychological growth and enhance creativity (cf. Dallett, 1973).

Some support for aspects of Jung's compensatory view of dream function was provided by a recent study of individuals who experience unpleasant recurrent dreams. Brown and Donderi (1986) examined dream content and self-reported well-being among subjects who regularly had recurrent dreams and those who had either never experienced a recurrent dream or had not experienced one for 12 months or more. They found that recurrent dreamers experienced more anxious, dysphoric, and conflict-oriented dream content than members of the other two groups. The recurrent dreamers also exhibited more overt psychological conflict. None of these subjects, however, reported seeking help from a mental health professional for their problems. These results seem to support Jung's notion that unpleasant recurrent dreams may act to compensate for habitual avoidance of conflicts during waking life.

Another study supporting the compensatory hypothesis of dream function was conducted by Newton (1970), who examined the amount of physical activity reported in the dreams of paralyzed and nonparalyzed subjects. He found that the amount of reported physical activity was equal in both groups. When length of disability was included in the analysis, though, it became apparent that recently paralyzed subjects reported more physical activity in their dreams than subjects who had been paralyzed for longer periods of time. Newton interpreted these results in light of an

"emergency repair" version of the compensatory hypothesis that suggests compensation for loss is needed most urgently immediately following the loss.

Further support for the compensatory hypothesis was provided by a study of the relationship between presleep activity and dream content. Hauri (1970) examined REM and NREM dream content following periods of presleep exercise, study, and relaxation. He found that subjects dreamed less about physical activity after a period of presleep exercise. He also found that, following a period of presleep studying, subjects dreamed less about problem solving and more about social interaction. Dream content from NREM periods generally showed a pattern similar to that of the REM periods. These findings were seen to support the view that dream content, particularly during REM periods, may complement waking experiences.

Additional support for the compensatory hypothesis was provided by a study of dream bizarreness among psychotic and nonpsychotic subjects. Cartwright (1972) examined bizarreness of reported dream content among acutely schizophrenic patients and groups of non-schizophrenic subjects who presented a clinically normal profile or scored in the pathological range on the schizophrenia (Sc) scale of the Minnesota Multiphasic Personality Inventory (MMPI). She found that the bizarreness of REM dreaming was inversely

related to the degree of psychological disturbance of the subjects. This was interpreted as support for the hypothesis that each individual may have a fixed daily "quota" of bizarre hallucinatory mental activity that may spontaneously intrude into wakefulness if not attained during REM dreaming. Such a finding suggests that waking fantasy and nocturnal dreams may act in a complementary or compensatory fashion to ensure an individual's "fantasy quota" is fulfilled.

The compensatory hypothesis has also received some support from the research of De Koninck and Koulack (1975). These researchers presented subjects with a stressful film prior to sleep and again in the morning. Half of the subjects were also presented with a portion of the film soundtrack during REM periods. It was found that subjects in the film soundtrack condition reported more incorporation of film elements in their dreams than subjects who did not receive the soundtrack presentations during REM sleep. It was also found that subjects who exhibited less adaptation to the film following the morning presentation reported more incorporations of film elements in their dreams. This suggests that dreaming about the film or including elements of it in subsequent dreams may interfere with adaptation to its stressful effects. Such a finding is consistent with the compensatory hypothesis. The researchers note, however, that the "natural" adaptation process may have been

disrupted by the soundtrack presentations. This led them to warn that their study does not provide unequivocal support for the compensatory hypothesis.

In a more recent examination of the compensatory hypothesis, Koulack et al. (1985) presented subjects with a difficult or easy version of an "intelligence test" and assessed the effects of this on subsequent sleep, dreams, and morning mood. They found that when subjects were awakened during REM sleep, those who received the difficult test version reported more treatment incorporation and more anxiety in their dreams than those who received the easy test. They also found that subjects who incorporated elements of the stressful presleep situation into their dreams showed less adaptation (i.e., more anxiety) on awakening than subjects who did not incorporate such stimuli into their dreams. These results suggest that dreaming about a stressful stimulus may sometimes impede adaptation to it, which is consistent with the compensatory hypothesis. These results held only under a REM-awakening condition, however. When subjects were allowed to sleep uninterrupted, there were no differences in adaptation between the easy and difficult test conditions. It is therefore possible that a mastery process was occurring during the night of uninterrupted sleep. But, because no dream data were collected during that night, there is no evidence available to confirm this possibility.

The disruption-avoidance-adaptation model. The various studies reviewed in support of the mastery and compensatory hypotheses suggest dreams perform an adaptive function in response to contemporary waking stress. The presumed mechanisms by which this adaptation is facilitated, however, appear diametrically opposed. Most studies supporting the mastery hypothesis suggest adaptation occurs as a result of incorporation of stressful stimuli into subsequent dreams. Most studies supporting the compensatory hypothesis, on the other hand, suggest adaptation is often facilitated by dreams that do not incorporate references to stressful stimuli. The disruption-avoidance-adaptation model (Wright & Koulack, 1987) attempts to reconcile these seemingly antithetical hypotheses and account for the disparate data gathered in their support.

The disruption-avoidance-adaptation model proposes that dreams oscillate between mastery and avoidance functions in response to contemporary waking stress. The model is based on the assumption that differences between mastery and compensatory findings in various studies are a result of sampling dreams from different points along an adaptation continuum.

According to the disruption-avoidance-adaptation model, dreams initially following a stressful event are most likely to be of the mastery variety. Poststress mastery dreams

typically incorporate references to the stressor, and appear to represent a continuation of the dreamer's waking attempts to master the stressful experience (e.g., Breger et al., 1971). Maintaining exposure to the stressful stimulus through dream incorporation may facilitate adaptation by reducing the potency of the stressor or allowing it to be integrated with memories of past solutions to similar problems (e.g., Breger, 1967; Greenberg et al., 1972). The mastery process is potentially disruptive to the dreamer, however, because it entails a "reexperiencing" of the stressful stimulus and its associated affect. This means that some form of respite from the affectively-charged mastery dreams may be necessary to ensure that the level of arousal they engender does not consistently disrupt the dreamer's sleep. In many cases this respite takes the form of avoidance dreams.

Avoidance dreams provide the dreamer with intermittent relief from the potentially disruptive stimulation of mastery dreams. They may also help compensate for waking mastery attempts. Avoidance dreams typically accomplish these goals by (a) avoiding references to the stressor (e.g., De Koninck & Koulack, 1975), (b) complementing the stressful experience (e.g., Hauri, 1970; Newton, 1970), or (c) presenting elements of thought or activity missing from waking life (e.g, Cartwright, 1972; Jung, 1945/1960). The point at which disruptive mastery dreams give way to these

pleasant avoidance dreams is a function of the nature of the stressor, its significance to the dreamer, and the dreamer's ability to tolerate or cope with stress. Another important factor, however, is the extent to which the dreamer has successfully dealt with the stressful experience while awake. Successful attempts to deal with the stressful experience while awake may be followed by avoidance dreams devoid of references to stressful stimuli. Denial of stressful waking experiences, though, may result in disruptive mastery dreams incorporating references to current stressors. This suggests that waking differences in the way individuals characteristically deal with their current concerns may affect the subsequent function of their dreams.

The disruption-avoidance-adaptation model, then, assumes adaptation to stress is a dynamic process that begins with the onset of stressful stimulation and continues, at different levels of consciousness, for some period of time thereafter (cf. Wright, 1987). The model also assumes that dreams oscillate between a mastery and an avoidance function throughout the adaptation process. This means that whether a researcher finds dreams are performing a mastery or an avoidance function may depend on the point in the adaptation process at which subjects' dreams are sampled. Of equal importance, however, are individual differences in the way subjects respond to stressful stimuli

(cf. Wright & Koulack, 1987). The question of whether dream function may also be related to individual differences in waking fantasy style is considered in the following sections.

Mental Imagery During Wakefulness and Sleep

The advent of behaviorism (Watson, 1913) served to overturn the "mentalism" characterizing nineteenth-century psychology (Schultz, 1981). This led to a focus on observable behavior and decreased interest in covert experiences such as mental imagery. The development of behavior therapies employing imagery techniques (e.g., Wolpe, 1958), however, led eventually to a "return of the ostracized" (Holt, 1964, p. 254), and today there is much clinical and experimental interest in mental imagery and other cognitive processes (e.g., George, 1986; MacInnis & Price, 1987; Singer & Pope, 1978).

The concept of mental imagery. Most recent definitions of mental imagery (e.g., George, 1986; Tower & Singer, 1981) stem from Richardson's (1969) comprehensive definition. According to Richardson:

> Mental imagery refers to all those quasi-sensory or quasi-perceptual experiences of which we are self-consciously aware, and which exist for us in the absence of those stimulus conditions that are known to produce their genuine sensory or perceptual counterparts, and which may be

> expected to have different consequences from their sensory or perceptual counterparts. (pp. 2-3)

This broad definition of mental imagery encompasses a wide variety of covert experiences, including nocturnal dreams and daydreams or fantasy (cf. Bowers, 1983).

Mental imagery and information processing. Starker (1978) suggests that the continuous stream of mental imagery characterizing human thought provides a type of nonsequential information processing that is essential to cognitive functioning. He also suggests that imaginal thought operates in a synthetic manner, simultaneously integrating input from both sensory modalities and internal sources. This process, which occurs during both wakefulness and sleep, purportedly allows for the expression and retention of meaning in overall patterns of relations rather than separate elements.

A similar view has recently been proposed by MacInnis and Price (1987), who define mental imagery as a process by which sensory information is represented in working memory. According to these theorists, various levels of mental imagery processing can be placed on an elaboration continuum that ranges from simple cognitive concepts at one pole to more complex processes involving multiple cognitive concepts and constructions at the other. Mental imagery processed at a low level of elaboration may elicit only a simple

recognition response. Information processed at higher levels of elaboration, though, may establish connections between incoming information and prior knowledge, which could serve to activate and integrate data from multiple knowledge structures (cf. Breger, 1967; Foulkes, 1985). Simple imaginal responses, such as the retrieval of an object's image from memory, fall at the low end of this elaboration continuum. More complex imaginal processes, such as visual problem-solving and daydreams or fantasy, fall at the high end of the elaboration continuum (cf. Hilgard, 1981; Richardson, 1983).

Fantasy and daydreams. A waking fantasy or daydream is a form of elaborated mental imagery or "self-generated inner activity" (Singer & Pope, 1981, p. 272) that typically involves "a shift of attention away from an ongoing physical or mental task . . . towards a response to some internal stimulus" (Singer, 1966, p. 3). Such fantasies often have no obvious immediate goal, but may help individuals to anticipate future situations (Singer, 1978), solve current problems (Klinger, 1977), influence affective experiences (Lang, 1977, 1979), or alter their level of arousal (Gold & Henderson, 1984). A number of studies have also demonstrated the value of mental imagery in enhancing recall and learning under certain conditions (e.g., Paivio, 1969, 1971; Paivio & Csapo, 1973; Sheehan, 1972).

The process of fantasizing or daydreaming occurs across cultures (Doob, 1972; Giambra & Stone, 1982) and various age groups (Giambra, 1974, 1977a; McIlwraith & Schallow, 1983; Rosenfeld, Huesmann, Eron, & Torney-Purta, 1982). This suggests it may be important in the development and maintenance of normal intellectual and emotional functioning (cf. Gould, 1972; Murphy, 1962; Singer, 1973). Imaginal processes may also be important as means of cognitively exploring behavioral options and their consequences (Halderman, Zelhart, & Jackson, 1985).

Psychoanalytic theorists explain fantasy as an expression of unfulfilled conscious and unconscious wishes (e.g., Freud, 1908/1953). Behavioral theorists, on the other hand, suggest fantasy is a product of its consequences (e.g., Rimm & Masters, 1974). This implies that fantasies will continue only if they are reinforced or are themselves reinforcing. Other theorists view fantasy as a reflection of the cognitive schemas through which individuals interpret experience (e.g., Golding & Singer, 1983) or as a source of information about individuals' current experiences and concerns (e.g., Klinger, 1971, 1977).

Waking fantasy and current concerns. Several studies offer support for the view that waking fantasies reflect individuals' current concerns. Gold and Reilly (1986), for example, examined the roles of personality traits and

current concerns as determinants of daydream content in undergraduate students. These researchers administered the Personality Research Form to subjects and then asked them to list their current concerns and keep a log of their daydreams for two weeks. They found that about two-thirds of subjects' daydreams reflected their current concerns, with over one-third of the daydreams corresponding to the subjects' top two concerns. This was consistent with Klinger's (1978) earlier report that subjects spend about one half of their total thinking time focused on their top two current concerns. Gold and Reilly found no relationship between measured personality traits and daydreams.

Similar results have been obtained using clinical samples. Burstein (1985), for example, found that a sample of patients with posttraumatic stress disorder frequently reported vivid mental imagery related to the traumatic events they had recently experienced. Starker and Jolin's (1982) study of Vietnam veteran psychiatric inpatients, however, demonstrated that a sufficiently traumatic event can influence spontaneous mental imagery and fantasy long after the traumatic event has ended. This suggests the "current concerns" that help determine fantasy content do not include just those events experienced recently, but those that continue to be a source of stress to the individual over time as well.

Waking fantasy styles. The evidence cited above indicates that the content of waking fantasy is determined largely by an individual's current concerns. There is considerable evidence, however, of measurable stylistic consistencies in the way individuals use or experience their fantasy productions (Huba, Singer, Aneshensel, & Antrobus, 1982). This implies that, regardless of the specific nature of their current concerns, individuals may use or experience their waking fantasy in a characteristic manner.

The psychometric assessment of waking fantasy styles originated with Singer's (1966) daydreaming questionnaire. This formed the basis for the Imaginal Processes Inventory (IPI) (Singer & Antrobus, 1970), a 344-item Likert-type instrument comprised of 28 scales that measure aspects of daydreaming style and content, mental style, and general inner experience.

Factor analyses of the IPI showed that eight first-order factors could be reduced to three more general second-order factors of mental style (Huba, Aneshensel, & Singer, 1981). These second-order factors were labeled Positive-Constructive Daydreaming, Guilt and Fear of Failure Daydreaming, and Poor Attentional Control. Huba et al. (1982) note that these second-order factors are consistent with previous research using IPI scale subsets to identify different waking fantasy styles (e.g., Starker, 1974).

The internal consistency of the IPI scales ranges from .7 to .9 (Huba et al., 1982), and 12-month test-retest reliability coefficients range from .47 to .84, with a mean of .65 (Giambra, 1977b). This suggests that waking fantasy styles can be measured with a reasonable degree of reliability (cf. Cundiff & Gold, 1979).

There have been a number of attempts to correlate the IPI with more "objective" data on subjects' use of fantasy. These studies indicate that IPI scales are positively correlated beyond chance levels with subjects' self-reported frequency of home daydreams (Gold, Teague, & Jarvinen, 1981) and with self-reported home daydream content (Gold & Gold, 1982a). There is also evidence of significant intercorrelations between measures of depression and guilty, dysphoric fantasy themes as measured by the IPI (Cundiff & Gold, 1979).

The IPI, then, seems able to identify individuals with different waking fantasy styles. The original scales, however, proved too unwieldy for some research applications. This led Huba et al. (1982) to develop a Short Imaginal Processes Inventory (SIPI) based on the three second-order factors characterizing the original IPI (Huba et al., 1981). The waking fantasy styles identified by the SIPI are Positive-Constructive Daydreaming, Guilt and Fear of Failure Daydreaming, and Poor Attentional Control. High scorers on

the Positive-Constructive scale believe that daydreams are worthwhile, solve problems, and help generate original ideas. They also believe that daydreams provide answers to problems, help to plan alternatives, and have significance. High scorers on the Guilt and Fear of Failure scale have daydreams with depressing, frightening, and panicky qualities. They also have fantasies of not being able to finish a job, failing loved ones, and aggressing toward enemies. In addition, they often feel guilty and are afraid of doing something wrong. High scorers on the Poor Attentional Control scale tend to let their minds wander and thoughts drift. They easily lose interest or become bored, cannot work at something for a long time, and are easily distracted by environmental events.

A recent factor analysis of the SIPI using an independent sample confirmed the internal consistency of the scales and the presence of three distinct waking fantasy styles (Huba & Tanaka, 1983). This suggests the SIPI can be used to identify different waking fantasy styles with a reasonable degree of consistency. There is also some evidence suggesting the SIPI can yield results comparable to those obtained using the original IPI (Starker, 1985).

Waking fantasy styles and nocturnal dreams. Klinger (1971) notes that some of the most important theorists of the twentieth century have unequivocally asserted that

dreams and waking fantasies represent a common psychological process. Freud (1908/1953), for example, stated that:

> I cannot pass over the relation of fantasies to dreams. Our nocturnal dreams are nothing but such fantasies, as we can make clear by interpreting them. Language, in its unrivaled wisdom, long ago decided the question of the essential nature of dreams by giving the name of 'daydreams' to the airy creations of fantasy. (p. 178)

Freud also stated that "nocturnal dreams are fulfillments of desires in exactly the same way as daydreams are" (p. 179).

A similar position was adopted by Piaget (1945/1962), who saw play as one manifestation of a child's fantasy life. According to Piaget:

> In their symbolic structure as well as in their content, children's dreams seem to be closely related to symbolic play. It is unnecessary to stress the differences -- they are obvious. The dreamer believes what he dreams, while belief in the pretence of play is always very relative. The construction of games is much more deliberately controlled, while that of dreams carries the subject far beyond the point his conscious would wish. Most important of all, in play, material substitutes of all kinds which make it easier to imagine the object are used as symbols, while in dreams the object must be represented by a mental

image or by another image symbolizing the same object. (pp. 181-182)

Most early attempts to empirically demonstrate relationships between waking fantasy and nocturnal dreams involved comparing subjects' morning dream reports with their Thematic Apperception Test (TAT) responses (cf. Cartwright, 1969; Klinger, 1971; Starker, 1978). Sarason (1944), for example, found thematic similarities between dream reports and TAT stories among a sample of mentally retarded young women. A similar outcome was reported by Gordon (1953), who found positive correlations between psychiatric patients' dreams and TAT responses on 32 of 42 content variables. The generalizability of these results, however, is limited by the use of clinical samples.

Other studies comparing projective test responses with nocturnal dream content have employed "normal" samples and used a REM-awakening strategy rather than morning recall to obtain dream reports (cf. Cartwright, 1969; Klinger, 1971; Starker, 1978). Ben-Horin (1967), for example, compared impulsive and non-impulsive subjects' dreams with their TAT stories. He found no consistent relationship between the expression of impulses in subjects' TAT stories and dreams. Eagle (1964) obtained similar results, noting that levels of drive expressiveness were not consistent across subjects' TAT stories, Rorschach responses, and dream reports.

These laboratory investigations did not support the notion of thematic consistency between waking fantasy and dreams (cf. Zepelin, 1981). In areas such as imaginativeness, however, structural and stylistic consistencies were evident (cf. Klinger, 1971). This led Klinger (1971) to assert that the degree of relationship between dreams and waking fantasy is highly dependent on the way in which these variables are measured. He therefore suggested that researchers use measures of spontaneous waking fantasy, rather than responses to projective test stimuli, in their attempts to identify relationships between "normal" waking fantasy and nocturnal dreams.

One of the first studies to adopt such a methodology was conducted by Starker (1974). In his study, undergraduate students were administered selected scales from the IPI. On the basis of their responses, they were identified as having either a Positive, a Negative, or an Anxious daydreaming style. They were then asked to record their nocturnal dreams in a diary for 14 consecutive nights. Subsequent analysis of these dream reports indicated that various dimensions of the subjects' nocturnal dreams seemed to correspond to their waking fantasy style. Subjects with a Positive daydreaming style, for example, reported the least bizarre and most affectively positive nocturnal dreams. Subjects with a Negative daydreaming style, on the other hand, reported more bizarre and negatively-charged

dreams. The most bizarre, emotional, and negatively-charged dreams were obtained from the Anxious daydreamers. Starker interpreted these results as support for the view that dreaming and daydreaming are analogous, parallel, or continuous processes rather than alternative or unrelated phenomena.

Methodological limitations of this study, including a small sample (N = 9) and few categories of dream content, led to a follow-up study designed to redress these problems (Starker, 1977). The replication attempt involved a sample of 24 undergraduates and a more elaborate analysis of dream content. For the most part, the results of the follow-up study paralleled those from the earlier study. Positive daydreamers were once again found to report less negative affect in their dreams than Guilty-Dysphoric or Anxious daydreamers. The Positive daydreamers also reported less fear, aggression, and bizarreness in their dreams relative to the Anxious daydreamers, but did not differ from the Guilty-Dysphoric subjects in these areas. Starker (1977, 1978) concluded from these data that structural continuities involving affective polarity, level of anxiety, and (to a lesser extent) bizarreness exist across waking and sleeping fantasy.

Starker (1977, 1978) also conducted a factor analysis of the dream and daydream data collected in his study. The

first factor derived from the analysis was related to the dream content rating system. The second factor was related to the IPI scales used to assess the subjects' waking fantasy style. Starker regarded these as "instrumental" factors because they simply indicated that two different instruments had been used to measure the subjects' covert experiences. The third factor derived from the analysis involved aspects of both daydreaming style and nocturnal dream content. The dream content categories that loaded most highly on the third factor were positive affect, gratification, affiliation, and sex. The daydream characteristics of fear of failure, guilt, and hallucinatory vividness had high negative loadings on this factor. Starker concluded that this pattern indicates the existence of a positive fantasy style that includes aspects of both waking and sleeping fantasy.

In a more recent factor analytic investigation, however, using a larger sample, Starker (1985) found that the inner experience of male undergraduates may be more appropriately characterized by a two-factor model. The first factor identified describes a dysphoric style of inner experience characterized by poor attentional control, guilty/failure-oriented daydreams, insomnia, and nightmares. The second factor describes a positive style of inner experience characterized by positive-constructive daydreams, dream recall, and positive mood states. As in the previous

study, these factors cut across both waking and sleeping experience. This lends further support to the notion that stylistic continuities exist between waking fantasy and nocturnal dream variables (cf. Starker, 1978).

The Relationship Between Waking Fantasy and Dream Function

Starker (1974) identified three models by which daydreams and nocturnal dreams may possibly be related. The first model is that of "alternative channels," which suggests that whatever is rendered inaccessible to waking fantasy seeks expression in nocturnal dreams. A similar model was described by Cartwright (1969), who referred to it as the "compensatory" hypothesis. Some support for this perspective has been provided by Cartwright's (1972) study showing an inverse relationship between the structural characteristics of waking fantasy and nocturnal dreams.

The second model described by Starker characterizes dreams and daydreams as analogous or parallel processes located at different ends of an arousal continuum. It predicts that the thematic, affective, and structural characteristics of dreams and daydreams are positively rather than inversely related. Support for this view comes from Starker's (1974, 1977, 1978, 1985) research indicating that aspects of subjects' nocturnal dreams are consistent with their waking fantasies.

The third model described by Starker suggests that dreams and daydreams are relatively independent processes bearing little or no relationship to each other. Support for this hypothesis may be inferred from studies demonstrating a lack of correspondence between nocturnal dreams and waking fantasy (e.g., Ben-Horin, 1967; Eagle, 1964).

Rationale for the present study. Despite the growing body of research in the area of waking fantasy and dream content, no study has attempted to examine the relationship between waking fantasy style and dream function following a stressful waking event. The nature and extent of any relationship between dream function and waking fantasy style is therefore unknown. The present study attempted to fill this gap in knowledge by assessing the relationship between dream function and waking fantasy style over time. The experimental hypotheses and guiding theoretic framework for the study were derived from the disruption-avoidance-adaptation model of dream function.

Overview of the present study. A sample of male undergraduate students was administered the Short Imaginal Processes Inventory (SIPI) (Huba et al., 1982) and a screening questionnaire (see Appendix A). Students reporting frequent spontaneous morning dream recall and an absence of identifiable sleep pathology were contacted by telephone and asked to participate in the study.

Male undergraduates were used as subjects because the majority of the dream function literature is based on studies of this population. One of the reasons for this sex bias in the literature is concern over evidence suggesting the emotional content of women's dreams may be affected by the menstrual cycle (cf. Schultz & Koulack, 1980; Sirois-Berliss & De Koninck, 1982). To avoid this potentially confounding factor, and remain consistent with previous research in the area, the present study did not employ female subjects.

Following a practice night of dream recording and collection of baseline dream reports, subjects were randomly assigned to either a high or a low stress condition. Subjects in the high stress condition were given a difficult version of an intellectual aptitude test. Subjects in the low stress condition were given an easier version of this test.

The intellectual testing situation was presumed to be stressful due to the evaluative nature of the task, the level of difficulty of the questions, and the time pressure subjects experienced while attempting to complete the test. A pilot study and manipulation check both confirmed that levels of negative affect increased significantly following test administration, which supports the view that subjects found the testing situation stressful. Several other

studies have also shown that a demanding or ego-threatening intellectual activity is stressful to subjects who are undergraduate students (e.g., Cohen & Cox, 1975; Koulack et al., 1985; McGrath & Cohen, 1980; Wright, 1987).

After exposure to the stressful intellectual activity, subjects completed presleep and morning Mood Adjective Checklists (MACLs) (cf. Nowlis, 1965), a morning dream report form, and a dream content rating scale for six consecutive days. These measures provided information on subjects' dream content and concomitant affective experiences following exposure to the stressor. This information was used to make inferences about the relationship between waking fantasy style and dream function following a stressful waking event.

Hypotheses. The experimental hypotheses were derived largely from Wright and Koulack's (1987) disruption-avoidance-adaptation model of dream function. This model suggests there may be an identifiable relationship between the extent to which an individual successfully handles stress while awake and dream function. Individuals who are able to successfully deal with their current concerns while awake, for example, are assumed to be less likely to experience disruptive mastery dreams following exposure to a stressor. Individuals who do not successfully deal with their current concerns while awake, however, are assumed to

be more likely to experience disruptive mastery dreams following exposure to a stressor.

The relationship between waking fantasy style and dream function is not addressed by the disruption-avoidance-adaptation model. There is evidence to suggest that a link between these variables is possible (e.g., Starker, 1974, 1977, 1978), but the nature such a relationship may take is unknown.

It is not clear, for example, how positive-constructive daydreaming is related to the likelihood of disruptive mastery dreams following stress. One possibility is that positive-constructive daydreaming may contribute toward more effective management of stressful events while awake. This would then suggest that positive-constructive daydreaming may be associated with a decreased need for disruptive mastery dreams following stress. It is also possible, however, that this style of daydreaming may simply reflect a more positive attitude toward waking fantasy and not contribute toward more effective stress management. In this case positive-constructive daydreaming would not be expected to show an inverse relationship with the frequency of mastery dreams following stress.

A similar situation exists with regard to guilty/failure-oriented daydreaming. It is possible that such ruminative daydreaming impairs the effective handling

of stress while awake. This would then suggest that guilty/failure-oriented daydreaming may be associated with an increased need for disruptive mastery dreams following exposure to a stressor. It is also possible, however, that increased waking exposure to current stressors through guilty/failure-oriented daydreaming may reduce the potency of the stressors. Under these circumstances this style of daydreaming would be inversely related to the frequency of mastery dreams following a stressful waking event.

The poor attentional control dimension of daydreaming may also have either a positive or an inverse relationship with the need for disruptive mastery dreams. The inability to remain focused on a task while awake, for example, may serve to reduce the extent to which an individual is able to successfully deal with stressful events while awake. In this case the likelihood of a positive relationship between poor attentional control and disruptive mastery dreams following stress would be increased. It is also possible, however, that poor attentional control may contribute toward effective stress management by allowing an individual's mind to wander from an unpleasant situation. In this case the likelihood of a positive relationship between poor attentional control and disruptive mastery dreams may be decreased because the individual has had a measure of success in dealing with the stressor while awake.

The intent of the present study was to explore the nature and extent of any relationship between the three dimensions of waking fantasy style identified by the Short Imaginal Processes Inventory and dream function (as measured by treatment incorporation, dream pleasantness, and morning mood) among subjects exposed to a stressful waking event. Because there has been no previous research of this kind, there was insufficient basis for postulating directional hypotheses. The experimental hypotheses were therefore of a general nature, and were as follows:

1. The dimensions of waking fantasy style will be related to the dependent measures of treatment incorporation, dream pleasantness, and morning mood.

2. Presleep mood will be related to the dependent measures of treatment incorporation, dream pleasantness, and morning mood.

3. Level of exposure to the stressor (i.e., the version of the intellectual aptitude test completed) will be related to presleep mood, treatment incorporation, dream pleasantness, and morning mood.

4. The nature of the relationships predicted in the preceding hypotheses will change with the passage of time.

METHOD

The original intent of this study was to use waking fantasy style and level of exposure to the stressor as independent variables in a factorial design. However, only 14 of 350 potential subjects evidenced a clearly unidimensional waking fantasy style, making it difficult if not impossible to recruit adequate numbers of subjects for each of the experimental cells. The design of the study was therefore modified to take advantage of the continuous nature of the waking fantasy style variable. By using the full range of scores on the waking fantasy style measure, it was possible to select subjects solely on the basis of their dream recall and sleep habits. This facilitated the recruitment of subjects and also provided results that may be more widely generalizable than if only extreme scorers had been used.

Subjects

A brief presentation describing the nature of the study was made to introductory psychology classes at the University of Manitoba. The students were told that the study they were being asked to sign up for would be used to

recruit male subjects for a subsequent study of dreams and intellectual functioning. The classes were also told that the first part of the study required them to complete questionnaires assessing their sleep schedule, dream recall, general health, alcohol and drug use, first spoken language, and personality variables (see Appendix A). The Short Imaginal Processes Inventory (SIPI) (Huba et al., 1982) was included among the questionnaires subjects in the screening study completed. Individuals indicating they used drugs or alcohol daily, spontaneously recalled fewer than four dreams per week, suffered from insomnia or early morning awakenings, took medications that could influence sleep variables, or did not speak English as a native tongue were not considered for further participation. Students who participated in the pilot study were not eligible to sign up for the screening study.

Three hundred and fifty male students completed the screening study. About one-half of them met the criteria for further participation. One hundred and seven of these subjects agreed to participate in the study when contacted by telephone. Ninety-six of these individuals attended the experimental sessions and all but three provided data over the course of the study. The mean age of the sample was 18.6 years, with a range from age 17 to 29.

Students completing the study received seven hours of credit toward a course requirement for research participation. Students in the screening study who were not selected for participation in the main study received one hour of credit.

Materials

Short Imaginal Processes Inventory (SIPI). The SIPI (Huba, Singer, Aneshensel, & Antrobus, 1982) is a 45-item self-report instrument designed to assess subjects' waking fantasy styles. It consists of a series of statements about subjects' daydreams, fantasies, and ability to concentrate. Subjects respond to these statements using a 5-point Likert-type scale. Low scores indicate that a statement is "definitely untrue or strongly uncharacteristic" of the subject. High scores indicate that the statement is "very true or strongly characteristic" of the subject. Fourteen of the items are reverse-keyed to control for response sets.

The SIPI is composed of three scales that represent different waking fantasy styles (i.e., Positive-Constructive scale, Guilt and Fear of Failure scale, and Poor Attentional Control scale). The scores on each of these scales can range from 15 to 75. Reported coefficient alphas of internal consistency for the scales equal or exceed .78 (Huba et al., 1982; Huba & Tanaka, 1983), and four-week test-retest correlations range from .53 to .63 (Schallow &

McIlwraith, 1986). The three scales are largely uncorrelated with each other (Huba et al., 1982), and their factor structure appears stable over time (Tanaka & Huba, 1986). The original pool from which the SIPI items were drawn is relatively free from a social desirability response set (Oakland, 1968).

Some construct validity data for the SIPI with male undergraduates have been reported by Golding and Singer (1983). Their results indicate that Positive-Constructive scale scores have a slight negative correlation with reported feelings of inefficacy. Their results also indicate that high Guilt and Fear of Failure scale scores are associated with heightened levels of self-criticism. Poor Attentional Control was found to be positively correlated with dependency and inefficacy.

Intellectual aptitude tests. The intellectual aptitude tests used as stressors in the present study were developed by Wright (1987) (see Appendix B). Wright constructed an easy and a difficult version of an "intellectual aptitude test" for use in her examination of the function of dreams in adaptation to a stressful intellectual activity. The tests consisted of items similar to those found on the Graduate Record Examination, the Miller Analogies Test, and the Scholastic Aptitude Test. The test versions each contained 20 verbal analogies, 10 quantitative problems, and

20 sentence completion problems. The test items were presented in a multiple-choice format with four alternative answers per question. The easy test was designed so that 20 minutes was ample to complete it. The difficult test was designed so that subjects would find it hard to complete within the 30-minute time limit.

The content of the test versions was determined from a pilot study Wright conducted using male undergraduate students. Potential test items answered incorrectly by 50% or more of the subjects were selected as the difficult test items. Items answered correctly by 75% of the subjects were selected for the easy test version. Wright also provided data showing that male undergraduates found the easy version of the test significantly less stressful than the difficult version.

The test items were not modified in the present study because a pilot study showed that a sample of male undergraduate students found the test versions differentially stressful.

Mood Adjective Checklist (MACL). The MACL (see Appendix C) is a modified version of the Nowlis-Green Mood Adjective Check List (Nowlis, 1965), which was designed as a measure of mood change. It consists of 24 adjectives divided equally into eight categories: aggression, anxiety, surgency, social affection, depression, distrust, quietness,

and detachment. Subjects are asked to rate how they are feeling at the present time with regard to each of the adjectives. The response choices for each adjective are: "much," "little," "don't know," and "no." Each adjective is scored on a four-point scale (0 - 3) with "no" corresponding to a score of zero and "much" corresponding to a score of three. Category scores are obtained by summing the scores earned on the adjectives comprising each category. The score on each category can range from zero to nine. The MACL categories can also be grouped on the basis of positive affect (i.e., surgency, social affection), negative affect (i.e., aggression, anxiety, depression, distrust), and neutral affect (i.e., quietness, detachment).

Nowlis (1965) has shown that MACL categories are sensitive to changes in mood over short periods of time. As a result, test-retest correlations are low. There is a high degree of consistency, however, in the direction of change for adjectives comprising a given category. This suggests that MACL categories provide a reasonably reliable measure of various mood states.

There is also evidence that the social desirability status of MACL adjectives has little effect on how they are checked when subjects are asked to report how they feel at the moment of reading each word (Green, 1964, cited in Nowlis, 1965). This suggests that the probability of a

social desirability response set is low. Other validity data show that MACL negative affect scores correlate positively with physiological measures of stress (Handlon, 1962) and reflect subjects' adaptation to stress over time (Pomeranz, 1962).

The MACL has been used successfully as a measure of mood or affect in a number of sleep and dream studies (e.g., De Koninck & Koulack, 1975; Goodenough, Witkin, Lewis, Koulack, & Cohen, 1974; Karacan, Goodenough, Shapiro, & Starker, 1966; Koulack, 1969; Koulack et al., 1985; Sirois-Berliss & De Koninck, 1982; Wright, 1987). Subjects in the present study were asked to complete MACLs prior to sleep and upon awakening each morning for six consecutive days following administration of the stressor.

Dream report form. A version of Hall and Van de Castle's (1966) dream report form (see Appendix D) was used in the present study to obtain information on subjects' home dream content. The form was designed to provide enough structure to attain the information needed to score the reports without depriving subjects of the opportunity to organize and detail the information in whatever manner seemed most appropriate. This dream report form has previously proved useful in eliciting detailed home dream content from subjects (Stewart, 1986). Subjects were asked to complete dream report forms immediately upon awakening

each morning for six consecutive days following administration of the stressor.

Dream Rating Scale (DRS). The DRS consists of a series of 7-point bipolar scales designed to tap subjects' perceptions of their dreams along several dimensions (see Appendix E). The DRS scales assess dream pleasantness, activity, familiarity, organization, emotionality, vividness, and participation. The DRS also asks subjects to rate how rested they feel and to estimate how many hours of sleep they have had. Versions of this scale have been successfully used in previous research to assess subjects' perceptions of their dream content (e.g., Koulack et al., 1985; Wright, 1987). Subjects were asked to complete the DRS after their morning dream reports for six consecutive days following administration of the stressor.

Postexperiment Questionnaire (PEQ). The PEQ (see Appendix F) is designed to assess subjects' attitudes toward the experiment and the intelligence tests (cf. Wright, 1987). It also attempts to assess whether the subjects experienced high levels of stress unrelated to the experimental manipulation during the course of the study.

Procedure

Subjects meeting the criteria for inclusion in the main study were contacted by telephone at the beginning of the

second university term. This time was selected because there was little likelihood of class exams interfering with the stress manipulation. When contacted, subjects were reminded of their participation in the screening study and asked whether they still wished to participate in a study of dreams and intellectual functioning. Those who did were informed of the research requirements and asked to attend an orientation meeting. A number of such meetings were scheduled over a two-day period, with groups of approximately 15 subjects attending at a time.

At the orientation meeting, subjects were provided with a description of the general procedure of the study, after which they signed an informed consent form. They were then given two packets, each of which contained a presleep MACL, a morning dream report form, a Dream Rating Scale, and a postsleep MACL. The presleep MACL contained an additional item asking subjects to briefly describe the most significant event that happened to them that day. The procedure to follow in completing these materials was described to subjects (see Appendix D), and any questions they had were answered.

Subjects were asked to complete the mood and dream report measures over two consecutive nights immediately preceding their second meeting with the experimenter. The times available for the second meeting were restricted to

either Monday or Tuesday to ensure that any weekend disruptions in sleep patterns would not interfere with the stress manipulation. Subjects once again attended in groups of approximately 15 at a time.

At the second meeting, subjects' dream reports were examined for proper completion, and any problems with their reports were pointed out to them and resolved. The first night of recording was considered a practice trial and its data were not used for subsequent analysis. Data from the second night were used as a baseline from which changes due to the stress manipulation could be inferred.

Following the collection and review of baseline data, the subjects were administered a pretest MACL, an intellectual aptitude test, and a posttest MACL. The MACL data were intended to provide a manipulation check on the levels of stress produced by the different test versions.

To ensure that performance on the test was important to subjects, the following instructions were delivered orally and in written form:

> The following test is designed to provide a measure of your intellectual aptitude. It was developed from items comprising a number of standard intelligence tests administered to university students. You will have 30 minutes to complete the test. This should prove sufficient for you to complete most of the

items. If you have trouble with a question, leave it and go on to the next question. If you have time left at the end, you can go back and complete any items left unanswered. It is important that you do your best on this test, as we will assume that your performance on it is an accurate reflection of your intellectual ability.

After the time allotted for test completion expired, a posttest MACL was administered. Following completion of the MACL, subjects turned in their tests and MACLs and were given a packet containing a six-day supply of dream report forms, presleep and morning MACLs, and Dream Rating Scales. Subjects were given oral and written instructions regarding completion of these measures over the next six consecutive days. They were also instructed to bring in their completed reports to the experimenter's office on the days they attended their introductory psychology class. The intent of this strategy was to reduce the likelihood that subjects would complete all their reports the day before their final meeting with the experimenter rather than on each of six consecutive days. The subjects also signed up for a debriefing session where they completed the postexperiment questionnaire (see Appendix F) and received information about the aim of the study and the intent of the intellectual aptitude testing (see Appendix G).

During the data collection phase, subjects were encouraged to go to sleep at approximately the same time each night. They also received instructions to abstain from coffee, alcohol, or drugs for three hours prior to sleep, unless such abstinence would cause undue hardship for them. The likelihood of dream recall was maximized by asking subjects to set their alarm clocks for a time 20 minutes prior to their usual wake-up time. This also ensured subjects had sufficient time to complete the measures each morning. Subjects having clock radios were asked to use the buzzer rather than the radio-alarm setting to minimize distractions at awakening.

At the debriefing session subjects were told that the intellectual aptitude test they completed was not a valid measure of their intellectual aptitude or potential. They were also told of the purpose of the study and how to obtain aggregate results when available.

Dream Content Analysis

After the dream reports were collected, they were identified by a code number and placed in random order prior to their analysis by a trained rater blind to the conditions under which the reports were obtained. Each dream report was analyzed for treatment incorporation (i.e., appearance of items, places, events, or persons related to the experimental situation) according to the content analysis

procedures outlined by Hall and Van de Castle (1966) and Wright (1987) (see Appendix H). A single treatment incorporation score was calculated for every dream report. The reliability of the rater's assessments was determined by computing an interrater agreement coefficient for a randomly selected subset of dream reports scored by a second rater.

RESULTS

Missing Data

The large number of measures subjects were asked to complete over the course of the study made it inevitable that some data would be missing. Of the original 96 participants, three were dropped from the study because they did not provide data on the baseline and first posttest nights. For the remaining 93 subjects, any missing data were estimated using the mean of each subject's available scores. This procedure for dealing with missing data is considered more conservative than estimates based on predicted values, but is less conservative than dropping cases with missing values from the analyses (Tabachnick & Fidell, 1983). The mean insertion procedure was selected because it maximizes the number of degrees of freedom available for hypothesis testing without altering the mean of the distribution as a whole.

Efficacy of Stress Manipulation

This section describes the effects of the intellectual aptitude test versions on subjects' stress levels immediately following test completion. Mood Adjective

Checklist (MACL) negative affect scores were used as an index of stress in the analyses.

Pilot study. Prior to their use in the main study, the two intellectual aptitude test versions were administered to a sample of 79 English-speaking male undergraduate students as part of a pilot study. Subjects were recruited from the University of Manitoba introductory psychology student subject pool and received one hour of course credit for participation. They were told that the study was an investigation of intellectual functioning and personality.

Subjects in the pilot study completed the Short Imaginal Processes Inventory and a pretest MACL prior to the intellectual aptitude test administration. They were then randomly given either the easy or the difficult test version, followed by a posttest MACL. The results of a 2 x 2 (easy or difficult test version x time of assessment) repeated measures analysis of variance on negative affect showed a main effect for time of assessment (pretest vs. posttest), F (1, 77) = 6.98, $p < .01$, and a time x test version interaction, F (1, 77) = 4.30, $p < .05$. These findings confirmed the prediction that subjects who received the difficult version of the test would report greater increases in negative affect following the test than subjects who received the easier version (see Figure 1). Descriptive statistics are presented in Table 1. The summary table for the analysis is contained in Table 2.

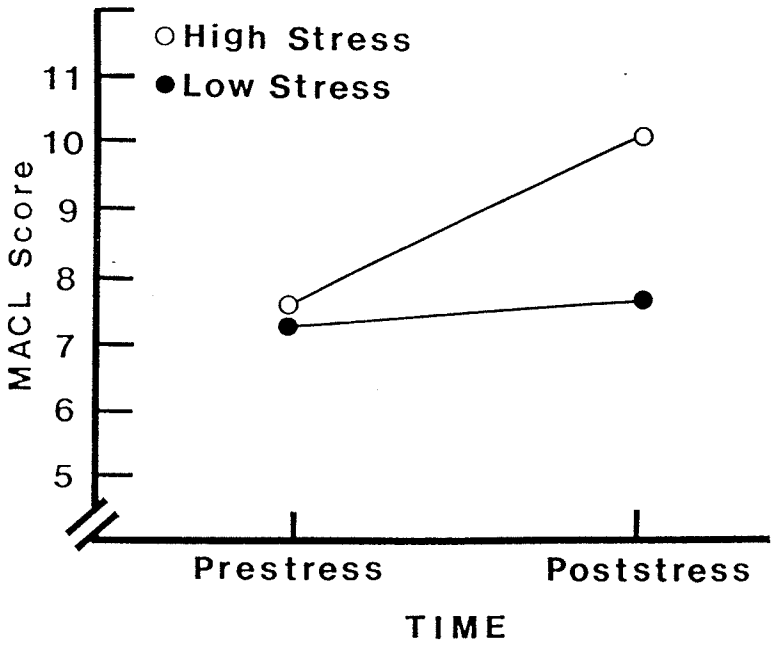

Figure 1. Pilot study MACL negative affect scores as a function of stress condition and time of mood assessment. (Higher scores reflect more negative affect.)

Table 1

Means and Standard Deviations () of MACL Negative Affect Scores for Subjects in the Pilot Study

	Time	
Group	Prestress	Poststress
High Stress	7.67 (5.49)	10.15 (7.44)
Low Stress	7.38 (5.70)	7.73 (5.50)

Table 2

ANOVA Summary Table for Pilot Study MACL Data

Source	df	SS	MS	F	p
Stress	1	75.79	75.79	1.20	.28
Error	77	4589.82	63.11		
Time	1	76.70	76.70	6.98	.01
Time x Stress	1	47.23	47.23	4.30	.05
Error (Time)	77	846.07	10.99		

On the basis of the pilot study results it was concluded that the test versions were appropriate for use without modification in the main study.

Main study. Subjects in the main study completed MACLs immediately preceding and following the intellectual aptitude testing. The results of a 2 x 2 (easy or difficult test version x time of assessment) repeated measures ANOVA on negative affect showed main effects for time of assessment (pretest vs. posttest), F (1, 91) = 45.93, p < .0001, and test version, F (1, 91) = 4.50, p < .04. A time x test version interaction was also found, F (1, 91) = 5.46, p < .025 (see Figure 2). Table 3 contains the descriptive statistics. The summary table for the analysis is presented in Table 4.

Results from the manipulation check in the main study were consistent with the pilot study data. In both cases subjects receiving the difficult version of the test reported greater increases in posttest negative affect than subjects who received the easier version.

Summary. Levels of negative affect changed as expected following test administration in two independent samples. This provided support for the view that the two intellectual aptitude test versions were differentially stressful to subjects and therefore successful as a stress manipulation.

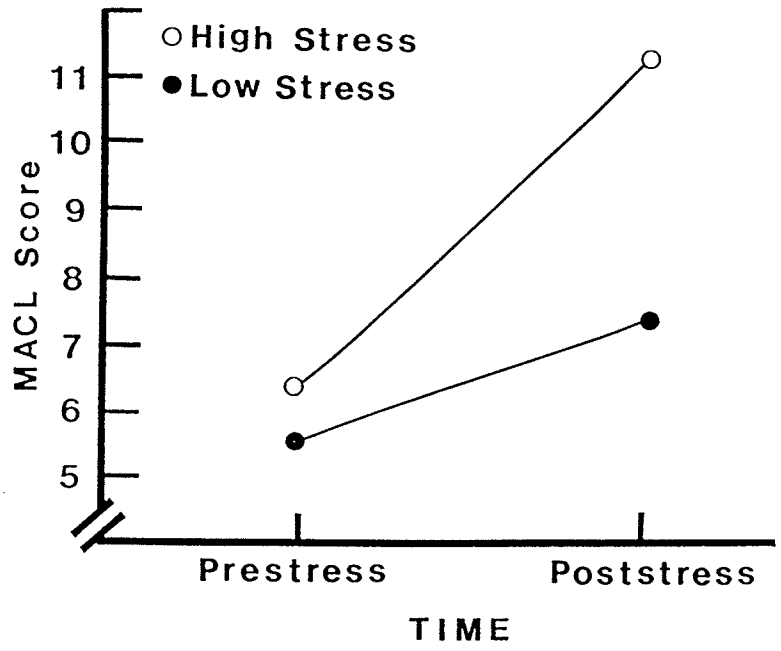

Figure 2. Manipulation check MACL negative affect scores as a function of stress condition and time of mood assessment. (Higher scores reflect more negative affect.)

Table 3

Means and Standard Deviations () of MACL Negative Affect Scores from the Main Study Manipulation Check

	Time	
Group	Prestress	Poststress
High Stress	6.36 (5.30)	11.44 (7.51)
Low Stress	5.46 (3.99)	7.94 (5.47)

Table 4

ANOVA Summary Table for Manipulation Check MACL Data

Source	df	SS	MS	F	p
Stress	1	225.25	225.25	4.50	.04
Error	91	4554.34	50.05		
Time	1	665.13	665.13	45.93	.01
Time x Stress	1	79.09	79.09	5.46	.03
Error (Time)	77	1317.81	14.48		

The effects of the stress manipulation over the posttest dream recording period will be discussed in a subsequent section.

Reliability of Dream Content Analysis

All baseline and posttest dream reports were analyzed for references to the intellectual aptitude testing situation (i.e., treatment incorporation) by a blind rater using procedures set out by Hall and Van de Castle (1966) and Wright (1987) (see Appendix H). The number of references to the testing situation were summed to yield a treatment incorporation score for each report.

Practice ratings. A sample of 34 dream reports representing various degrees of treatment incorporation was selected from the subjects' practice dream reports. These were used to familiarize the blind rater with the content analysis procedure. They were also scored by a second rater, which provided an opportunity to calculate a preliminary interrater reliability coefficient.

Using Hersen and Barlow's (1976) method for computing interrater reliability, an agreement coefficient of .794 was obtained on the practice reports. This exceeded the a priori minimum agreement level of .75. Subsequent ratings of dream reports were therefore done without further training of the blind rater.

Main study ratings. After scoring by the blind rater, a random sample of 30 dream reports was selected from the baseline and posttest reports. These were then scored by a second rater, and an interrater reliabilility coefficient was calculated. The resulting interrater reliability value was .90. This indicates that the content analysis of dream reports was conducted with an acceptable level of reliability.

SIPI Patterns in Present vs. Normative Sample

Several analyses were conducted to determine similarities and differences between white males in the Short Imaginal Processes Inventory normative sample and subjects used in the present study.

Correlational analyses. Pearson product-moment correlation coefficients were calculated between subsets of the SIPI scales. The relationship between Poor Attentional Control and Positive-Constructive Daydreaming was -.035, n.s., indicating that these variables were not related beyond chance levels in the present study. The obtained r did not differ significantly from the correlation of .14 reported for the SIPI normative sample (Huba et al., 1982), z = -1.517, n.s. The correlation between Positive-Constructive Daydreaming and Guilt-Fear of Failure Daydreaming in the present study was -.133, n.s., which is significantly different from the SIPI normative sample r of

.16 (Huba et al., 1982), $z = -2.54$, $p < .01$. The correlation between Poor Attentional Control and Guilt-Fear of Failure Daydreaming in the present study was .252, $p < .05$. The corresponding value reported for the SIPI normative sample was .28 (Huba et al., 1982). The difference between these correlations was not significant.

Comparisons between means. The mean SIPI scale scores of white male subjects in the SIPI normative sample and subjects in the present study were compared through a series of independent sample t tests. Descriptive statistics (and obtained Cronbach alpha values) are shown in Table 5.

Table 5

Means and Standard Deviations () of SIPI Scale Scores for Subjects in the Present Study and Normative Sample

SIPI Scale	Sample		Cronbach Alpha
	Present Study	Normative Sample	
Positive-Constructive Daydreaming	54.26 (8.42)	48.46 (9.13)	.83
Guilt-Fear of Failure Daydreaming	41.08 (9.02)	34.27 (9.89)	.76
Poor Attentional Control	48.37 (9.40)	46.90 (9.82)	.80

The results indicated there was no significant difference between the present sample and white males in the normative sample on the Poor Attentional Control scale, t (491) = 1.37, n.s. There were differences between the samples, however, on the Guilt-Fear of Failure Daydreaming scale, t (491) = 1.997, $p < .05$, and the Positive-Constructive Daydreaming scale, t (491) = 6.03, $p < .001$. Subjects in the present study scored significantly higher than subjects in the normative sample on both these scales.

The obtained Cronbach alpha internal consistency values were consistent with those reported for other samples (Huba et al., 1982; Schallow & McIlwraith, 1986).

Waking Fantasy Style and Dream Function

Hypotheses concerning the overall relationship between the three dimensions of waking fantasy style identified by the SIPI and dream function (as measured by treatment incorporation, dream pleasantness, and morning mood ratings) were initially assessed using an omnibus canonical correlation procedure. This was followed by a series of multiple regression analyses designed to provide more specific information about interrelationships among the variables.

Overview of canonical correlation. A canonical correlation is used to analyze the relationship between two

sets of variables. The analysis is accomplished by generating pairs of linear combinations of variables from each of the two sets. These linear combinations are called canonical variates. The first pair of canonical variates calculated maximizes the correlation between a linear combination of one set of variables and a linear combination of the other. A second pair of canonical variates, uncorrelated with the first, is then calculated. The second pair maximizes the correlation between linear combinations of variables after the variance due to the first pair of variates has been removed. Pairs of canonical variates are calculated until no significant relationships between sets remain or all variables are exhausted (cf. Tabachnick & Fidell, 1983).

Interpretation of canonical correlations provides information on the number of independent dimensions along which the variable sets are related. Interpretation of correlations between the variables and their canonical variates provides information on which variables are most important in the linear combinations maximizing the correlation between the variable sets.

Canonical correlation results. A canonical correlation analysis was conducted between the independent and dependent variable sets. The independent variables were presleep mood, level of exposure to the stressful intellectual

aptitude test, and the SIPI scales of Positive-Constructive Daydreaming, Guilt-Fear of Failure Daydreaming, and Poor Attentional Control. The dependent variables were treatment incorporation, dream pleasantness, and morning mood. Higher scores on the dependent measures reflected more references to the stressor in dream reports, more unpleasant dreams, and more negative morning mood (i.e., increasing levels of disruptive, mastery dream content). Lower scores on the dependent measures reflected increasing levels of pleasant, avoidance content in dreams. Higher scores on the independent variables reflected more negative presleep mood, increasing levels of each of the waking fantasy style dimensions, and a lower level of exposure to the stressor.

The correlation matrices were of full rank, indicating that assumptions regarding within-set multicollinearity and singularity were met (see Tables 6-8 for the within- and between-set correlation matrices). This demonstrated that the extent of correlations between variables within each of the variable sets was moderate and none of the variables appeared to be a linear combination of other variables. No data points were considered outliers.

Hypotheses one and two stated that waking fantasy style and presleep mood would be related to dream function. The discovery of two significant canonical correlations between the independent and dependent variable sets provided support

Table 6

Correlations Among the Independent Variables

Variable	SIPI Scale: Poor Att.	Pos-Cons.	Guilt-Fear	Stress Level
Poor Att. Cont.	1.0	-.04	.25*	-.14
Pos-Con. Dayd.		1.0	-.13	-.17
Guilt-Fear Fail.			1.0	-.07
Presleep Mood				
Night 1	.04	.10	.03	-.14
Night 2	.02	.12	.16	-.04
Night 3	.09	.01	.14	-.15
Night 4	.01	.08	-.01	-.09
Night 5	-.00	.03	.23*	-.12
Night 6	.08	.17	.06	-.25*
Night 7	.08	.12	.07	-.20

Presleep Mood	Presleep Mood (Night): 1	2	3	4	5	6	7
Night 1	1.0	.40**	.22*	.30**	.31**	.35**	.36**
Night 2		1.0	.28**	.42**	.41**	.33**	.51**
Night 3			1.0	.40**	.53**	.37**	.40**
Night 4				1.0	.48**	.35**	.41**
Night 5					1.0	.33**	.37**
Night 6						1.0	.51**

*$p < .05$ **$p < .01$

Table 7

Correlations Among the Dependent Variables

	Morning Mood (Night)						
Morning Mood	1	2	3	4	5	6	7
Night 1	1.0	.51**	.53**	.38**	.54**	.36**	.45**
Night 2		1.0	.55**	.42**	.55**	.56**	.42**
Night 3			1.0	.57**	.55**	.44**	.43**
Night 4				1.0	.43**	.44**	.52**
Night 5					1.0	.45**	.36**
Night 6						1.0	.51**
Night 7							1.0
Treatment Incorporation							
Night 1	-.07	-.01	.05	-.14	.09	.08	.01
Night 2	.03	.05	.00	-.06	.10	.21*	.02
Night 3	-.04	-.04	-.02	-.09	.02	.08	.20
Night 4	-.07	.01	.07	-.02	.16	.10	.09
Night 5	-.02	-.07	-.00	-.03	.08	-.08	.00
Night 6	-.04	.07	.16	-.13	-.00	.15	.02
Night 7	-.06	.10	-.13	-.19	.08	.09	-.05

... continued

Table 7 (continued)

Correlations Among the Dependent Variables

	Dream Pleasantness (Night)						
Dream Pleasantness	1	2	3	4	5	6	7
Night 1	1.0	.13	.06	.08	.09	.03	.01
Night 2		1.0	.17	.27**	.21*	.24*	.07
Night 3			1.0	.22*	.05	.13	.32**
Night 4				1.0	.15	.16	.26*
Night 5					1.0	-.12	.15
Night 6						1.0	.03
Night 7							1.0
Morning Mood							
Night 1	.42**	.27**	.23*	.02	.12	.11	.14
Night 2	.20	.45**	.30**	.23*	.14	.25*	-.05
Night 3	.03	.08	.35**	.18	.01	.11	.18
Night 4	.22*	.21*	.22*	.31**	.14	.27**	.21*
Night 5	.08	.21*	.14	.11	.29*	-.06	-.13
Night 6	-.08	.19	.05	.21*	-.07	.26*	.07
Night 7	.10	.05	.06	.15	.03	.07	.26*

... continued

Table 7 (continued)

Correlations Among the Dependent Variables

	Treatment Incorporation (Night)						
Treatment Incorporation	1	2	3	4	5	6	7
Night 1	1.0	.15	.04	-.05	-.01	.04	.02
Night 2		1.0	.14	.19	.16	.14	.15
Night 3			1.0	.37**	.22*	.06	.34**
Night 4				1.0	.33*	-.03	.26*
Night 5					1.0	.04	.17
Night 6						1.0	.02
Night 7							1.0
Dream Pleasantness							
Night 1	.15	.11	-.10	-.01	.18	.03	-.03
Night 2	-.03	.03	-.04	.04	.24*	.19	.05
Night 3	.17	-.08	-.11	-.03	-.03	.10	.03
Night 4	-.22*	.02	-.05	.25*	.04	.24*	.00
Night 5	.10	.02	.00	.14	.00	-.10	-.02
Night 6	.09	-.05	.10	-.04	.05	.15	-.01
Night 7	.06	.18	-.11	-.12	-.16	-.05	.06

*$p < .05$ **$p < .01$

Table 8

Correlations Between the Independent and Dependent Variables

Variable	SIPI Scale: Poor Att. Cont.	SIPI Scale: Pos-Con. Dayd.	SIPI Scale: Guilt-Fear Fail.	Stress Level
Morning Mood				
Night 1	.05	.07	.13	-.09
Night 2	.06	.14	.01	-.07
Night 3	.07	.13	.15	-.24*
Night 4	.15	.13	-.01	-.26*
Night 5	-.05	.16	.11	-.12
Night 6	-.02	.19	.01	-.10
Night 7	.14	.04	.05	-.08
Dream Pleasantness				
Night 1	.04	.09	.07	.01
Night 2	.00	.01	.04	-.16
Night 3	-.02	.24*	-.09	-.26*
Night 4	.04	.14	.04	-.36**
Night 5	-.08	.20	.11	-.06
Night 6	-.05	-.03	-.16	.07
Night 7	-.05	.09	-.03	-.24*

... continued

Table 8 (continued)

Correlations Between the Independent and Dependent Variables

Dream Pleasantness	Presleep Mood (Night) 1	2	3	4	5	6	7
Night 1	.10	.08	.11	.02	.20	.07	.21*
Night 2	.17	.20	.21*	.37**	.18	.09	.14
Night 3	.06	.23*	.22*	.10	.03	.24*	.23*
Night 4	.11	.16	.16	.26*	.00	.17	.31**
Night 5	.08	.12	.09	.15	.22*	.01	.10
Night 6	-.10	.06	-.02	.23*	.14	-.11	-.07
Night 7	.19	.12	.15	-.01	.03	.17	.20

Treatment Incorporation	SIPI Scale: Poor Att. Cont.	Pos-Con. Dayd.	Guilt-Fear Fail.	Stress Level
Night 1	-.05	.11	.10	.21*
Night 2	-.08	.05	-.18	.13
Night 3	-.06	.13	.03	.06
Night 4	-.16	.16	.06	-.11
Night 5	-.12	.03	.12	.03
Night 6	.05	-.09	-.19	.08
Night 7	.03	.14	.16	-.17

... continued

Table 8 (continued)

Correlations Between the Independent and Dependent Variables

Treatment Incorporation	Presleep Mood (Night) 1	2	3	4	5	6	7
Night 1	-.08	-.01	-.10	-.15	.02	-.08	.03
Night 2	.14	-.04	-.03	-.10	-.02	-.05	.05
Night 3	.15	.10	-.09	.07	.08	-.06	-.06
Night 4	-.18	-.13	.02	-.11	-.07	-.10	-.08
Night 5	-.01	.10	.11	.15	.11	-.11	.05
Night 6	.17	-.02	.02	.19	-.00	.04	-.05
Night 7	.06	-.06	.15	-.01	.22*	.05	-.03
Morning Mood							
Night 1	.53**	.53**	.38**	.41**	.51**	.30**	.52**
Night 2	.41**	.50**	.42**	.49**	.52**	.30**	.46**
Night 3	.28**	.52**	.63**	.51**	.64**	.33**	.45**
Night 4	.28**	.34**	.44**	.68**	.49**	.39**	.43**
Night 5	.30**	.41**	.46**	.42**	.58**	.27**	.44**
Night 6	.38**	.35**	.34**	.40**	.38**	.45**	.57**
Night 7	.27**	.42**	.31**	.38**	.37**	.41**	.56**

*$p < .05$ **$p < .01$

for these hypotheses. The canonical correlation represented by the first relationship between the independent and dependent variable sets was .898, $p < .0001$ (Rao's F

approximation). Squaring this value indicated that the first canonical correlation accounted for 81% of the overlapping variance between the sets. The second canonical correlation was .782, $p < .005$. It accounted for 61% of the remaining common variance between the sets. There were no other significant canonical correlation coefficients.

The proportion of variance in the independent and dependent variable sets extracted by their own and by the opposite canonical variates is presented in Table 9. Overall, about 36% of the total variance in the independent variables was accounted for by the two canonical variates of the independent variables. About 23% of the total variance in the dependent variables was extracted by the canonical variates of the dependent variables. The proportion of total variance in the independent variables accounted for by the canonical variates of the dependent variables was about 28%. The proportion of total variance in the dependent variables extracted by the canonical variates of the independent variables was about 18%.

Table 10 shows the standardized canonical variate coefficients for the two canonical variates. The standardized canonical variate coefficients reflect the relative weighting of each of the variables in calculating the canonical variates.

Table 9

Proportion of Variance Accounted for by Canonical Variates

Standardized Variance of Independent Variables Explained by:			
Canonical Variates of the Independent Variables		Canonical Variates of the Dependent Variables	
Variate 1	.295	Variate 1	.238
Variate 2	.068	Variate 2	.041
Standardized Variance of Dependent Variables Explained by:			
Canonical Variates of the Dependent Variables		Canonical Variates of the Independent Variables	
Variate 1	.194	Variate 1	.156
Variate 2	.039	Variate 2	.024

The first canonical variate consistently weighted presleep mood most heavily in the independent variable set and morning mood most heavily in the dependent variable set. The weighting of variables relevant to the second canonical variate was somewhat more complicated. In the independent variable set, Poor Attentional Control was moderately heavily weighted in the negative direction, whereas Positive-Constructive Daydreaming and Guilt-Fear of Failure Daydreaming were equally weighted in the positive direction.

Table 10

Standardized Canonical Variate Coefficients for the Independent and Dependent Variable Sets

Independent Variables	Variate 1	Variate 2
Poor Attentional Control	.0011	-.3285
Positive-Constructive Daydreaming	.1145	.3275
Guilt-Fear of Failure Daydreaming	-.0148	.3231
Presleep Mood Night 1	.1313	.1073
Night 2	.2549	-.1804
Night 3	.2523	.1026
Night 4	.2395	-.7327
Night 5	.3097	-.2200
Night 6	-.0731	.1892
Night 7	.2160	.7243
Stress Level	-.0994	.0290
Dependent Variables	**Variate 1**	**Variate 2**
Morning Mood Night 1	.3118	.2388
Night 2	.2186	-.0849
Night 3	.3285	-.2123
Night 4	.1941	-.3935
Night 5	.0675	-.1524
Night 6	.1499	.8559
Night 7	.0122	-.0779

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Table 10 (continued)

Standardized Canonical Variate Coefficients for the Independent and Dependent Variable Sets

Dependent Variables		Variate 1	Variate 2
Dream Pleasantness	Night 1	-.1217	.0594
	Night 2	-.0285	-.2528
	Night 3	.0786	.2586
	Night 4	-.0179	.0932
	Night 5	.0976	.0336
	Night 6	-.0025	-.4696
	Night 7	.0686	.1930
Treatment Incorporation			
	Night 1	-.0275	.2683
	Night 2	-.0230	-.0079
	Night 3	.0149	-.2956
	Night 4	-.0236	.3208
	Night 5	.1166	.0871
	Night 6	-.0811	-.3104
	Night 7	.0157	.1383

Presleep mood was weighted heavily in the negative direction on night four, but on night seven was weighted heavily in the positive direction. The second canonical variate of the dependent variable set appeared to weight morning mood,

dream pleasantness, and treatment incorporation fairly equally, but the valence of the weightings changed over time. These changes in valence across the variable sets may be interpreted as support for the hypothesis that the relationship between waking fantasy style and dream function would change over time.

The structure of the canonical variates was examined in more detail by looking at the correlations between the canonical variates for each set and the variables comprising that set.

Using a cutoff correlation of .30 for interpretation (Tabachnick & Fidell, 1983), the only independent variable relevant to the first canonical variate was presleep mood, which had consistently high correlations over time (see Table 11). The dependent variables relevant to the first canonical variate were morning mood, which maintained a consistently high association over time, and dream pleasantness on the first posttest night (see Table 11). This pattern provided limited support for hypothesis two, which stated that presleep mood would be related to the dependent measures. No other variables were meaningfully correlated with the first canonical variate.

The independent variables relevant to the second canonical variate were Positive-Constructive Daydreaming and presleep MACL score on nights four and seven (see Table 11).

Table 11

Correlations Between the Independent and Dependent Variables and the Canonical Variates

Independent Variables	Variate 1	Variate 2
Poor Attentional Control	.0519	-.1843
Positive-Constructive Daydreaming	.2223	.3384
Guilt-Fear of Failure Daydreaming	.1394	.1978
Presleep Mood Night 1	.5351	.1188
Night 2	.7063	.0062
Night 3	.6849	.0487
Night 4	.7178	-.4567
Night 5	.7719	-.1504
Night 6	.4923	.2853
Night 7	.7031	.4560
Stress Level	-.2677	-.1328
Dependent Variables	**Variate 1**	**Variate 2**
Morning Mood Night 1	.7329	.0859
Night 2	.7426	-.0778
Night 3	.8428	-.0787
Night 4	.7285	-.2835
Night 5	.7193	.0561
Night 6	.6252	.2572
Night 7	.5908	.1083

... continued

Table 11 (continued)

Correlations Between the Independent and Dependent Variables and the Canonical Variates

Dependent Variables		Variate 1	Variate 2
Dream Pleasantness	Night 1	.1929	.1960
	Night 2	.3491	-.2247
	Night 3	.2704	.2095
	Night 4	.2974	.0952
	Night 5	.2394	.0421
	Night 6	.0885	-.4336
	Night 7	.1868	.2752
Treatment Incorporation			
	Night 1	-.0704	.2315
	Night 2	-.0237	.1416
	Night 3	.0704	-.0802
	Night 4	-.0899	.1879
	Night 5	.1585	-.0510
	Night 6	.0401	-.3198
	Night 7	.1276	.0869

Presleep mood had an inverse relationship with the second canonical variate on night four and a positive relationship on night seven. The dependent variables relevant to the second canonical variate were dream pleasantness and

treatment incorporation on night six (see Table 11). Both these variables were inversely related to the second canonical variate, suggesting that more pleasant dreams with fewer references to the stressor occurred as time since the stress manipulation increased. This may be interpreted as additional support for hypothesis four, which stated that the nature of the relationship between waking fantasy style and dream function would change over time.

Summary of canonical correlation analysis. The independent and dependent variables were related along two orthogonal dimensions. The first dimension indicated that presleep mood was associated with morning mood over time. The second dimension indicated that positive-constructive daydreaming and changes in presleep mood were associated with pleasant dreams devoid of references to the stressor late in the dream recording period.

Multiple regression analyses. Several sets of multiple regression analyses were conducted using presleep mood, level of exposure to the stressor, and SIPI subscales as predictors of morning mood, dream pleasantness, and treatment incorporation. Each of the analyses employed a standard multiple regression approach in which all independent variables were entered into the regression equation simultaneously. With this procedure, each independent variable was assessed as if it had entered the

regression equation after all other independent variables had been entered. Each independent variable, then, was evaluated in terms of what it added to prediction of the dependent variable over and above the predictability afforded by the other independent variables (cf. Tabachnick & Fidell, 1983).

The results of the first set of analyses indicated that morning mood was predicted beyond chance levels by presleep mood each night. The proportion of variance in morning mood accounted for by presleep mood across nights ranged from 29% to 55%. In the regression model, negative presleep mood predicted negative morning mood beyond the .01 level (see Table 12). None of the other variables -- apart from stress condition on night four -- made significant contributions to the prediction of morning mood.

The results of the second set of analyses indicated that dream pleasantness on nights three and four was predicted by level of exposure to the stressor. The proportion of variance in dream pleasantness accounted for by level of exposure to the stressor was 19% on night three and 20% on night four. In the regression model, less unpleasant dreams were predicted by exposure to the less stressful version of the intellectual aptitude test beyond the .05 level (see Table 13). None of the other variables

Table 12

Multiple Regression Statistics for Predicting Morning Mood from the Independent Variables

Variable	Beta	p	R-square	F	p
Night 1 (Model)			.2931	7.21	.00
Intercept	-2.2	.68			
Poor Att. Cont.	-0.0	.99			
Pos-Con. Dayd.	0.0	.69			
Guilt-Fear Fail.	0.1	.21			
Presleep Mood	0.5	.00			
Stress Level	0.0	.99			
Night 2 (Model)			.3141	6.56	.00
Intercept	-1.1	.84			
Poor Att. Cont.	0.0	.47			
Pos-Con. Dayd.	0.0	.49			
Guilt-Fear Fail.	-0.0	.46			
Presleep Mood					
Night 1	0.2	.02			
Night 2	0.4	.00			
Stress Level	-0.0	.97			

... continued

Table 12 (continued)

Multiple Regression Statistics for Predicting

Morning Mood from the Independent Variables

Variable	Beta	p	R-square	F	p
Night 3 (Model)			.5447	14.53	.00
Intercept	-1.5	.74			
Poor Att. Cont.	-0.0	.98			
Pos-Con. Dayd.	0.0	.40			
Guilt-Fear Fail.	0.0	.83			
Presleep Mood					
Night 1	-0.0	.99			
Night 2	0.4	.00			
Night 3	0.5	.00			
Stress Level	-1.7	.08			
Night 4 (Model)			.5485	12.75	.00
Intercept	-1.8	.68			
Poor Att. Cont.	0.1	.10			
Pos-Cons. Dayd.	0.0	.55			
Guilt-Fear Fail.	-0.0	.34			
Presleep Mood					
Night 1	0.0	.80			
Night 2	0.0	.57			
Night 3	0.2	.05			
Night 4	0.5	.00			
Stress Level	-1.9	.03			

... continued

Table 12 (continued)

Multiple Regression Statistics for Predicting

Morning Mood from the Independent Variables

Variable	Beta	p	R-square	F	p
Night 5 (Model)			.4292	6.93	.00
Intercept	-1.8	.75			
Poor Att. Cont.	0.0	.43			
Pos-Cons. Dayd.	0.1	.18			
Guilt-Fear Fail.	-0.0	.89			
Presleep Mood					
Night 1	0.1	.52			
Night 2	0.2	.17			
Night 3	0.2	.07			
Night 4	0.1	.40			
Night 5	0.4	.00			
Stress Level	-0.3	.82			
Night 6 (Model)			.3440	4.30	.00
Intercept	-1.5	.78			
Poor Att. Cont.	-0.0	.67			
Pos-Con. Dayd.	0.1	.25			
Guilt-Fear Fail.	-0.0	.71			
Presleep Mood					
Night 1	0.2	.10			
Night 2	0.1	.55			
Night 3	0.1	.46			

... continued

Table 12 (continued)

Multiple Regression Statistics for Predicting

Morning Mood from the Independent Variables

Variable	Beta	p	R-square	F	p
Night 6					
Presleep Mood					
Night 4	0.1	.21			
Night 5	0.1	.30			
Night 6	0.2	.03			
Stress Level	0.5	.66			
Night 7 (Model)			.3901	4.71	.00
Intercept	0.2	.97			
Poor Att. Cont.	0.1	.18			
Pos-Con. Dayd.	-0.0	.58			
Guilt-Fear Fail.	-0.0	.47			
Presleep Mood					
Night 1	-0.0	.95			
Night 2	0.1	.24			
Night 3	-0.0	.94			
Night 4	0.1	.48			
Night 5	0.1	.25			
Night 6	0.1	.23			
Night 7	0.4	.00			
Stress Level	0.7	.58			

Table 13

Multiple Regression Statistics for Predicting Dream Pleasantness from the Independent Variables

Variable	Beta	p	R-square	F	p
Night 3 (Model)			.1939	2.92	.00
Intercept	3.3	.03			
Poor Att. Cont.	-0.0	.84			
Pos-Con. Dayd.	0.0	.09			
Guilt-Fear Fail.	-0.0	.20			
Presleep Mood					
Night 1	-0.0	.32			
Night 2	0.1	.06			
Night 3	0.0	.10			
Stress Level	-0.7	.03			
Night 4 (Model)			.1980	2.59	.02
Intercept	4.1	.02			
Poor Att. Cont.	0.0	.89			
Pos-Cons. Dayd.	0.0	.60			
Guilt-Fear Fail.	-0.0	.46			
Presleep Mood					
Night 1	-0.0	.77			
Night 2	0.0	.49			
Night 3	0.0	.81			
Night 4	0.0	.11			
Stress Level	-1.2	.00			

added to the predictability of dream pleasantness on nights three and four. Dream pleasantness was not predictable beyond chance levels on any other nights.

The third and fourth sets of analyses indicated that treatment incorporation and presleep mood were not predictable beyond chance levels on any night of the study.

The regression analyses involving dream pleasantness provided partial support for hypothesis three, which stated that level of exposure to the stressor would be related to the dependent measures, and also supported hypothesis four, which stated that relationships would change over time. The regression analyses involving morning mood provided partial support for hypothesis two, which stated that presleep mood would be related to the dependent measures.

Summary of multiple regression analyses. Several sets of standard multiple regression analyses were conducted. Consistent with the canonical correlation analysis, presleep mood was found to be a reliable predictor of morning mood. Dream pleasantness was predicted by level of exposure to the stressor on nights three and four. Treatment incorporation and presleep mood were not predicted by any of the other variables.

Dream Function Over Time

Hypothesis three stated that level of exposure to the stressor would be related to presleep mood, morning mood, dream pleasantness, and treatment incorporation. Several repeated measures analyses of variance were conducted to assess changes in these variables as a function of level of exposure to the stressor and the passage of time.

The results of a 2 x 7 (easy or difficult test version x night) repeated measures analysis of variance on presleep mood showed a main effect for test version, F (1, 91) = 4.07, $p < .05$. Descriptive statistics are presented in Table 14. The summary table for the analysis is contained in Table 15. Post hoc comparisons indicated that subjects in the high stress group reported significantly more negative presleep affect on night six than subjects in the low stress group. Presleep mood followed a fluctuating but essentially parallel course for the two stress conditions across the other nights (see Figure 3).

A 2 x 7 (easy or difficult test version x night) repeated measures ANOVA on dream pleasantness indicated a main effect for test version, F (1, 91) = 8.17, $p < .01$, and a test version x night interaction, F (6, 546), = 3.00, $p < .01$. The descriptive statistics are displayed in Table 16.

Table 14

Means and Standard Deviations () of Presleep MACL Negative Affect Scores Over Time

	Presleep Mood (Night)						
Group	1	2	3	4	5	6	7
High Stress	7.27 (5.70)	5.89 (6.25)	6.18 (7.61)	6.86 (8.18)	5.75 (6.23)	6.77 (7.84)	7.48 (7.06)
Low Stress	5.70 (5.63)	5.43 (5.86)	4.27 (4.72)	5.69 (5.56)	4.35 (5.27)	3.59 (3.87)	4.90 (5.52)

Table 15

ANOVA Summary Table for Presleep MACL Data

Source	df	SS	MS	F	p
Stress	1	499.92	499.92	4.07	.05
Error	91	11168.69	122.73		
Time	6	195.10	32.52	1.37	.23
Time x Stress	6	114.03	19.01	0.80	.57
Error (Time)	546	12970.95	23.76		

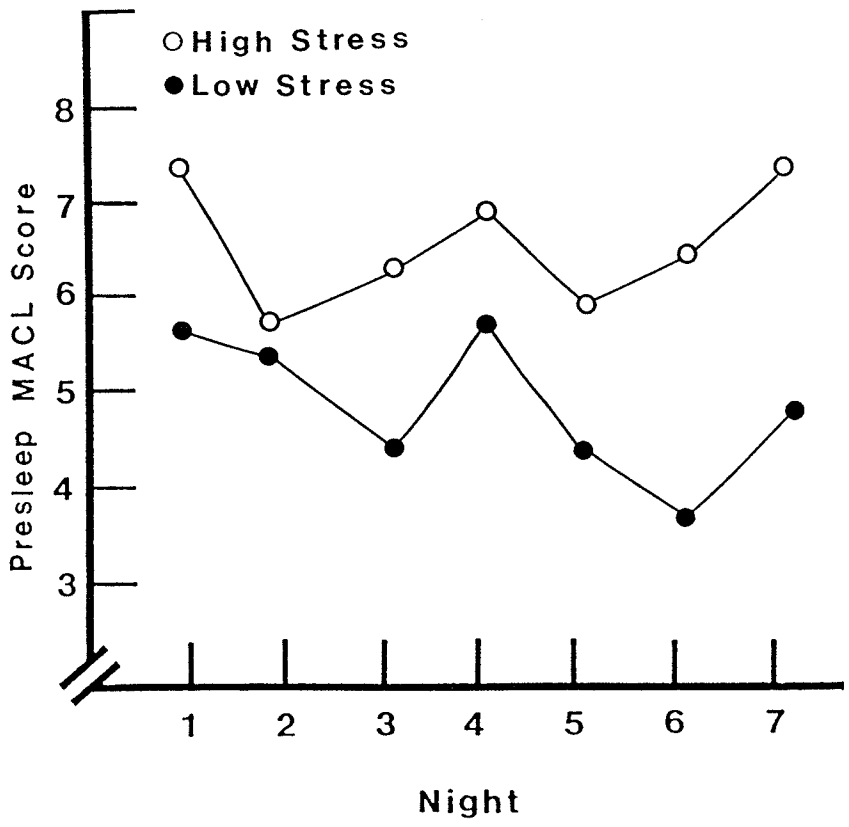

Figure 3. Presleep MACL negative affect scores as a function of stress condition and time. (Higher scores reflect more negative affect. Night 1 = baseline.)

Table 16

Means and Standard Deviations () of Dream Pleasantness Scores Over Time

	Dream Pleasantness (Night)						
Group	1	2	3	4	5	6	7
High Stress	3.84 (1.49)	3.89 (1.54)	4.27 (1.52)	4.68 (1.71)	3.75 (1.51)	3.55 (1.53)	3.95 (1.41)
Low Stress	3.88 (1.55)	3.37 (1.59)	3.49 (1.40)	3.43 (1.53)	3.57 (1.49)	3.80 (1.84)	3.20 (1.58)

Table 17

ANOVA Summary Table for Dream Pleasantness Data

Source	df	SS	MS	F	p
Stress	1	33.85	33.85	8.17	.01
Error	91	376.91	4.14		
Time	6	16.68	2.78	1.31	.25
Time x Stress	6	38.30	6.38	3.00	.01
Error (Time)	546	1161.57	2.13		

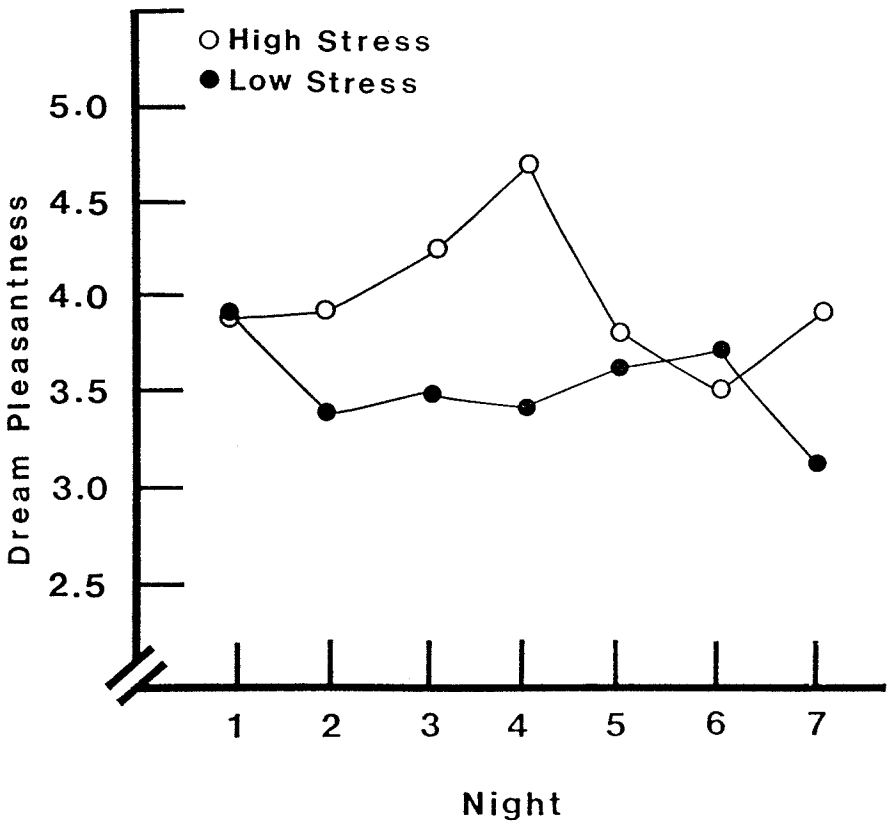

Figure 4. Dream pleasantness scores as a function of stress condition and time. (Higher scores reflect less pleasant dreams. Night 1 = baseline.)

Table 17 contains the summary table for the analysis. Post hoc comparisons indicated that the high and low stress conditions differed over time on nights three, four, and seven (see Figure 4). This suggests that subjects in the high stress group experienced significantly more unpleasant dreams than subjects in the low stress group during the middle and late stages of the dream recording period.

The results of 2 x 7 (easy or difficult test version x night) repeated measures ANOVAs on morning mood and treatment incorporation did not achieve statistical significance.

Summary. Level of exposure to the stressor was found to relate to presleep mood and dream pleasantness. This provided partial support for hypothesis three, which stated that level of exposure to the stressor would be related to presleep mood and the dependent measures. The observation of a time x stress level interaction for dream pleasantness lent support to hypothesis four, which stated that the nature of the relationship between the variables would change over time.

Postexperiment Questionnaire

An eight-item postexperiment questionnaire (PEQ) (see Appendix F) was administered to subjects at their final meeting with the experimenter. The PEQ was designed to

obtain information on subjects' attitudes toward the experiment and the stress manipulation. It also attempted to assess whether subjects experienced high levels of stress unrelated to the stress manipulation over the course of the study.

Approximately two-thirds of the subjects (59) reported that they believed the purpose of the experiment was to examine how presleep mood affects subsequent dreams. Another 16 subjects stated that they thought the study was designed to identify the relationship between IQ and dreams. The remaining subjects advanced notions ranging from "the identification of dream habits of males" to "a study of the unconscious" as perceived purposes of the study. No subjects guessed the actual purpose.

All but one of the subjects reported that they were treated fairly during the study. The lone dissenter, who was in the low stress condition, reported that "the IQ test made [him] feel stupid." Fortunately, he also reported that this image of himself did not persist for long.

Twenty-three subjects in the high stress condition and 18 in the low stress condition reported that the intellectual aptitude tests made them feel they knew less than they previously thought. Comparable numbers of subjects in each group also reported that the test had no effect on their opinion of themselves. Six subjects in the

low stress condition and one in the high stress condition reported that the test confirmed their already high opinions of how intelligent they were.

The majority of subjects said completion of the intellectual aptitude test did not affect their levels of confidence or ambition. Thirty-one subjects indicated there was a change in self-confidence, but virtually all of these individuals said it was a temporary reduction that reverted back to its pretest level within several hours.

Approximately one-third of the subjects felt there was no relationship between the intellectual aptitude testing and the collection of dream reports. Another third of the subjects felt the aptitude test was administered to provide a way of comparing dream complexity or recall with level of intelligence. Eight subjects thought the test was designed to see how individuals reacted to a stressful situation, but did not link this with the collection of dream reports. Because these individuals came close to guessing the aim of the stress manipulation, however, their data were scrutinized to ensure their responses were consistent with those of other subjects. No consistent pattern of differences was found, so the data from these subjects were included in all analyses.

Thirty-three subjects indicated that they believed dreams were collected over a number of nights so that

patterns in dream content could be observed. Another third of the subjects said that dreams were collected successively so that their relationship with mood and events over time could be explored. The remainder of the subjects thought dreams were collected over time to increase the number of dreams available for analysis or to help subjects become accustomed to recording their dreams.

None of the subjects reported having any prior knowledge of the experiment and none reported any events that they felt significantly disrupted their sleep or affected their dreams.

Significant Presleep Events

The presleep MACLs subjects completed asked them to briefly describe the most significant event that happened to them that day. This was intended to provide an ongoing method of assessing daily events that could have affected subjects' moods or dreams. Subjects generally reported movies, sporting events, or time spent with friends or family as the most significant events of the day. A few reported conflict with roommates or girlfriends as significant presleep events.

DISCUSSION

This study was designed to provide information on the disruption-avoidance-adaptation model of dream function. Its aims were to explore the relationship between waking fantasy style and elements of dream function and to examine the function of dreams in adaptation to stress over time. In this chapter the results of the hypothesis tests are summarized and discussed in light of the disruption-avoidance-adaptation model and the literature on waking fantasy style and dreams. Strengths and limitations of the study are also discussed, and suggestions for further research are made.

Summary of Hypothesis Tests

Hypothesis one stated that the dimensions of waking fantasy style would be related to the dependent measures of treatment incorporation, dream pleasantness, and morning mood. Limited support for this hypothesis was provided by a canonical correlation analysis indicating that positive-constructive daydreaming and changes in presleep mood were associated with pleasant dreams devoid of references to the stressor late in the dream recording period.

Hypothesis two stated that presleep mood would be related to the dependent measures of treatment incorporation, dream pleasantness, and morning mood. Partial support for this hypothesis was provided by a canonical correlation analysis indicating that presleep mood was associated with morning mood over time. Additional support was provided by a series of multiple regression analyses showing that morning mood was positively predicted beyond chance levels by presleep mood each night.

Hypothesis three stated that level of exposure to the stressor (i.e., the version of the intellectual aptitude test completed) would be related to presleep mood, treatment incorporation, dream pleasantness, and morning mood. Partial support for this hypothesis was provided by multiple regression analyses indicating that stress condition positively predicted levels of negative morning mood on night four and dream pleasantness on nights three and four. Additional support was provided by a repeated measures ANOVA indicating that subjects in the high stress condition reported significantly more negative presleep affect on night six than subjects in the low stress condition. Further support was provided by a second repeated measures ANOVA showing that subjects in the high stress condition experienced significantly more unpleasant dreams than subjects in the low stress condition during the middle and late stages of the dream recording period.

Hypothesis four stated that the nature of the relationships predicted in the other three hypotheses would change with the passage of time. Some support for this hypothesis was provided by a canonical correlation analysis showing that positive-constructive daydreaming and changes in presleep mood over time were associated with levels of dream pleasantness and treatment incorporation in the latter portion of the dream recording period. Changes in the valence of the canonical variate coefficients for presleep mood, morning mood, treatment incorporation, and dream pleasantness over time may be interpreted as an additional source of support. The observation that level of exposure to the stressor predicted levels of dream pleasantness and negative morning mood on some nights but not others provided further support for this hypothesis, as did the observation of a significant time x stress level interaction for dream pleasantness ratings in the poststress dream recording period.

Each of the hypotheses received at least limited support. This suggests there may be identifiable relationships among waking fantasy style variables, presleep mood, and elements of dream function following stress. Because the same variables were involved in multiple comparisons, however, some of these relationships may have occurred by chance. Confidence in the veracity of reported relationships should therefore be proportional to the level

of consistency with which findings were replicated across analyses.

Waking Fantasy Style and Dream Function

Early clinical research found thematic similarities between waking fantasy and nocturnal dreams (Gordon, 1953; Sarason, 1944). Later laboratory studies failed to support the notion of thematic consistency between waking fantasy and dreams (Ben-Horin, 1967; Eagle, 1964), but did provide evidence of some structural and stylistic consistencies (Klinger, 1971). Subsequent research in this area led to the formulation of three models by which waking fantasy and nocturnal dreams could possibly be related (Starker, 1974).

The first model suggests that whatever is rendered inaccessible to waking fantasy seeks expression in nocturnal dreams (cf. Cartwright, 1969). The second model suggests that the thematic, affective, and structural characteristics of dreams and waking fantasy are positively rather than inversely related (cf. Starker, 1974, 1977, 1978). The third model suggests that dreams and waking fantasy are independent processes bearing little or no relationship to each other (cf. Ben-Horin, 1967; Eagle, 1964).

Starker's (1974, 1977, 1978) research using scales from the Imaginal Processes Inventory showed that there was considerable continuity between waking fantasy style and

some structural dimensions of nocturnal dreaming (e.g., affective level and tone). This led him to conclude that waking fantasy style and nocturnal dreams are most appropriately viewed as analogous or parallel rather than alternative or independent processes.

The results of the present study provide only limited evidence of any consistent relationship between the dimensions of waking fantasy style and elements of dream function (see Endnote). A canonical correlation analysis indicated that positive-constructive daydreaming and changes in presleep mood were associated with pleasant dreams devoid of references to the stressor late in the dream recording period. At first glance this finding seems to support the notion of a positive relationship between waking fantasy style and dream function (cf. Starker, 1974, 1977, 1978, 1985). There are several factors complicating such a straightforward interpretation, however.

The omnibus canonical correlation analysis was designed to convey an overall sense of patterns of relationships within the data. A series of multiple regression analyses was then conducted in an effort to provide more specific information about interrelationships among the variables. The multiple regression analyses, however, failed to support the notion of a predictive relationship between positive-constructive daydreaming and any of the elements of dream

function (i.e., treatment incorporation; dream pleasantness; morning mood). Indeed, the multiple regression analyses showed that none of the SIPI waking fantasy style scale scores could be used to predict any of the elements of dream function. This lack of predictability suggests that the canonical solution linking positive-constructive daydreaming and pleasant, avoidance dreams should be interpreted cautiously.

Another reason for caution is the inclusion of presleep mood scores from nights four and seven in the canonical solution associating positive-constructive daydreaming with pleasant, avoidance dreams. Although the inclusion of presleep mood scores in the canonical solution is not problematic in itself, the observation that presleep mood had an inverse relationship with the independent variable set on night four (- .45) and a positive relationship on night seven (.45) may be a source of concern. A change in valence such as this may be interpreted simply as evidence that the relationship between the variable sets changed over time. It is also possible, however, that these results are an artifact of the canonical correlation analysis. Tabachnick and Fidell (1983) warn that canonical correlations may reflect mathematically elegant solutions that maximize the correlation between linear combinations of variables rather than provide meaningful or easily interpretable results. The use of time-series data in a

canonical correlation analysis may compound such a problem. As a consequence, the role of presleep mood in the canonical solution is difficult to evaluate with certainty. This makes it necessary to employ caution when interpreting the relationship between positive-constructive daydreaming and pleasant, avoidance dreams.

A third reason why it is difficult to view the results of the canonical correlation analysis as unambiguous evidence of a positive relationship between waking fantasy style and dream function stems more from theoretical than statistical concerns. It is possible, for example, that the positive relationship observed between positive-constructive daydreaming and pleasant, avoidance dreams is not due to a positive fantasy set that transcends state of consciousness (cf. Starker, 1974, 1977, 1978, 1985) but to an inverse relationship between waking mastery attempts and dream function (cf. Wright & Koulack, 1987). In other words, the apparent link observed between positive-constructive daydreaming and pleasant, avoidance dreams may be due to an association between positive-constructive daydreaming and effective waking mastery attempts (cf. Golding & Singer, 1983). This view remains speculative, however, because there was no direct measure of subjects' waking mastery attempts or coping strategies.

It is evident, then, that there are difficulties in unequivocally interpreting the results of the canonical solution linking positive-constructive daydreaming with pleasant dreams devoid of references to the stressor. When this is considered in light of the lack of predictability evidenced by the multiple regression analyses, it appears most prudent to conclude that the results provide only limited support for the existence of a positive relationship between positive-constructive daydreaming and elements of dream function. There is also some question about the theoretical implications of this relationship and the nature of the relationship between waking cognitive processes and dream function it supports. There was no evidence of any relationship between dream function and guilty/failure-oriented daydreaming or poor attentional control.

The failure to clearly identify a consistent relationship between waking fantasy style and elements of dream function may be interpreted in two ways. The first interpretation rests on the assumption that consistent relationships between waking fantasy style and dream function exist, but that this study failed, for some reason, to identify them. The second interpretation stems from the view that waking fantasy style and dream function may be relatively independent processes bearing no consistently identifiable relationship to each other. Both of these positions will be discussed in turn.

The notion that waking fantasy style and dream function should be reliably associated draws most of its support from Starker's (1974, 1977, 1978) research into the continuity between waking and sleeping fantasy. In a series of studies he demonstrated how structural continuities were evident across both waking and sleeping fantasy variables. One of his most consistent findings was that a positive fantasy set appeared to link male subjects' waking fantasy with the structural aspects of their nocturnal dreams (e.g., affective level and tone; bizarreness).

It seems reasonable to conclude from this that a relationship might similarly exist between waking fantasy style and elements of dream function following stress. There are some important procedural and conceptual differences between Starker's studies and this one, however, and an elaboration of these may help explain why the current results did not unequivocally support the notion of a consistent relationship between waking fantasy style and elements of dream function.

The most significant procedural differences between this study and Starker's research involve the way dream data were collected and analyzed and how the subjects were selected. Starker's (1974) subjects were a small sample of individuals specifically selected to represent positive, negative, and anxious daydreaming styles. An attempt in the

present study to identify individuals with a clearly unidimensional waking fantasy style indicated that only 4% of available subjects could meet such a criterion. In addition, Starker pooled dreams from each of his highly-selected subjects, essentially using reported dreams as "subjects," to increase the sample size. This violated the assumption of independence between observations, and may have affected the probability of a Type I error (Hays, 1981). Starker's (1977) follow-up study attempted to overcome these problems by using less restrictive subject selection criteria (thereby enlarging the sample) and employing a different method for assigning subjects to waking fantasy style conditions. The results of his replication study supported the findings from the initial research, but the use of multiple *t* tests may have again affected the probability of a Type I error.

There is a chance, then, that some of Starker's (1974, 1977) results may have been affected by the statistical procedures employed. It is also likely that his use of highly-selected subjects significantly reduced the generalizability of the results. As a consequence, Starker's observation of continuity between waking fantasy style and structural aspects of dreaming may hold only for a small percentage of individuals manifesting a predominantly unidimensional waking fantasy style.

The most significant conceptual difference between the present study and Starker's (1974, 1977, 1978) research involved the context within which the dependent variables were selected. This study was designed to explore the realm of dream function, and whether waking fantasy style was associated with it, whereas Starker's research was designed to assess whether waking and sleeping fantasy reflect a common fantasy process that cuts across various states of consciousness. Different conceptual frameworks led to the adoption of different dependent measures. Starker assessed the structural characteristics of dreaming that seemed most likely to covary with specific waking fantasy styles (e.g., affective level and tone; bizarreness; length of report). This study, on the other hand, involved an assessment of dream function following a stress manipulation. The dependent variables therefore differed from Starker's measures because they were designed to assess the dimensions of dreaming previous research identified as covarying most reliably with changes in dream function (i.e., treatment incorporation; dream pleasantness; morning mood). It is possible, then, that the use of different dependent measures led to the failure to observe a consistent relationship between waking fantasy style and the dimensions of dreaming assessed in this study. It is interesting to note in this regard that the greatest similarity in results between this study and Starker's research involved the dream pleasantness

dimension, which was close in content to Starker's affective polarity measure. This suggests that closer correspondence in the selection of dependent measures may have heightened the likelihood of obtaining results more consistent with Starker's findings. The process of collecting dream data following exposure to a stressor may have also contributed to the observed differences in the results, as Starker's research did not involve manipulation of any variables.

Conceptual and procedural differences between this study and previous research may have conspired against the identification of potential relationships between waking fantasy style and elements of dream function. The failure to obtain unequivocally confirmatory results, however, may also be interpreted in support of the view that dream function and waking fantasy style are independent processes. Such a position might suggest that dream function is associated more strongly with the vicissitudes of waking life (e.g., level and nature of stress; presleep experiences) than with the subjects' waking fantasy processes. Some evidence in support of this view may be inferred from the abundance of home and laboratory studies showing the effects of various stressful presleep experiences on elements of dream function (e.g., Cohen & Cox, 1975; De Koninck & Koulack, 1975; Koulack, in press; Koulack et al., 1985; Wright, 1987). In the absence of data showing that waking cognitive processes do not influence

dream function as well, however, it seems premature to conclude that dimensions of waking cognitive processing are not associated with dream function (cf. Rados & Cartwright, 1982). This seems especially true when one considers the accumulated evidence showing that the cognitive appraisal and interpretation of events is a key element in the identification of a situation or stimulus as stressful (e.g., Lazarus & Folkman, 1984; Meichenbaum, 1985). The failure to unequivocally identify consistent relationships between waking fantasy style and dream function in this study, then, is not sufficient to refute the view that a common cognitive process may underlie both waking fantasy and nocturnal dreams (cf. Cartwright, 1969; Klinger, 1971; Starker, 1974, 1977, 1978). Nor does it rule out the possibility that waking fantasy and dreams may somehow act in concert to facilitate adaptation to stress. The current results do suggest, however, that consistencies between elements of waking and sleeping fantasy are most likely to be observed when general structural dimensions of dreaming rather than correlates of experimentally-induced stress are used as dependent measures. Speculation about other factors that may influence the probability of observing covariation between waking fantasy style and dream function will be discussed in a subsequent section.

The Function of Dreams in Adaptation to Stress

In addition to exploring the relationship between waking fantasy style and elements of dream function, this study also provided an opportunity to examine the function of dreams in adaptation to stress over time. The results of this aspect of the study will be discussed in light of the disruption-avoidance-adaptation model of dream function (Wright & Koulack, 1987).

Subjects were randomly administered either an easy or a difficult version of an intellectual aptitude test as a means of inducing a stress reaction. Data from a manipulation check indicated that subjects completing the difficult test version reported greater increases in negative affect from pretest to posttest than subjects completing the easier test version. This indicated that the two test versions were differentially stressful and therefore appropriate for use as a stress manipulation in this study. Measures of presleep mood and dream function were recorded over a six-day period following administration of the stressor.

Several analyses of the effects of the stress manipulation on presleep mood and elements of dream function were conducted. A stress condition x nights repeated measures ANOVA showed a main effect for stress condition on presleep mood. Post hoc testing indicated the source of

this effect was an elevation in presleep negative affect for subjects in the high stress condition on the fifth poststress night. A stress condition x nights repeated measures ANOVA on dream pleasantness showed a main effect for stress condition and a stress x time interaction. Post hoc testing indicated that subjects in the high stress condition reported significantly more unpleasant dreams than subjects in the low stress condition on poststress nights two, three, and six. Multiple regression analyses indicated that stress condition positively predicted levels of negative morning mood on poststress night three and dream pleasantness on poststress nights two and three.

The pattern of results obtained indicates that exposure to the more stressful test condition was associated with a significantly greater level of presleep negative affect and more unpleasant dreams over time. These observations are consistent with the disruption-avoidance-adaptation model, which predicts that exposure to stress will subsequently influence subjects' affective experiences during both wakefulness and sleep. It is interesting to note, however, that although the stressor clearly influenced levels of dream pleasantness, it did not lead to increased levels of treatment incorporation. This raises the possibility that during their unpleasant dreams the subjects may have been dealing with the stressor in a symbolic rather than direct fashion (cf. Cartwright, Bernick, Borowitz, & Kling, 1969;

Wright & Koulack, 1987). It may also suggest that exposure to a high level of stress in this study led to a general increase in negative affect that altered the emotional tone of subjects' dreams without specifically altering their dream content.

Another interesting finding was the apparent fluctuation in levels of dream pleasantness during the poststress dream recording period. The results of the post hoc testing indicated that dream pleasantness ratings from the first poststress night did not differ as a result of subjects' level of exposure to the stressor. After a 24-hour period had passed, however, changes in dream pleasantness ratings associated with level of exposure to the stressor became evident. The less pleasant dreams continued for a second night, abated for two nights, and resumed on the final poststress dream recording night.

The disruption-avoidance-adaptation model predicts an oscillation between unpleasant or disruptive mastery dreams and more pleasant or avoidance dreams following stress. The observation of poststress fluctuations in dream pleasantness ratings over time provides some support for this aspect of the disruption-avoidance-adaptation model. The failure to observe a consistent association between levels of dream pleasantness and direct treatment incorporation complicates this interpretation of the results, but it does not indicate

that the unpleasant dreams were performing an avoidance rather than a mastery function.

The observation that there were no between-group differences in dream pleasantness ratings on the first poststress night suggests the initial poststress dreams may have been performing an avoidance rather than a mastery function. This stands in contrast to the disruption-avoidance-adaptation model, which predicts that dreams initially following a stressful experience will most likely be of the mastery variety.

One reason for the apparently delayed onset of mastery dreams in this study may relate to subjects' experiences in the time between administration of the stressor and sleep onset. It is possible that during this time other events in the subjects' lives may have outweighed the initial effects of the stressor. There was no general indication of objectively positive events in the subjects' descriptions of significant daily events immediately following the stressor, however, which lessens confidence in this view. A more likely explanation is that the subjects were able to deal somewhat effectively with the stressful experience prior to sleep and therefore enjoyed pleasant, avoidance dreams as compensation for their waking efforts to master the stressor. The identification of unpleasant mastery dreams on several subsequent nights, however, suggests that

adaptation to the stressor was not completely successful in the initial presleep period. It may also support the notion that adaptation to stress reflects an interplay between waking and sleeping mastery processes over time, which is consistent with the disruption-avoidance-adaptation model.

The present study, then, offered support for two key predictions arising from the disruption-avoidance-adaptation model. The notion that stress influences both waking and sleeping processes was supported by the observation of stress-related differences in presleep mood and levels of dream pleasantness over time. The notion that dreams oscillate between mastery and avoidance functions was supported by the observation of fluctuations in dream pleasantness ratings in the poststress dream recording period. The notion that adaptation to stress involves an interplay between waking and sleeping mastery attempts was also supported if one assumes that the delayed onset of poststress mastery dreams was due to the relative success of subjects' initial waking mastery efforts.

Dreams, Waking Fantasy Style, and Adaptation to Stress

The results of the present study provided some evidence that dreams oscillate between mastery and avoidance functions following a stressful waking event. There was also limited evidence of a positive association between positive-constructive daydreaming and pleasant, avoidance

dreams late in the dream recording period. These observations in combination permit cautious speculation that elements of dream function may at times covary with dimensions of waking fantasy style. Some of the factors that may influence the nature and extent of covariation observable between these variables are discussed in this section.

The disruption-avoidance-adaptation model (Wright & Koulack, 1987) allows for the possibility that waking cognitive processes may influence the function of dreams in adaptation to stress. It also emphasizes the role of individual differences in determining dream function. The results of this study suggest that under certain circumstances individual differences in waking fantasy style should be among the cognitive processes considered when evaluating factors associated with dream function. Levels of positive-constructive daydreaming seem of particular importance in that they appear to have the most readily identifiable relationship with elements of dream function.

The observation that high levels of positive-constructive daydreaming were positively associated with pleasant, avoidance dreams following stress supports the view that poststress oscillations in dream function may at times covary with dimensions of waking fantasy style. The results also suggest that this relationship becomes more

readily observable as length of time since exposure to the stressor increases. This may imply that the level of stress to which a subject is trying to adapt has a stronger association with dream function than do any of the dimensions of waking fantasy style. As adaptation continues, however, the need to facilitate the process through an oscillation between mastery and avoidance dreams may decrease, allowing associations between waking fantasy style and aspects of dreaming to be more readily observed. This suggests that covariation between elements of dream function and dimensions of waking fantasy style is most likely to be identified during periods in which stress is absent or at a low level.

Another factor to consider when identifying the conditions under which dream function and waking fantasy style are most likely to covary is the extent to which subjects successfully deal with a stressor while awake. Successful mastery of a stressor while awake, for example, would reduce the need for subsequent mastery dreams. Failed attempts to master the stressor, or attempts to avoid or deny its impact, on the other hand, may increase the likelihood of disruptive mastery dreams. The potential influence of waking mastery attempts on dream function should also be considered, then, when evaluating the probability of observing correlations between waking fantasy style and elements of dream function.

Overall, it appears that relationships between dimensions of waking fantasy style and elements of dream function are most likely to be observed under relatively benign conditions. Under more stressful conditions, the need to facilitate adaptation through an oscillation between mastery and avoidance dreams appears to predominate, thereby obscuring covariation between waking fantasy style and dream variables. Such a process, although speculative, could help account for the apparent disparity between the current results and Starker's (1974, 1977, 1978) research identifying positive associations between waking fantasy style and dream variables among subjects not exposed to stress.

The Relationship Between Presleep and Morning Mood

The disruption-avoidance-adaptation model suggests that differences in the amount and direction of poststress mood change over the course of a night will vary with the specific function of dreams (i.e., mastery vs. avoidance) and the passage of time (Wright, 1987). The results of a canonical correlation analysis and a series of multiple regression analyses indicated that morning mood was consistently positively associated with presleep mood despite apparent oscillations in dream function over time. These data appear to be inconsistent with the disruption-avoidance-adaptation model, but there may be a way to interpret them within its framework.

Although the disruption-avoidance-adaptation model emphasizes the oscillation in dream function manifest across nights, it allows for the possibility that dreams may also perform different functions within the course of a single night. That is, an oscillation between mastery and avoidance dreams may occur within as well as across nights.

Evidence that such a view is plausible has recently been provided by Lauer, Riemann, Lund, and Berger (1987). In their study they exposed male subjects to a neutral and a stressful film in counterbalanced order prior to sleep over two nonconsecutive nights. Subjects were then awakened following their first and last REM periods of the night and asked to describe any dreams recalled. These experimental nights were alternated with recovery nights to reduce the effects of sleep schedule disruptions on the results. The dependent variables included measures of treatment incorporation, dream affect, and sleep pattern. The results indicated that (a) dreams from the initial poststress REM period of the night were less pleasant (i.e., more anxious and aggressive) and accompanied by a more negative mood tone than dreams from the final REM period of the night, (b) the amount of poststress treatment incorporation increased from the initial to the final REM period, and (c) higher rates of initial treatment incorporation were accompanied by greater reductions in negative mood at the final awakening.

Taken together, the pattern of within-night affective changes reported by Lauer et al. seems to support the view that oscillations in dream function may occur during the course of a single night. The net effect of these oscillations may be to heighten the probability that a stressed subject who is allowed to sleep undisturbed over the course of the night will report levels of negative affect closely corresponding to the level of negative affect held prior to sleep. One way this apparent affective stability might be achieved is through the operation of a process acting to mitigate the potentially disruptive effects of poststress mastery dreams. Such a process could conceivably operate by countering the disruptive effects of mastery dreams with compensatory or avoidance dreams. Over the course of a night's sleep, then, levels of negative affect may be regulated by an oscillation between mastery and avoidance dreams. This could result in a restriction on the extent of change in negative affect observable after a night of uninterrupted sleep.

The reasons why this apparent mood-regulation process was evident in the present study but not others in which subjects slept undisturbed (e.g., Koulack et al., 1985) could be related to such factors as the subject selection criteria, the use of a home dream recall procedure, the nature of the stress reaction engendered in the subjects, and the increased length of time over which data were

collected. Another possibility is that the temporal stability in mood scores may be related to personality variables. In any event, further research is necessary to replicate the observation of consistency between presleep and morning mood and to identify the conditions under which such a relationship is most likely to be found.

Strengths and Limitations

Dream research is fraught with problems of experimental control. An attempt was nevertheless made in this study to control as many extraneous and potentially confounding variables as seemed practical. Some of the resulting strengths and limitations of this endeavor are described below.

One of the strengths of this study was its sampling procedure. A fairly homogeneous sample of English-speaking young adult male subjects who reported frequent spontaneous morning dream recall and an absence of identifiable sleep pathology was recruited. These subjects were then randomly assigned to either the high or the low stress condition. This procedure allowed for an assessment of the variables of interest under fairly favorable and uniform conditions. The decision to abandon subject selection on the basis of specific patterns of Short Imaginal Processes Inventory scale scores served to enhance the generalizability of the results and allowed for recruitment of a larger sample.

Another source of strength involved aspects of the experimental procedure itself. Running all subjects at the beginning of a university term, for example, minimized the likelihood of real-life academic stressors interfering with the stress manipulation. The decision to start the experimental sequence on a Monday or a Tuesday for all subjects similarly helped reduce the likelihood of weekend sleep disruptions interfering with the immediate effects of the stressor.

Rates of dream recall during the study were high, and only three subjects had to be dropped due to incomplete data. Subjects also readily complied with the request to turn in their dream reports every other day. Collecting dreams throughout the course of the study like this helped reduce the temptation for subjects to complete a week's worth of dream report forms immediately prior to their final meeting with the experimenter.

It appeared that many of the subjects attempted to comply with the request to refrain from alcohol, drugs, or coffee for several hours prior to sleep, as evidenced by their good-natured "complaints" about this request to the experimenter. Similar comments were also made about the request to set their alarms for an earlier than usual wake-up time. None of the subjects reported feeling they were treated unfairly, however, and their spontaneous comments suggested most seemed to enjoy participation in the study.

An additional strength of this study was its ability to differentiate treatment effects between the high and low stress conditions. Wright's (1987) attempt to differentiate treatment effects between high and low stress conditions failed, leaving her with essentially one stress condition in her evaluation of the disruption-avoidance-adaptation model. The present study therefore provided a clearer forum for investigating the utility of the model in predicting the effects of different levels of stress on dream function. Wright also selected subjects on the basis of high levels of neuroticism, which restricted the generalizability of her results.

The adoption of a home dream recall procedure in this study enabled the use of a larger sample and a longer period of dream recording than if a laboratory REM-awakening procedure had been employed. Potential problems with sleep deprivation and the lack of representativeness of dreams obtained in the laboratory were also avoided.

Some of the limitations of this study are common to most home dream studies, while others are more unique. One of the most significant limitations of any home dream study is the question of the validity of the reports obtained (cf. Domhoff, 1969; Weisz & Foulkes, 1970). Even though steps to reduce confabulation were taken (i.e., collecting dreams every other day), the broader question of how closely the

reports corresponded to the actual dreams experienced remains unanswered (unanswerable? cf. Kramer, 1982). A related problem is that the dream collection procedure employed tended to maximize the likelihood that the dreams recorded would be from the final REM period of the night. Potential oscillations in dream function over the course of the night (e.g., Lauer et al., 1987) therefore went unexplored. This restriction on the type of dream data available may generate an incomplete or, at worst, misleading picture of the function of dreams in adaptation to stress.

Other limitations relate to the characteristics of the sample employed. Because only males were used, data on the relationship between waking fantasy style and dream function among females are unavailable. Given the data showing that dream content differs between the sexes (e.g., Winget, Kramer, & Witman, 1972), while waking fantasies may not (e.g., Gold & Gold, 1982b), an investigation of the relationship between these variables with a female sample is necessary to achieve a more complete picture of the nature of covariation between waking and sleeping fantasy.

Another limitation linked to the subject selection procedure involves the exclusive use of frequent dream recallers. Use of such a sample is necessary in home dream studies, but it restricts the generalizability of the

results. The differences in waking fantasy style observed between subjects in this study and white males in the SIPI normative sample (Huba et al., 1982) may also be related to the use of frequent dream recallers. Although the most reliable predictor of dream recall is an awakening during the course of the dream (Koulack & Goodenough, 1976), frequency of dream recall has also been associated with richness of imaginal life (Martinetti, 1985), verbal intelligence (Wood, Sebba, & Domino, 1989), neuroticism (Cohen & Cox, 1975; Wright, 1987), and positive-constructive daydreaming (Starker, 1985). Use of frequent dream recallers, then, may have inadvertently led to the selection of individuals possessing other characteristics that could influence the nature of the relationship observed between waking fantasy style and dream function.

A final limitation to be discussed is the lack of a no-stress control condition. Such a condition would have allowed the study to more clearly address the question of whether dream function changes in response to stress. As it was conducted, the study addressed the question of how dream function changed in response to different levels of stress rather than the more general question of whether stress affected dreams. Inclusion of a no-stress control condition may have also enabled clearer examination of the possibility that a relationship between elements of dream function and dimensions of waking fantasy style is more readily observable in the absence of stress.

Suggestions for Further Research

The present study offered some support for the disruption-avoidance-adaptation model of dream function (Wright & Koulack, 1987). It also identified directions future research might take in evaluating the model and the relationship between waking fantasy style and dream function.

For example, the potential influence of waking mastery attempts on dream function needs to be explicitly examined, perhaps by administration of a questionnaire assessing coping processes (e.g., Lazarus & Folkman, 1984) and a daily record where subjects could indicate how often they thought about the stressful event. Actual samples of subjects' daydreams should also be examined, either by daydream diaries (e.g., Gold, Teague, & Jarvinen, 1981; Teague & Gold, 1981) or by thought-sampling procedures (e.g., Hurlburt, 1980; Starker & Jolin, 1983). Collection of data on waking mastery attempts and actual fantasy content would aid in more clearly estimating the probability of mastery or avoidance dreams following stress.

Precision could also be enhanced by administering the stressor immediately prior to sleep (e.g., Cohen & Cox, 1975; Koulack et al., 1985). This would reduce the likelihood of waking mastery attempts influencing subsequent dream function and allow a clearer examination of how the

stressor affected dreaming. Such a procedure requires the structured environment of the sleep laboratory, however, which tends to enhance control at the expense of generalizability.

The ability of the disruption-avoidance-adaptation model to predict patterns of dream function following more intense stress could be examined by collecting dream data from individuals recovering from a traumatic event (e.g., accidents; victimization). Such individuals would also be appropriate for examining relationships between waking and sleeping fantasy due to their frequent reports of intrusive waking imagery (flashbacks) and nightmares (e.g., Burstein, 1985; Starker & Jolin, 1982). Information on pretrauma functioning would typically not be available for these subjects, however, which would limit causal inferences (Cook & Campbell, 1979). Moreover, it would not be possible to randomly assign individuals to stress conditions, resulting in nonequivalent groups. Although a lack of equivalence would further complicate causal inferences, the situation could be ameliorated somewhat by comparing several different types of posttrauma groups with a nontraumatized control group.

Future research in dream function could also benefit from the inclusion of female subjects. Females were not used in this study in order to enhance comparability between

the present sample and the samples used in previous dream function studies. It is possible that a biased or incomplete view of dream function is emerging from such an approach, however. It is recommended that future studies of dream function work to overcome the gender bias evident in the area by including sex of subject as a factor in the experimental design.

An explicit examination of changes in dream function throughout the course of the night would be of value in examining the disruption-avoidance-adaptation model. Such a study would involve REM-awakenings, however, which require the use of a sleep laboratory. Alternating dream collection nights with recovery nights would help reduce spurious effects due to sleep deprivation, but the representativeness of the dreams obtained would still be questionable.

An examination of mean SIPI scale scores between groups of subjects identifying themselves as either frequent or infrequent dream recallers might help identify whether the differences in waking fantasy style observed between subjects in this study and white males in the SIPI normative sample (Huba et al., 1982) were associated with dream recall frequency or not. A similar study involving level of verbal intelligence might also be of value, as this variable may be associated with the length and quality of dream reports provided (Wood et al., 1989). Further studies attempting to

evaluate the relationship between aspects of waking and sleeping fantasy under varying levels of stress are needed to provide an opportunity to evaluate the generality of the observation that such relationships are obscured by high levels of stress.

Concluding Comments

A primary goal of this study was to evaluate the disruption-avoidance-adaptation model of dream function (Wright & Koulack, 1987). Many of the assumptions inherent in the model were empirically supported by the results. The notion that level of stress affects both waking and sleeping variables was supported, as was the notion that poststress dreams oscillate between mastery and avoidance functions. The data also permitted speculation that the success of waking mastery attempts may influence subsequent dream function.

Waking fantasy style was not reliably associated with dream function in the immediate poststress period, but as adaptation progressed, a positive association between level of positive-constructive daydreaming and pleasant, avoidance dreams was observed. This suggested there may be a general pattern of dream function occurring in response to stress that obscures any relationship between elements of dream function and dimensions of waking fantasy style that may be observable during more quiescent periods.

The disruption-avoidance-adaptation model appeared to be a useful framework for interpreting the current results. Part of the reason for its utility is its general nature, which allowed a wide range of results to be interpreted in a manner consistent with its principles. The next step in evaluating the disruption-avoidance-adaptation model would involve additional attempts to identify specific variables associated with the pattern of poststress dream function it predicts. This would allow for more precise specification of the parameters of the model and consolidate its appeal as an explanatory framework.

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APPENDIX A

Screening Questionnaire

Screening Questionnaire

Name _____

Age _____

Phone number _____

Faculty _____ Year _____

Introductory Psychology class section number _____

Language first spoken as a child _____

Would you be willing to participate later this term in a study of dreams and intellectual functioning that will give you six additional hours of experimental credit?

Yes _____ No _____

Please answer the following questions as honestly and accurately as you can. Your responses will be kept strictly confidential.

1. When you awaken in the morning, how often can you recall experiencing at least one dream during the night?

---

1 2 3 4 5 6 7

Never Sometimes Always

2. When you awaken in the morning, how often can you describe all or part of a dream experienced before awakening?

---

1 2 3 4 5 6 7

Never Sometimes Always

3. On the average, how many mornings a week can you recall all or part of a dream when you awaken?

---

0 1 2 3 4 5 6 7

4. In general, how often do you have trouble falling asleep at night?

---

1 2 3 4 5 6 7

Never Sometimes Always

5. In general, how often do your dreams awaken you during the night?

---

1 2 3 4 5 6 7

Never Sometimes Always

6. On the average, how many nights a week do you have nightmares?

---

0 1 2 3 4 5 6 7

7. In general, how often do you awaken early in the morning and then have difficulty falling back to sleep?

---

1 2 3 4 5 6 7

Never Sometimes Always

8. Have you ever consulted a medical or mental health professional about a sleep-related problem? Yes ___ No ___

If yes, at what age? _____

For what problem? _____

With what outcome? _____

What is the present status of this condition? _____

_____

_____

9. Are you generally in good health? Yes ___ No ___

10. Are you currently being treated for any medical problems? Yes ___ No ___

If yes, what are you currently being treated for? _____

_____

11. What prescription and/or over-the-counter medications are you currently taking?

Drug:	Dosage/day:	Purpose:
_____	_____	_____
_____	_____	_____
_____	_____	_____

12. On the average, how many days a week do you drink alcohol?

_____

0 1 2 3 4 5 6 7

If you drink alcohol, how many drinks do you usually have at a time? 1-2 ___ 3-4 ___ 5-6 ___ more than 6 ___

13. Are you currently taking any other drugs? Yes ___ No ___

If so, what? _____ (your answer is optional)

How often? _____ (your answer is optional)

14. What time do you normally go to bed? _____ Get up? _____

Thank you for your cooperation.

APPENDIX B

Intellectual Aptitude Test Versions

Form A: Difficult version

Form B: Easier version

Intellectual Aptitude Test Form A

The following test is designed to provide a measure of your intellectual aptitude. It was developed from items comprising a number of standard intelligence tests administered to university students. You will have 30 minutes to complete the test. This should prove sufficient for you to complete most of the items. If you have trouble with a question, leave it and go on to the next question. If you have time left at the end, you can go back and complete any items left unanswered. It is important that you do your best on this test, as we will assume that your performance on it is an accurate reflection of your intellectual ability. Record your answers on the IBM sheet provided. Please do not make any marks on the test booklet. You may begin.

Part I

The following analogy questions test your ability to recognize relationships between words and to apply this relationship to other words. Although the verbal analogy test is, to some degree, an indicator of your vocabulary, it is essentially a test of your ability to think things out.

This test contains two forms of analogy questions. One form of analogy is the type in which two capitalized words are followed by a third capitalized word and a group of four non-capitalized words lettered a, b, c, and d. You are to select from the four alternatives the single word that best completes the analogy with the three capitalized words.

An example of this type of analogy question would be:

TRIANGLE is to SQUARE as PENTAGON is to a) octagon
b) heptagon
c) hexagon
d) circle

The correct answer is c) hexagon. A triangle has three sides, a square has four, a pentagon has five, and a hexagon has six sides.

Another example of this type of analogy question is:

WORM : BIRD : MOUSE : a) man
b) snake
c) rodent
d) lion

The correct answer is b) snake. Birds like to eat worms; snakes like to eat mice.

The other form of analogy contained in this test is the type in which each question consists of two words that have some specific relationship to each other. From the four pairs of words that follow, you are to select the pair that is related in the same way as the words of the first pair.

An example of this type of analogy question is:

PAGE : BOOK : a) dictionary : library
b) slat : blind
c) teacher : school
d) boy : knight

The correct answer is b) slat : blind.

For the following questions in Part I, choose the one response that best completes the analogy. Any questions having more than one alternative selected will be considered incorrect.

1. FLEECE : SHEEP : PLUMAGE : a) chest
   b) feather
   c) finery
   d) swan

2. RUBY : TOMATO : EMERALD : a) rose
   b) gem
   c) shamrock
   d) squash

3. THEATRE : a) burlesque : POETRY : DOGGEREL
   b) tragedy
   c) thespian
   d) in-the-round

4. HARVEST : MARKET : MANUFACTURE : a) wholesale
   b) sell
   c) store
   d) purchase

5. FLAUNT : a) slyly : BETRAY : FAITHFULLY
   b) ostentatiously
   c) brazenly
   d) boastfully

6. WAGON : HORSE : a) adolescence : CHILDHOOD
b) birth
c) youth
d) travel

7. SILVER : PAPER : TARNISH : a) wrinkle
b) yellow
c) rust
d) age

8. FROND : FERN : a) acorn : oak
b) bulb : tulip
c) needles : pine
d) foliage : blossom

9. THIEF : LARCENY : a) traitor : sedition
b) demagogue : dissension
c) witness : perjury
d) critic : commentary

10. OBEDIENT : OBSEQUIOUS : a) ludicrous : ridiculous
b) helpful : officious
c) happy : zealous
d) serene : agitated

11. TREMULOUS : COURAGE : a) portentous : strength
b) stupendous : stability
c) copious : quality
d) frivolous : seriousness

12. IMPRESSMENT : HIRING : a) enchantment : enslaving
b) condemnation : forgiving
c) payment : compensating
d) confiscation : purchasing

13. PANTOMIME : DIALOGUE : a) burlesque : humor
b) tableau : movement
c) melodrama : costume
d) choreography : music

14. TAXONOMY : ANIMALS : a) cultivation : plants
b) codification : laws
c) emendation : resolutions
d) astronomy : stars

15. COURT : LITIGATION : a) tournament : joust
b) reconciliation : dispute
c) judge : lawyer
d) prayer : litany

16. FAULT : EARTHQUAKE : a) death : sorrow
b) volcano : lava
c) pain : relief
d) delta : river

17. ENIGMA : EXPLICABILITY : a) disembodiment : palpability
b) paradox : reality
c) abstraction : vacuity
d) ephemera : mutability

18. BREAKWATER : HARBOR : a) sandbag : river
b) jetty : ocean
c) dike : sea
d) levee : land

19. PLASTERED : WALL : a) wet : ground
b) sanded : wood
c) smothered : fire
d) bound : book

20. EVADE : CAPTURE : a) impede : obstacle
b) escape : fugitive
c) parry : thrust
d) bait : trap

GO ON TO PART II

Part II

This section contains quantitative questions. Most of the items do not require training beyond a high school level.

21. The average of four numbers is 54. If one of the numbers is increased by 6, the average will remain unchanged if each of the other three numbers is reduced by:

    a) 2

    b) 1

    c) 3/4

    d) 4

22. If the area of square S is six times the perimeter of S, then one side of S is:

    a) 6

    b) 12

    c) 24

    d) 36

23. Which of the following divides $2^6 \times 3^8 \times 5^3$?

    a) $2^7 \times 3^7 \times 5^3$

    b) $2^6 \times 3^5 \times 5^2$

    c) $2^5 \times 3^9 \times 5^2$

    d) $2^4 \times 3^7 \times 5^5$

24. After an initial deposit of X dollars, the amount of money in a certain fund is doubled at the end of each month for 5 months. If at the end of the 5-month period there is a total of $560 in the fund, how much money was in the fund at the beginning of the third month?

a) $17.50

b) $35

c) $70

d) $140

25. In the expression below, if each odd-numbered term is x/2 and each even numbered term is 2/x, what is the sum of the first 56 terms of the expression?

x/2 + 2/x + x/2 + 2/x x/2 ...

a) $\dfrac{28x^2 + 28}{x}$

b) $\dfrac{7x^2 + 7}{x}$

c) $\dfrac{7x^2 + 32}{x}$

d) $\dfrac{14x^2 + 56}{x}$

26. Which of the following fractions is more than 3/4?

    a) 71/100

    b) 15/20

    c) 19/24

    d) 35/71

27. Starting from the same town, two trucks travel due east and due west, respectively. After three hours, they are 420 kilometers apart. If the truck going east travels 2/3 as fast as the truck going west, what is the rate in kilometers per hour of the truck going east?

    a) 33.6

    b) 50.4

    c) 56

    d) 84

28. If $2 \leq X \leq 4$ and $2 \leq Y \leq 4$, then the maximum possible value of $X - X/Y$ is:

    a) 1

    b) 1 1/2

    c) 2

    d) 3

29. Which number in the series below is in error?

3, 3, 6, 18, 72, 216, 2160

a) 2160

b) 216

c) 72

d) 6

30. What is the smallest positive number which, when it is divided by 3, 4, or 5, will leave a remainder of 2?

a) 42

b) 62

c) 22

d) 182

GO ON TO PART III

Part III

In the following section, you will be required to complete a sentence in which one or two words are missing and represented by blank spaces. It is necessary to select the word or words that best complete the meaning of the statement from the lettered words or sets of words.

31. The fact is so _____ that no one has ever succeeded even in defining it.
    a) mastoidal
    b) elusive
    c) fragmentary
    d) morbid

32. Matty wanted nothing more than to _____ the pain.
    a) subordinate
    b) allegate
    c) increase
    d) alleviate

33. Historians of science will welcome this volume, for they have long _____ the fact that there is no adequate account of the development of science in ancient China.
    a) debated
    b) refuted
    c) belittled
    d) bemoaned

34. She was saddened to hear that her colleagues continued to _____ her protege, for she had hoped that success would _____ him.

a) underwrite .... attract

b) disparage .... vindicate

c) patronize .... enrage

d) flatter .... encourage

35. Smith was _____, an elementary force in herself, driving, yearning, and resistant.

a) guileless

b) pretentious

c) autonomous

d) radical

36. To _____ the lecture on the _____ effects of smoking, the doctor showed slides of damaged lungs and distributed pamphlets replete with frightening statistics.

a) authenticate .... salutary

b) corroborate .... deleterious

c) undermine .... innocuous

d) substantiate .... innocuous

37. She owes most of her success to her calm, measured, analytical attacks on the problems of advertising, making order out of _____.

a) chaos

b) austerity

c) procedure

d) squalor

38. In Hindu mythology, _____ referred to a _____ to earth.

a) autoclave .... reference

b) dipsomania .... prayer

c) divagation .... bowing

d) avatar .... descent

39. The lover of democracy has a(n) _____ toward totalitarianism.

a) antipathy

b) empathy

c) antipode

d) petard

40. The _____ effects of the drug made her weary.

a) succinct

b) spurious

c) soporific

d) supine

41. After seven hours of listening to his interminable story-telling, we finally escaped from the _____ old man.

a) evasive

b) garrulous

c) replenished

d) surreptitious

42. The one nice thing about the house is that it was situated on a _____ from which one could see all the city lights at night.

a) proboscis

b) promontory

c) proscenium

d) preponderance

43. Being very _____, he knew what was going on about him.

a) circumlocutory

b) caustic

c) choleric

d) circumspect

44. The chairman's _____ speech swayed the audience to favor his proposal.

a) cursory

b) bombastic

c) auxiliary

d) cogent

45. His _____ had no place in our serious conversation.

    a) valence

    b) decency

    c) badinage

    d) concatenation

46. With a less _____ expansion of the economy, we should make _____ progress toward stable price levels.

    a) marked .... detailed

    b) noticeable .... approximate

    c) suitable .... infinite

    d) rapid .... substantial

47. They talk a good deal about using _____ but deep down they seem to expect that society will treat them with _____ if they do so.

    a) theology .... reverence

    b) violence .... indulgence

    c) intellect .... appreciation

    d) machinations .... relish

48. He struggled to maintain his _____ in the face of the threatening mob.

    a) fraternity

    b) belligerence

    c) umbrage

    d) composure

49. Till his death he remained _____ in the belief that the world was conspiring against him.

a) ignominious

b) taciturn

c) obdurate

d) tantamount

50. The defendant was unjustly _____ as a criminal on the basis of the _____ evidence by the paid informer.

a) lauded .... voluminous

b) deified .... partisan

c) stigmatized .... spurious

d) mitigated .... adverse

Intellectual Aptitude Test Form B

The following test is designed to provide a measure of your intellectual aptitude. It was developed from items comprising a number of standard intelligence tests administered to university students. You will have 30 minutes to complete the test. This should prove sufficient for you to complete most of the items. If you have trouble with a question, leave it and go on to the next question. If you have time left at the end, you can go back and complete any items left unanswered. It is important that you do your best on this test, as we will assume that your performance on it is an accurate reflection of your intellectual ability. Record your answers on the IBM sheet provided. Please do not make any marks on the test booklet. You may begin.

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TRIANGLE is to SQUARE as PENTAGON is to a) octagon
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c) hexagon
d) circle

The correct answer is c) hexagon. A triangle has three sides, a square has four, a pentagon has five, and a hexagon has six sides.

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b) snake
c) rodent
d) lion

The correct answer is b) snake. Birds like to eat worms; snakes like to eat mice.

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An example of this type of analogy question is:

PAGE : BOOK : a) dictionary : library
b) slat : blind
c) teacher : school
d) boy : knight

The correct answer is b) slat : blind.

For the following questions in Part I, choose the one response that best completes the analogy. Any questions having more than one alternative selected will be considered incorrect.

1. FOOD : FUEL : BODY : a) gasoline
   b) mechanic
   c) logs
   d) engine

2. a) second : HOUR : YARD : FOOT
   b) minute
   c) time
   d) day

3. DUNGEON : a) torture : CELLAR : HOME
   b) prison
   c) castle
   d) basement

4. a) puzzle : ENIGMA : LABYRINTH : MAZE
   b) alternative
   c) label
   d) sphinx

5. 25 : 36 : 49 : a) 53
   b) 63
   c) 94
   d) 64

6. EXILE : TAX : EXCOMMUNICATION : a) pope
b) exclusion
c) canon
d) tithe

7. FLEECE : SHEEP : PLUMAGE : a) chest
b) feather
c) finery
d) swan

8. CYLINDER : MOTOR : FOUNDATION : a) brick
b) house
c) basis
d) chassis

9. DISCOVERY : CHURCH : a) scalpel : operation
b) decision : trial
c) fly : bird
d) parade : march

10. JUNTA : POLITICAL : a) team : successful
b) council : advisory
c) jury : secretive
d) parent : instructive

11. METAL : DROSS : a) milk : cream
b) wound : scar
c) wheat : chaff
d) soap : lather

12. COLD : CONGEALMENT : a) solidity : coagulation
b) light : refraction
c) electricity : generation
d) heat : incandescense

13. PODIUM : CONDUCTOR : a) easel : artist
b) theater : actor
c) typewriter : author
d) pulpit : preacher

14. GLAUCOMA : EYES : a) equilibrium : eardrum
b) amnesia : memory
c) caries : decay
d) hemophilia : blood

15. PAINTING : ARTIST : a) poem : writer
b) song : singer
c) cook : meal
d) car : driver

16. GRIZZLE : GRAY : a) blanch : white
b) wilt : black
c) glower : red
d) weep : blue

17. IMMORTAL : DEATH : a) infinite : limit
b) incomprehensible : wisdom
c) helpless : aid
d) inexhaustible : fund

18. DISTANCE : MILE : a) liquid : pint
b) bushel : corn
c) weight : scale
d) ton : coal

19. PNEUMATIC : AIR : a) atomic : nucleus
b) cosmic : universe
c) hydraulic : water
d) ultrasonic : speed

20. SIGN : STREET : a) billboard : advertising
b) handshake : friendship
c) target : gun
d) title : story

GO ON TO PART II

Part II

This section contains quantitative questions. Most of the items do not require training beyond a high school level.

21. If all P are S and no S are Q, it necessarily follows that:
    a) all Q are S
    b) all Q are P
    c) no P are Q
    d) some Q are P

22. The average of four numbers is 54. If one of the numbers is increased by 6, the average will remain unchanged if each of the other three numbers is reduced by:
    a) 2
    b) 1
    c) 3/4
    d) 4

23. If a hat costs $4.20 after a 40% discount, what was the original price?
    a) $2.52
    b) $4.60
    c) $5.33
    d) $7.00

24. A cylindrical oil tank is 1/3 full. If 30 more liters are added, the tank will be half-full. What is the capacity in liters of the tank?

    a) 150

    b) 160

    c) 170

    d) 180

25. A prime number is a number that can be divided only by itself and one. Which is <u>not</u> a prime number?

    a) 23

    b) 37

    c) 53

    d) 87

26. If $x = y + 1$ and $y = 3$, then $x/y =$

    a) 4/3

    b) 5/6

    c) 3/4

    d) 6/5

27. In a certain class, 65% of the students are taller than Judy and 32% are taller than Bill. What percent of the class is taller than Judy but not taller than Bill?

    a) 3%

    b) 33%

    c) 35%

    d) 68%

28. What is the value of rs in the following equation?

$$43\ rs + 17 = 77\ rs$$

a) -1/2

b) -2

c) 1/2

d) 2

29. A student receives grades of 92, 88, 84, and 76 in four of his major subjects. What must he receive in his fifth major subject in order to average 85?

a) 85

b) 84

c) 86

d) 83

30. Which of the following fractions is more than 3/4?

a) 71/100

b) 15/20

c) 19/24

d) 35/71

GO ON TO PART III

Part III

In the following section, you will be required to complete a sentence in which one or two words are missing and represented by blank spaces. It is necessary to select the word or words that best complete the meaning of the statement from the lettered word or sets of words.

31. The day will come when _____ will look back upon us and our time with a sense of superiority.
    a) prosperity
    b) antiquity
    c) ancestors
    d) descendants

32. Many young people, even from _____ backgrounds, show their _____ by opposing the Establishment.
    a) repressed .... visibility
    b) disadvantaged .... connection
    c) morose .... ingenuity
    d) affluent .... alienation

33. In spite of its limited _____, the magazine had a strong _____ on political thought in the country.
    a) appeal .... repression
    b) insights .... reminder
    c) circulation .... influence
    d) values .... survival

34. With a less _____ expansion of the economy, we can make _____ progress toward stable price levels.

a) marked .... detailed

b) noticeable .... approximate

c) suitable .... infinite

d) rapid .... substantial

35. The strenuousness of the 48-hour week is further _____ when it is compared with the schedule of other police forces in our Canadian cities.

a) inculcated

b) accentuated

c) demoralized

d) cauterized

36. He struggled to maintain his _____ in the face of the threatening mob.

a) fraternity

b) belligerence

c) umbrage

d) composure

37. Though he was realistic and pragmatic in most things, he was an ardent devotee of plays of _____.

a) satire

b) fantasy

c) realism

d) emotion

38. The problem of pollution must be _____ studied before we can overcome it.

    a) primarily

    b) virulently

    c) adequately

    d) monetarily

39. Matty wanted nothing more than to _____ the pain.

    a) subordinate

    b) allegate

    c) increase

    d) alleviate

40. Under these circumstances, every word that is uttered must be dealt out _____ like the last rounds of ammunition in a besieged fortress.

    a) ceremoniously

    b) suddenly

    c) endlessly

    d) sparingly

41. We learned to think of the laws of nature as _____, never to be _____ without severe penalty.

    a) esoteric .... enjoyed

    b) inescapable .... accepted

    c) invidious .... invoked

    d) inexorable .... violated

42. She owes most of her success to her calm, measured, analytical attacks on the problems of advertising, making order out of _____.

a) chaos

b) austerity

c) procedure

d) squalor

43. An installment of a Dickens novel _____ the sale of an edition of the newspaper, for his _____ was unbounded.

a) guaranteed .... popularity

b) augmented .... charity

c) solidified .... fame

d) paralleled .... magnanimity

44. Historical experience should sober not only the _____, who think they have found the certain solution to our problems, but also the _____, whose solution is a certain return to the ancient faiths, which have always failed in the past.

a) agnostics .... atheists

b) materialists .... idealists

c) revolutionaries .... traditionalists

d) scientists .... philosophers

45. Feeling no particular affection for either of his two acquaintances, he was able to judge their dispute very _____.

a) impartially

b) judiciously

c) immaculately

d) accurately

46. In our _____ to reason and logic we sometimes forget that goodness and beauty are also _____ criteria.

a) devotion .... valid

b) response .... objective

c) attention .... conflicting

d) homage .... insignificant

47. There was much _____ as to the _____ steps needed to reduce inflation, but little actual knowledge about it.

a) information .... activated

b) criticism .... typical

c) speculation .... specific

d) agitation .... recurrent

48. Actors are often very _____ since they must believe strongly in their own worth and talents.

a) laconic

b) reticent

c) unequivocal

d) egotistic

49. In legislative investigations of _____ subjects, there will always be great risks that any standards set up will yield or be circumvented in one way or another.

a) controversial

b) parsimonious

c) innocuous

d) subliminal

50. Her devotion to music _____ his own interest in an art he had once loved as a child.

a) reviled

b) revived

c) defiled

d) belied

APPENDIX C

Mood Adjective Checklist (MACL)

Feelings Checklist

Name _____

Date _____

Beside each of the words listed below, please rate how you are feeling at the present time. Write the term MUCH, LITTLE, DON'T KNOW, or NO beside each word to indicate the extent to which each word describes your feelings right now.

jittery _____	regretful _____
playful _____	distant _____
suspicious _____	rebellious _____
quiet _____	clutched up _____
detached _____	skeptical _____
defiant _____	placid _____
angry _____	remote _____
warm-hearted _____	witty _____
sad _____	kindly _____
fearful _____	sorry _____
carefree _____	dubious _____
affectionate _____	still _____

APPENDIX D

Dream Report Form

Morning Dream Report Forms

Please complete the following forms each morning, as soon as you wake up, as this is when your memory of dreaming is most clear and accurate. If you do not recall dreaming, describe any thoughts or images you remember having while asleep. If you have nothing to report, please indicate "Nothing to report" rather than leaving the form blank.

After completing the dream report form each morning, go on to complete the Dream Rating Scale as it applies to the dream or sleep-related thoughts or images described in your report that morning. Be sure to complete the last two items on the Dream Rating Scale regardless of whether you recalled a dream or not. After completing the Dream Rating Scale, please complete the Feelings Checklist, even if you did not report a dream.

Please try to avoid coffee, alcohol, or drugs for 3 hours prior to sleep, unless this would be a hardship for you. Please try also to go to bed at about the same time each night, if possible. To make sure you have enough time to complete the forms each morning, you should set your alarm clock for 20 minutes prior to your normal wake-up time. If you have a clock-radio, use the buzzer rather than the radio to awaken you, as it will be less distracting.

Thank you for your cooperation.

Morning Dream Report Form

Name _____

This morning's date _____ Time _____

Please describe the dream as exactly and as fully as you remember it. Your report should contain, whenever possible, a description of the setting of the dream, whether it was familiar to you or not, a description of the people and their relationship to you, a description of any objects in the dream, and a description of your feelings during the dream. If you do not recall dreaming, describe any thoughts or images you remember having while asleep.

_____

APPENDIX E

Dream Rating Scale

Dream Rating Scale

Name _____

This morning's date _____

Please indicate the point along each scale that best describes the dream or sleep-related thoughts or images you have just reported on today's Morning Dream Report Form.

Dream very pleasant	1	2	3	4	5	6	7	Dream very unpleasant
Dream very active	1	2	3	4	5	6	7	Dream very calm
Dream very familiar	1	2	3	4	5	6	7	Dream very strange
Dream very organized	1	2	3	4	5	6	7	Dream very confused
Dream very emotional	1	2	3	4	5	6	7	Dream very unemotional

PLEASE GO ON TO THE NEXT PAGE ...

Dream very vivid	1	2	3	4	5	6	7	Dream very vague
You were a participant	1	2	3	4	5	6	7	You were an observer
You feel rested	1	2	3	4	5	6	7	You do not feel rested

How many hours of sleep did you have last night?

1-2 ___ 3-4 ___ 5-6 ___ 7-8 ___ 9-10 ___ 11-12 ___ >12 ___

APPENDIX F

Postexperiment Questionnaire

Postexperiment Questionnaire

1. What do you think was the purpose of this experiment?

2. Do you feel that you were treated fairly? If "no," why not?

3. What was the influence of the intellectual aptitude test on your opinion of your intelligence?

4. What was the effect of the intellectual aptitude test on your levels of confidence and ambition?

5. What relationship, if any, do you think there was between the intellectual aptitude test and the collection of dreams?

6. What was the purpose of collecting dreams from each night?

7. Did you have any prior knowledge concerning this experiment? If so, what?

8. During the past week, what events stand out in your memory? Do you think these events affected your sleep or dreams in any way? If so, how? For how long?

Appendix G

Debriefing Script

Debriefing Script

Thank you for participating in this study. The purpose of the study was to determine the relationship between a person's preferred style of daydreaming or fantasizing and his pattern of dream content following a stressful activity. The questionnaire you completed during the screening phase of this study provided information on your waking fantasy style. The intellectual aptitude test you completed, however, was not a true measure of your intellectual aptitude, level of intelligence, or potential to succeed at university. Rather, it was intended as a way of temporarily altering your level of stress so that we could study the effects of a stressful intellectual activity on subsequent dream content. The test was designed so that you would find it difficult to complete more than 40-50% of the items within the allotted time period. This time pressure was intended to increase the stress level of the testing situation so that it more closely approximated a real-life testing situation. As you can see, then, the test does not say anything about your real abilities or level of intelligence, so please do not make any inferences about yourself based on how well you felt you did on the test. The mood measures you completed gave us additional information on how dreams may act with waking fantasy over time to promote adaptation to stressful waking events. If you wish to receive feedback about the overall results of

this study, please leave your name and address with the experimenter. The overall results of the study will then be mailed to you when they are available.

Appendix H

Treatment Incorporation Criteria

Treatment Incorporation Criteria

One point is scored for each unique reference to any of the elements comprising the following categories:

Objects

Test, exam, paper, essay, assignment, project, book, questionnaire, table, chair, IBM sheet, computer, pen, pencil, tape recorder, microphone, TV camera, clock, or watch.

Person

Experimenter, subject, professor, teacher, instructor, friends from school, or students.

Location

Enclosed room, windowless room, long hallway, maze, laboratory, classroom, university, school, class, college, residence, or library.

Treatment Situation

Sleeping, dreaming, recording personal information, taking notes, studying, reading, or writing. Evaluation, assessment, examination, grades, marks, research, or psychology. Being observed, watched, recorded, or followed. Intelligence, competence, capability, stupidity, ineptitude, clumsiness, time pressure, frustration, anxiety, fear, or

inability to complete a task. Being surrounded by people or the center of positive or negative attention. Feeling left out, abandoned, rejected, manipulated, cheated, treated unfairly, taken advantage of, or out of control.

Miscellaneous

Other references to school or research (identify).

Endnote

Endnote

An effort was made to determine whether clearer evidence of associations between waking fantasy style and dream function might be obtained by examining data from subjects in the high and low stress conditions separately. Pearson product-moment correlation coefficients calculated between the waking fantasy style dimensions and the dream function measures indicated that level of positive-constructive daydreaming was positively associated with amount of direct treatment incorporation, $r = .32$, $p < .05$, on the first poststress night for subjects in the high stress condition. Significant associations between presleep and morning mood, $r = .42$, $p < .005$, and between morning mood and dream pleasantness, $r = .43$, $p < .005$, were also found for the high stress group on poststress night one.

These results suggest that positive-constructive daydreaming was associated with an increased frequency of stress-related mastery dreams immediately following exposure to the stressor. Because these dreams were not rated as unpleasant, however, it appears that subjects with a high level of positive-constructive daydreaming were able to initially dream about the stressor without being disturbed by it. This implies that these dreams may not have been mastery dreams per se, but more a reflection or review of the day's events. Because the large number of post hoc

correlational analyses and subanalyses calculable within the present data set increases the possibility of spurious results due to inflated Type I error rates, any temptation to overinterpret an interesting (but isolated) finding is probably best resisted pending further research.