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ASPECTS OF INNER EXPERIENCE:
Autokinesis, Daydreams and Cognitive Styles

by

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A dissertation submitted to the Graduate Faculty in Psychology
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INTRODUCTION

The past decade has witnessed a dramatic upsurge of interest in the experimental study of inner experience. The varied causes of this trend range from the methodological advances in sleep and dream research to the emergence of a drug culture which worships the "altered state of consciousness." Whatever the reasons, experimentally oriented psychologists today seem less shy of approaching such subjective experiences as dreams, daydreams, meditation, hypnosis, etc. An important outcome of this research has been the discovery of stable patterns or "styles" of inner experience, which vary from individual to individual. When more thoroughly explored, such findings may prove of significant value in the diagnosis, understanding, and treatment of psychopathology.

This study attempts to examine the interrelatedness of several measures which purport to tap aspects of inner experience, but which involve overtly different levels of functioning, e.g., perception, cognition, behavior, and response to a questionnaire. Predictions based on previous research and theoretical models are tested regarding the patterns of relatedness which may exist among the diverse measures. Additionally, an attention mechanism hypothesized by H.M. Voth and M. Mayman to underly such relatedness is tested experimentally.

Understanding the aims and methods of this study requires some acquaintance with the research literature in the areas of autokinesis, dream recall, daydreaming, and psychological differentiation. Consequently, this work is summarized in the first (Background) section prior to detailed discussion of the current endeavor.

I

BACKGROUND

A - Autokinesis and Personality

The autokinetic phenomenon, long a subject of perceptual research, is also the basis for an extensive series of clinical and experimental investigations into personality structure. This work began in 1941 with the observation by A.C. Voth that the perception of autokinetic movement may be a function of enduring personality traits. He tested subjects by placing them in a totally darkened room for 10 minutes and asking them to look steadily at a stationary point of light. Some persons, he found, would report considerable movement of the light, while others consistently reported little or no movement at all. He also noted, and it has been repeatedly confirmed, that a subject's score on the autokinetic test tends to remain quite consistent.

Shortly thereafter, A.C. Voth set out to explore the relationship between the extent of perceived autokinesis and clinical diagnosis in psychiatric patients. He found that subjects reporting little or no movement tended to have diagnoses of alcoholism, manic-depressive psychosis, paranoid conditions, and psychopathic personality. Those seeing extensive movement, on the other hand, were diagnosed as schizophrenics, obsessional neurotics, or anxiety neurotics. This work, many years later, was the foundation upon which H.M. Voth and M. Mayman based their studies of autokinesis and personality, which are the primary concern of this section.

In 1962, H.M. Voth published a paper entitled "Choice of Illness" in which he attempted to "demonstrate a principle of personality organization, which when incorporated into the body of psychoanalytic theory, will

further our understanding of personality organization, structure, and functioning." This principle, or theoretical construct, was a continuum of proximity between the ego and external reality. "Ego-closeness" to reality refers to a high dependence on external stimulation and a "compelling need to invest attention cathexis in external objects." "Ego-distance" implies a greater independence of the ego from external reality, "a greater ability to shift cathexis from external objects to internal objects and stimuli."

As the simplest and most direct expression of this ego principle the author chose the autokinetic phenomenon: Ego-closeness was defined as the perception of little or no movement, i.e., adherence to the external reality situation. Ego-distant subjects "lose their anchorage to external reality; inner processes override the power of the external stimulus, and movement of the light is perceived."

In the same paper the author reports the results of a pilot study and two replication studies in which he found low-autokinesis subjects to be more suggestible, distractible, responsive to reality impingement, emotionally labile, exhibitionistic, social, impulsive, and action-oriented than high-autokinesis persons. The latter were more independent, self-sufficient, negativistic, skeptical, prone to daydreaming, likely to think abstractly, likely to enjoy or seek solitude. "Correlations between degrees of autokinetic movement and these behavioral styles were high in all three studies with probabilities reading $P < .05$ to $.005$." The methodology of the study did not appear in this paper, however, which was theoretical in focus.

In 1963 a paper by H.M. Voth and M. Mayman revealed the methodology

of the studies reported above. In the pilot experiment, subjects were interviewed for approximately two hours each, after which the interviewer (H.M.V.) recorded a one paragraph sketch of conspicuous behavior traits of the individual. The paragraphs were then rated on a 1 to 5 scale along the theorized dimension of ego-closeness - ego-distance. As noted above, these behavior ratings correlated significantly with a measure of autokinetic movement. Later, 33 behavior traits were identified as relevant to the hypothesis and capable of being rated by the interviewer. A 3-point rating scale was applied to the paragraph for each of the 33 traits. The authors found that "most of the single trait predictors covaried significantly with the autokinetic movement score, and in the predicted direction."

The authors acknowledge their departure from strict experimental standards in the pilot study. They claim "no illusions about the 'purity' or independence of these single-trait measures; each is undoubtedly contaminated by the global impression made by the subject on the interviewer."

In the replication studies, subjects were again interviewed for 2 hours by one of the authors (H.M.V.). Each subject was then rated by the interviewer on each of 41 behavior traits and a global prediction was also made as to how much autokinesis the subject would see. The global ratings correlated highly with the autokinetic measure, and "most of the single-trait predictors also reached a significant level of correlation." Again, "no attempt was made to overcome the 'halo' effect in these ratings, so the single-trait predictors can in no sense be viewed as independent measures." Moreover, when a 118-item self-rating questionnaire was administered to subjects, consisting largely of the questions asked during the interview, results

were completely negative for the scale as a whole, and item analysis revealed very few significant correlations with autokinesis. Such negative findings and methodological problems will be discussed further in the course of formulating the hypotheses of the present investigation.

In a more recent series of papers, Voth and Mayman (1966, 1967, 1968) have attempted to demonstrate that an individual's position on the ego-close - ego-distance dimension significantly affects the course and outcome of psychotherapy. Subjects in the studies were long-term psychotherapy patients, who were tested for autokinesis as part of the intake procedure, and their therapists. After each of the patients terminated treatment, or after 2 years of treatment, therapists were asked to give a "running account of the therapy as it unfolded from the beginning." An interviewer asked questions in order to direct the therapist's remarks toward the eight aspects of treatment under study. Following this interview with the therapist, the patient's autokinetic performance was predicted (rated 1 to 5) on the basis of each of the eight treatment variables and the authors' theoretical understanding of the ego-close - ego-distant dimension. Results may be summarized as follows: persons who experienced little autokinesis tended to externalize the cause of their illness; lacked psychological mindedness; reified or acted out the transference; responded less well to exploratory than supportive therapy; were more reactive to environmental pressures; relied on repression, projection and acting out. Persons who experience much autokinesis tend to respond in an opposite manner, and relied on defenses of isolation, intellectualization and withdrawal.

The following are capsule descriptions of the ego-close (low autokinesis)

and ego-distant (high autokinesis) persons, as currently characterized by Voth and Mayman:

Ego-close - These subjects maintain "a relatively unwavering investment of attention cathexis in the immediate stimulus field." They are more suggestible, responsive to external stimuli, distractible, open, exhibitionistic, socially active, emotionally labile and impulsive, and they dream more prolifically. Overt transference manifestations are developed more rapidly, and there is a capacity for easily shifting cathectic investments. Resistance and defensive styles are characterized by externalization and discharge through action, as well as such mechanisms as avoidance and flight, repression, displacement, persistent denial, acting out, projection and compulsivity. They "rapidly develop close, often intense, working relationships with the therapist."

Ego-distant - These individuals "tended to be less dependent upon external conditions and more likely to turn to private, subjective experiences." They are characteristically more reflective, enjoy solitude, tend to be daydreamers, are more autonomous, more psychological minded, less open emotionally, more withdrawn and shy. They reveal overt transference phenomena more slowly; are characterized by over-control in the expression of impulse and affect. Their main defense mechanisms are intellectualization, isolation and withdrawal from object relationships into fantasy. They dream less, but "seemed to express their conflicts more in fantasies and daydreams." They also have a greater capacity to introspect and free associate.

Before moving on to a description of the current research effort,

some exploration of work in other areas is required, and this is presented in the next section.

B - Dream Recall

It has long been thought that people experience many more dreams than they can later recall. With the development of an "objective method for the study of dreaming" by Dement and Kleitman (1957), it became possible to check on this hypothesis experimentally.

In 1959, Goodenough, Shapiro, Holden and Steinschriber set out to compare "dreamers" and "nondreamers" in terms of nocturnal electroencephalograms and eye-movements. Subjects were selected according to a questionnaire on frequency of dream recall, such that half stated that they recalled dreams almost every night (dreamers) and half stated that they recalled dreams less than once a month (nondreamers). Each subject spent three nights in the sleep laboratory, and continuous readings were made of eye-movements and EEG. Several times each night subjects were awakened by the sound of a loud bell and asked whether or not they had been dreaming.

In examining the results of this study, it is quite significant that although the nondreamers were less likely to recall a dream upon awakening than dreamers, every subject studied, including those who said they had never dreamt before, reported at least one dream during the study. Moreover, the periods of rapid conjugate eye movements (REMs), which were found to be generally associated with dreaming activity, occurred at intervals during the night for all subjects. The difference between habitual "dreamers" and "nondreamers," then, does not appear to lie primarily with the frequency

of dreaming. Rather, the above and subsequent experimental dream research has lent considerable credence to the thesis that periods of dreaming are an intrinsic part of normal sleep, and that all people dream several times every night.

If everyone dreams, how is it that so many persons have little or no recall of dreams? Freud (1900) attempted to answer this question in terms of the mechanism of repression. He saw the forgetting of dreams as a purposeful psychological process designed to protect the conscious ego from the threat of unconscious material. His view remains predominant, even though based on clinical observation rather than experimental procedures, and guides much of the current research.

There are today two fairly distinct research approaches used to study dream recall. One, which may be called the "psychophysiological" approach, involves having subjects sleep in the laboratory while EEG and eye-movements are recorded. Some investigations involve uninterrupted sleep; others require that the subject be awakened at certain times for dream reports. Certainly, the study by Goodenough et al., described above, falls into this research category. The second method, the "psychological" approach, permits subjects to sleep in their own homes. Dream data is collected during interviews, or by having the subject keep a daily record, or diary, of his dreams.

The Goodenough et al. study reported above was but one of a series of psychophysiological investigations designed to test the accuracy of the claim made by some people that they rarely or never dream. In studies of uninterrupted sleep, Antrobus (1962) and Antrobus, Dement, and Fisher (1964) found that "reporters" and "nonreporters," as they have come to be called,

have approximately the same number of REM periods. They did find that non-reporters have somewhat shorter REM periods, but as Lewis et al. (1966) point out, the difference in REM length "does not seem large enough in itself to account for individual differences in dream reporting."

In a recent study by Lewis, Goodenough, Shapiro and Sleser (1966), subjects selected as reporters and nonreporters slept in the laboratory for 4 nights each. Gradual or abrupt awakenings were made at each EEG stage-1 REM period. Nonreporters and reporters did not differ in REM period frequency or EEG patterns during sleep, but nonreporters did report dreaming less frequently following REM period awakenings. All subjects showed considerable self-consistency in frequency of dream reporting and in the type of failure to report. Some nonreporters typically failed to remember any content; others typically said they were awake and thinking. In concluding their paper the authors remark that, "It should be useful in future research to examine the personality characteristics of each of our subgroups of nonreporters and of the dream reporters."

There are several other, similar studies of dream recall, notably those of Goodenough et al. (1965 a, b) and Shapiro et al. (1963, 1964, 1965). These focus primarily on the issue of how the method of awakening affects dream recall. Results suggest that the method of awakening (abrupt versus gradual) has little effect on recall for people who claim they recall almost every morning at home. When awakened from REM periods, they almost always recall dreams. For nonreporters, however, there is a difference. When awakened gradually from REM sleep, if they do recall any content, they label the experience a "thought" rather than a "dream" about half the time.

Gradual awakenings, also tend to maximize the occurrence of "thinking" reports upon awakening from non-REM sleep.

Clearly, the above investigations raise several interesting questions about dream recall. Just as clearly, they do not answer the question with which this section began, that is, why do some people tend to recall dreams while others do not. The more psychologically oriented investigators have attempted to solve this problem by discovering the distinguishing characteristics of persons who do, or do not, recall their dreams.

Schonbar (1959) had 42 graduate students in education turn in daily reports on recalled dreams for 4 weeks. They also completed the Edwards Personal Preference Schedule, the IPAT Anxiety Scale, and a vocabulary test. Subjects were divided into recallers and nonrecallers on the basis of frequency of recall, and difference between these subgroups on the personality variables were tested for significance. Among the most important findings were a positive relationship between manifest anxiety and frequency of dream recall, a lower ego strength in recallers than nonrecallers, and a positive relationship between the contentless recall of having dreamed and the recall of dream content. No relationship was found between recall and manifest needs for achievement, deference, exhibitionism, intraception, succorance, or autonomy.

According to Schonbar, the above finding that manifest anxiety is significantly related to dream recall can mean that anxious people "are more urgently pressed to resolve the conflicts that dreams theoretically illustrate, that they have more such conflicts, or that persons who have

erected fewer barriers between themselves and awareness of their anxiety are also more fully in touch with the rest of their internal experience and, hence, recall dreams more frequently." The high correlation between dream recall and the contentless recall of dreaming was interpreted as supporting the view that low recall is related to repression. "It seems likely that the almost absolute lack of recall of dreaming itself is due to factors associated with repression or control, and that it is therefore symptomatic of a more general lack of awareness of ongoing internal processes."

Support for the Schonbar findings was quickly forthcoming. Singer and Schonbar (1961), again using the dream diary method, found that reported frequency of dream recall (RFDR) was positively correlated with the Welsh A (anxiety) scale of the MMPI, and negatively correlated with the R (repression) scale. Tart (1962) divided subjects into sensitizers and repressors on the basis of their MMPI scores, and found that sensitizers, as predicted, reported recalling more dreams on a five-category frequency-of-recall questionnaire. Lachmann, Lapkin, and Handelman (1962), studying dream recall and cognitive controls, found a positive relationship between high recall and a sharpening tendency on the Schematizing test.

In 1965 Schonbar published a study of dream recall frequency as a component of "life style." She found that recallers have lower M thresholds on the Rorschach, and do better on an Embedded Figures Test than nonrecallers. High recallers also feel more in control of their own lives, and have less curiosity into noninterpersonal matters. No differences were found in intolerance of ambiguity, total or interpersonal curiosity, future-orientation, or

leisure-activity preferences. She believes that available data suggest two life-styles: "inneracceptant," of which high dream recall is a component, and "innerrejectant," with low recall.

At this point, we take leave of the area of dream recall in order to discuss daydreaming.

C - Daydreaming

There has been little systematic investigation of daydreaming, despite persistent (and often quite pleasant) intrusion of the phenomenon into most of our lives. Comprehensive normative studies have, in fact, only begun in the past decade.

As a means of obtaining basic information on daydream frequency, Singer and his colleagues (1961, 1962, 1963) set out to develop a questionnaire for administration to normal adults. Their General Daydream Questionnaire requires persons to indicate the frequency (on a six-point scale) with which they have experienced a series of approximately one hundred daydreams. Among the daydreams included are the following:

"I plan how to increase my income in the next year."

"I suddenly find I can fly - to the amazement of passersby."

"I see myself in the arms of a warm and loving person who satisfies all my needs."

"I see myself participating with wild abandon in a Roman orgy."

"I picture an atomic bombing of the town I live in."

In a study of 240 college educated adults from various parts of the United States, 96 per cent of the respondents reported that they engage

in daily daydreaming activity. Visual imagery was found to be the main modality for such fantasy, and it was said to occur chiefly when alone or while lying in bed prior to falling asleep. The most frequent content involved plans for the future, especially for interpersonal contacts, and most people found such daydreaming enjoyable. Singer summarizes the findings as follows: "daydreaming is a remarkably widespread common occurrence when people are alone and in restful motor states. It is a human function that chiefly involves resort to visual imagery and is strongly oriented towards future interpersonal behavior."

Singer and his associates have also used the questionnaire method to study the effects of socio-cultural background on daydreaming. Subjects were all educated, middle-class Americans of at least the second generation, with both parents of the same national origin. Negro and Jewish groups, in one study, evidenced the highest daydream frequencies, and Anglo-Saxons the lowest. In a subsequent investigation, the frequencies from highest to lowest were: Italian, Negro, Jewish, Irish, Anglo-Saxon, and German. Singer points out that the high frequency group (Italian, Negro, Jewish) is composed of cultural groups of relatively recent immigration, who are still upwardly mobile. The low frequency (Irish, Anglo-Saxon, and German) cultural groups enjoy a more secure status in the United States.

Of primary concern to this dissertation are the personality differences which have been discovered among persons of high and low daydreaming frequency, and the relationship of daydream frequency to dream recall. Data on the personality correlates of daydreaming comes mainly from two investigations by Singer and associates (Singer and Antrobus, 1963; Singer and

Schonbar, 1961). High daydreamers were found to be more curious about personal and interpersonal events, more creative and original in storytelling, more introverted, more closely identified with their mothers, and more self-aware.

Among the most relevant findings, for this paper, are the positive correlations of daydreaming frequency with questionnaire measures of anxiety, namely the Welsh A scale (Singer and Schonbar, 1961) and Cattell's Anxiety scale (Singer and Rowe, 1962; Rowe, 1963). Singer concludes, "This would suggest that persons reporting more frequent daydreams also describe themselves as more anxious, sensitive and fearful." This, of course, is the same pattern of characteristics found in highdream recallers. Moreover, in the Singer and Schonbar study, it was found that high daydreamers revealed less of a tendency to repress thoughts, and were most likely to recall their dreams. We shall return to these findings in later sections.

There is also a promising new method for the study of waking fantasy. Developed by Antrobus (1963), this technique is based on an information-processing model of cognitive processes. Daydreaming is thought of as a special kind of "noise" produced by unceasing brain activity, which is usually ignored in favor of the input from our physical and social environments. Reduction of the input from external sources permits far greater awareness of self-generated stimuli such as daydreams.

The following experiment (Antrobus and Singer, 1964) illustrates the use of this approach. A subject is seated in a dark, soundproof room, and required to monitor a series of auditory signals through earphones.

Two tones, differing only in frequency (high or low), are presented in a randomized sequence at one of two predetermined rates. Under one condition subjects must press a switch when the low (or high, as instructed) tone is presented. Another condition sets a more difficult task, that is, to indicate whether any given tone is the same or different from the one immediately preceding it. The subject must constantly rely on immediate memory for successful performance under this condition, and any "task-irrelevant imagery" would be more of an interference. Subjects are interrupted at irregular intervals to rate the frequency of their task-irrelevant thoughts along several scales: verbal thinking, auditory imagery, visual imagery, and kinesthetic imagery.

According to Singer, "The results of the experiment clearly indicated that increasing rate of signal presentation did indeed reduce the number of reported task-irrelevant spontaneous cognitive responses. Similarly, demanding of someone that he rely on short-term memory had an even greater effect in reducing internal activity. The most striking indications were that visual imagery and task-irrelevant thinking generally were particularly affected by changes in rate or by introduction of the memory task... The data also yielded evidence that (as found by Antrobus and Singer, 1964) drowsiness was accompanied by an increase in task-irrelevant thinking and visual imagery."

Following a discussion of psychological differentiation, in the next section, the implications of this research for the present endeavor are explored.

D - Psychological Differentiation

In a lengthy series of investigations, Witkin (1954, 1962, 1965), and his co-workers found that people differ in the manner by which they orient themselves toward the vertical in space. The individual's mode of orientation was also shown to be an expression of a more general style of perceiving which, in turn, appeared related to particular personality characteristics.

Under normal circumstances, in the presence of an articulated visual field, the perceived upright is determined with relation to the axes of the visual field and to sensory feedback from postural adjustment. The relative importance of these two factors is studied in the following ways:

1. Rod-and-Frame Test (RFT)-- the subject attempts to adjust a luminous rod within a luminous frame to the true vertical, in an otherwise dark room. Some subjects report the rod to be objectively upright whenever it lines up with the tilt of the surrounding frame, indicating that they are strongly influenced by the directional axes of the field that surrounds the rod. Other subjects adjust the rod close to the true vertical, demonstrating their ability to deal with an object without reference to its context, relying mainly on their own bodily cues.

2. Body-Adjustment Test (BAT)-- the subject is seated in a small room which may be tilted side to side by the experimenter. The subject's chair can be tilted independently of the room, and he is asked to adjust this chair to the true upright. Some subjects bring themselves close to the true vertical regardless of the tilt of the room, suggesting that they are able

to determine bodily position independently of the influence of the surrounding field, or to maintain separateness of body from context. Other persons align their bodies with the room before perceiving themselves as vertical. Their bodily sensations appear relatively unattended to; they cannot maintain a separateness of body from field.

When standardized versions of the above tests were administered to large groups of subjects, a wide range of results were obtained. At one extreme were those who determined the upright almost exclusively with reference to the visual field (field-dependent); at the other were subjects who located it mainly on the basis of bodily position (field-independent). Further training in the perceptual tasks failed to significantly alter a subject's mode of perception. From the high correlations among the parts of the orientation tests and between the tests, it was established that people are self-consistent in their mode of spatial orientation.

The ability of field-independent subjects to hold their bodies apart from a conflicting visual field and to separate a rod from its context in order to adjust it to the objective vertical suggested to Witkin a general capacity to keep things apart in experience. This "analytic" ability was said to describe the life style of the field-independent subject while a relatively "global" approach to life experience was attributed to the field-dependent subject.

Subsequent work revealed that the perceptual field approach is intimately connected with other individual characteristics:

1. The nature of the individual's relation to his environment.

The characteristic that most effectively discriminated among

people with different modes of perception was the extent of activity in dealing with one's environment. Passivity was found typically associated with field dependence, activity with independence. Activity involves an ability to initiate and organize behavior with little environmental support and a struggle for mastery over external forces, while passivity implies a need for environmental support and a readiness to submit to external forces. Consequently, these findings fit well into the theoretical conception of field independence as a more active, manipulative approach to the visual field.

2. The way in which the individual manages his impulses and strivings.

Field-dependent subjects were found to exhibit lack of insight, fear of aggressive and sexual impulses, poor impulse control, and a high anxiety level. Field-independent persons, on the other hand, tended toward awareness of inner life, acceptance of the existence of hostile and sexual impulses, and relatively effective discharge and control of these impulses.

3. The individual's conception of himself.

Field-dependence was found to be associated with low self-esteem, difficulty in self-acceptance, and a poorly defined sense of self-identity.

The relationships he observed between perceptual field approach and personality structure suggested to Witkin that he was measuring a very basic dimension of individual difference encompassing many aspects of organismic functioning. He believed this to be "psychological differentiation," i.e., the level of complexity of the entire psychic structure.

Witkin is in full agreement with the widely held thesis that the

experience of the world (or body-field matrix) is essentially global in childhood, and during development becomes progressively more articulated so that body, self, and objects in general are experienced as segregated. Segregation, or analysis, combined with the structuring of experience are said to be the manifestations of developed psychological differentiation. The growth of a segregated, structured "self" is part of this process, as is the development of specialized systems of control and defense. The analytic approach to the perceptual field, with its personality correlates, then, may be considered indicative of a highly differentiated individual.

A widely used measure of psychological differentiation is the Embedded Figures Test (EFT), which requires the subject to locate a simple figure in a complex design which is so organized as to conceal the simple figure. Field-independent persons exhibit a far greater capacity to separate the figure from the complex embedding design than field-dependent persons (Witkin, 1954). The Embedded Figures Test correlates quite highly with the other differentiation measures (RFT, BAT) and has the advantage of being much easier to administer.

Of greatest relevance to the current study is Witkin's (1954) report that individuals having a global field approach are apt to use primitive denial and massive repression as characteristic modes of defense, and consequently exhibit minimal awareness of inner experience. Persons with an analytic field approach use relatively sophisticated forms of defense such as intellectualization, rationalization, and isolation, and they exhibit greater awareness of inner life. Support for these observations was obtained from the finding that field-dependent persons tend to forget (presumably repress) their dreams more often than field-independent persons (Eagle, 1965; Linton and Schonbar, 1964).

II

THE PROBLEM AND HYPOTHESES

All of the research efforts described thus far involve attempts to make meaningful measurements of inner experience, although their lines of approach differ considerably. A major concern of this study is the manner in which these different measures of inner experience relate to one another.

Investigations in the fields of autokinesis, dream recall, daydreaming and psychological differentiation have in common the finding of "styles" of inner experience. Witkin (1965) refers to "cognitive styles" which are manifestations, at the cognitive level, of broader dimensions of personal functioning. Foulkes (1966), reviewing the literature on dreams, speaks of styles of fantasy life which appear to be based on a broader dimension of self-awareness. Singer (1961, 1962, 1963, 1970) has reported styles of daydreaming emerging from factor analytic studies of inner experience, which also related to other aspects of behavior. Voth and Mayman (1963, 1966, 1967, 1968) suggest that the process underlying autokinesis is a "core variable" of personality structure, with a host of behavioral correlates.

The impetus for the present study arose from the inconsistency between some of the findings of Voth and Mayman and those of other investigators. They characterize the ego-distant person, for example, as less repressive, more reflective, more likely to daydream, yet less likely to recall dreams. This conflicts with the notion of a self-awareness continuum as postulated by Witkin, Singer and Foulkes which is characterized by degrees of awareness of inner experience, whether dreams

or waking fantasies. Foulkes (1966) expresses this point of view as follows:

"The bulk of the evidence now available seems to indicate that some portion of individual differences in everyday dream recall is attributable to a waking personality dimension that might be labeled self-awareness, manifested in the relative absence of the defenses of repression or denial as applied to one's own inner thoughts and feelings. Those who generally deny or ignore their world of private and subjective experience during wakefulness seem to recall fewer dreams than do those who accept and exploit this dimension of inner experience."

Aside from the unusual way in which AK is thought to relate to daydreaming and dream recall, the manner of its relationship to psychological differentiation is of some interest. Cancro and Voth (1969) conducted a study which attempted to relate the rod-and-frame test (RFT), the embedded-figures test (EFT), and the autokinetic test. Despite the great similarity in reported personality correlates associated with these tests, there were no significant correlations between the measures of psychological differentiation and autokinesis. This surprising result, although in need of replication also raises questions about the way in which AK relates to other dimensions of functioning.

A first step toward understanding the relatedness of AK to other measures of inner experience is examination of the Voth and Mayman methodology. For example, the notion that ego-distant (high autokinesis) subjects are high daydreamers resulted from studies in which information was collected from subjects via personal interview with an experimenter. The interviewer then wrote a paragraph on the subject, which was subsequently rated for the presence of various traits, among them daydreaming.

Clearly, each of the single-trait measures may have been contaminated by the overall impression made by the subject on the interviewer, and/or by the paragraph on the rater. The authors originally acknowledged that "the single-trait predictors can in no sense be viewed as independent measures," yet, regrettably, subsequent publications seem to treat them as such. Moreover, the fact a subsequent self-rating questionnaire compiled by the same authors yielded completely negative results suggests the presence of significant experimenter bias in the original data.

What of dream recall? Voth and Mayman approach this problem in their psychotherapy studies, which have already been described. There are no actual data or statistics presented on the incidence of dream recall, but the following observation is made: "As unconscious material pressed for expression all patients were noted to dream, but ego-close patients dreamed more prolifically, while ego-distant patients seemed to express their conflicts more in fantasies and daydreams."

Again, this interesting observation cannot be considered validated in any systematic way. Even if ego-close patients were, on the basis of these studies, found to report significantly more dreams during the course of treatment, this data might be contaminated by differential transference factors. In fact, the authors themselves suggest that ego-close persons manifest overt transference phenomena much more quickly than ego-distant individuals.

This is not to say that Voth and Mayman's conclusions are necessarily invalid, but rather that the experimental foundation upon which they stand is noticeably shaky. Moreover, their basic assumption

that attention cathexis determines the perception of autokinetic movement has yet to be directly tested in the context of a sound methodology.

This brings us to the aims of the present investigation. First, determination of the patterns of interrelatedness among autokinesis, daydreaming, dream recall, and psychological differentiation is attempted. This involves using more sophisticated measures of daydreaming and dream recall than have yet been applied to this problem. Measurement of daydreaming activity is accomplished via the Imaginal Processes Inventory (Singer and Antrobus, 1966), an extensive self-report questionnaire which breaks down into 29 subscales. This is a refinement of earlier questionnaires which were used with considerable success in investigating patterns of inner experience. It has, moreover, been found to be highly correlated with the results of the signal-detection method of investigating daydreams (Antrobus, Coleman and Singer, 1967) described in part C of this section. Dream recall is measured through the use of a home dream diary, a method which has proven valuable in many of the experiments described in part B of this section.

Second, it is of considerable interest to see how AK, dream recall, and psychological differentiation relate to particular patterns of daydreaming, and whether the patterns which emerge essentially replicate those recently reported by Singer and Antrobus (1970). The latter study revealed such distinct styles of fantasy behavior as neurotic absorption in daydreaming, obsessional-emotional daydreaming, positive-vivid daydreaming, etc.

Finally, an attempt is made to determine experimentally whether the differential perception of autokinesis is related to an attention distribution mechanism as postulated by Voth and Mayman. This is done by providing subjects with experimental conditions which diminish or enhance their attending of the light source. According to the theoretical model advanced by Voth and Mayman, AK will increase to the extent that attention is diverted from the light source to inner experience, and decrease when closer attention is paid to the light. Individual differences in this regard would be expected according to one's characteristic tendency to focus on internal versus external stimuli, or "baseline" of attention distribution.

An alternative model to that of Voth and Mayman, also invoking the concept of attention distribution, has been suggested by some preliminary observations of the author to the effect that focal attention toward the light source, rather than diversion from it, seemed to enhance the perception of AK. It seems reasonable to think that awareness of the apparent movement of a stimulus may presume having attended to that stimulus. According to this point of view, persons seeing considerable AK are those who most efficiently focus their attention on the light to the exclusion of stimulus competition from within. This theory, of course, leads to experimental predictions which directly oppose those of Voth and Mayman. That is, conditions which introduce stimulus competition with the light source would reduce, rather than enhance AK. Conditions which facilitated attending of the light, on the other hand, would lead to increased AK. Again, such effects would be modulated by the baseline

of attention distribution.

If it can be demonstrated that autokinesis responds to experimental manipulations of attention distribution, this will lend considerable support to the notion that AK is a measure of broader aspects of psychological functioning.

Hypotheses

Group 1 - The first set of hypothesis is concerned with the interrelationships among the four measures of inner experience.

la. Autokinesis and Daydreaming - Based on the Voth and Mayman theoretical understanding of AK, a positive relationship is predicted between AK and measures of daydreaming frequency and vividness. A negative relationship between these variables would support the alternative model of autokinesis already described.

lb. Autokinesis and Dream Recall - Based on the observations of Voth and Mayman a negative relationship is predicted between AK and measures of dream recall, dream length and dream emotionality. The notion of a continuum of self-awareness, as postulated by Foulkes, Singer and others, would instead predict that recall and daydreaming relate in a congruous manner to AK.

lc. Autokinesis and Psychological Differentiation - On the basis of their similarity in reported personality correlates, low AK persons (ego-close) are expected to manifest low levels of differentiation as measured by the embedded-figures test. A lack of association between the measures would replicate the recent findings of Cancro and Voth (1969) discussed earlier.

ld. Daydreaming and Dream Recall - On the basis of the research into fantasy styles described in the previous section, a positive relationship is predicted between measures of daydreaming frequency and vividness and measures of dream recall, length and emotionality.

le. Daydreaming and Psychological Differentiation - On the basis of Witkin's (1962) characterization of the highly differentiated individual, a positive relationship is predicted between the degree of differentiation on the EFT and measures of daydreaming frequency and vividness.

lf. Dream Recall and Psychological Differentiation - Based on the research of Witkin and his colleagues, a positive relationship is predicted between the degree of differentiation on the EFT and measures of dream recall, dream length, and dream emotionality.

Group 2 - The second set of hypotheses is concerned with how autokinesis relates to those scales of the Imaginal Processes Inventory which are directed toward measuring styles of attention distribution. Each hypothesis is based on the Voth and Mayman model of autokinesis, according to which high AK is the result of withdrawing attention from the light source.

2a. Autokinesis and Mindwandering - A positive relationship is predicted between AK and the IPI scale of Mindwandering.

2b. Autokinesis and Boredom - A positive relationship is predicted between AK and the IPI measure of Boredom.

2c. Autokinesis and Distractibility - A positive relationship is predicted between AK and the Distractibility scale of the IPI.

2d. Autokinesis and Need for External Stimulation - A

negative relationship is predicted between AK and the Need for External Stimulation scale of the IPI.

Group 3 - The third set of hypotheses concerns the clustering of daydream subscales and other variables by factor analysis.

3a. Styles of Daydreaming - Factor analysis of the IPI

will yield psychologically meaningful clustering of the subscales in a manner that essentially replicates the factors recently reported by Singer and Antrobus (1970).

3b. Structure of Factors - Autokinesis, EFT, and dream

recall measures, being related to broader styles of fantasy functioning, will achieve high loadings on at least some of the daydream factors. It is also of considerable interest whether the measures will load on the same or different factors, although there is insufficient basis for specific prediction.

Group 4 - The fourth set of hypotheses concerns the experimental test of the attention-distribution model of autokinesis.

4a. Attention-Distribution Mechanism - To the extent that

Voth and Mayman are correct, greater AK will be perceived when attention is withdrawn from the light source, over a baseline measure of AK, and less AK will be perceived when attention is focused externally. The alternative model discussed in the last section would predict the opposite effects.

4b. Interaction Effects - Significant interactions will be

observed between the experimental effects described above (4a) and the subjects' baseline measures of AK (high versus low).

III

METHOD

The subjects chosen for this study were volunteer male college students between the ages of 18 and 25. To be acceptable for the experimental aspect of the study, subjects' scores on an initial test of autokinesis had to fall within the upper or lower 25% of the distribution of AK scores for City College students. Subjects were acceptable to the correlative part of the study regardless of initial AK scores. Hence, the two populations overlap considerably but are not identical.

Upon entering the laboratory, subjects were administered a ten minute autokinetic test in the manner of Voth and Mayman:

"The subject is seated at a table 9 feet away from a pinpoint of white light, .0006 footcandles in intensity, in a normally lighted room. Before him is a 22- by 28-inch sheet of paper fastened to a drawing board. The subject is told he will be left alone in a totally darkened room, except for the pinpoint of light, for ten minutes and that he is to look steadily at the light during the entire test period. He is told that the light may or may not appear to move, and should it move, he is to trace its path with a pencil. If the light then stops moving, he is to make a small dot and leave his pencil there, ready to resume tracing the movement if the light starts moving again. Should the pencil reach the edge of the board, he is to start again from the approximate center and proceed as before. The room is not darkened when these instructions are given, and discerning subjects can easily tell that the light is actually stationary. No suggestion is given that the light will move; subjects are merely told that it may or may not appear to move."

Subjects were divided into "high" and "low" AK groups, of 24 persons each, based on the length of their tracings. Each of these was further subdivided into three groups of 8 according to which experimental treatment they were to receive:

Group A - after being presented with a serial learning task (described below), subjects in this group were informed that they would be tested for recall of the material immediately following another autokinetic test. Each item correctly recalled, they were told, would earn them a 25¢ bonus above the \$5 fee earned by all subjects in the experiment. Consequently, an internal rehearsal of the syllables, during the second AK test, had a positive payoff value. This condition was intended to provide internal stimuli to compete for attention with the light source.

Group B (control) - for subjects in this group the recall test was administered shortly before the second autokinetic test, and they were told that the "learning" part of the experiment was over. They received no cash bonus. Under such circumstances, rehearsal was thought to be unlikely. The purpose of this group was to provide a measure of the effects on autokinesis of being retested following a short period of interpolated activity.

Group C - for these subjects the recall test was also administered before the second AK test, and they were also informed of the end of the learning task in order to exclude rehearsal. Persons in this group, however, received a new set of instructions prior to the second test. It read as follows:

"The first perceptual test you took was merely to determine your eligibility for this study. We will now repeat the procedure to collect the actual data. It is most important that you focus all your attention on the pinpoint of light; do not let yourself be distracted! The success of this experiment depends on getting as accurate a measure of your perception as is possible."

This condition was intended to encourage focal attention toward the light source. The overall experimental design may be represented as follows:

<u>GROUP</u>	<u>A</u>	<u>B</u>	<u>C</u>
High AK	8	8	8
Low AK	8	8	8

The learning task employed under all three conditions involved the rote memorization of ten nonsense syllables, using the method of serial anticipation. The syllables were presented to the subject in a fixed order, and he was asked to anticipate the syllable to follow the one being presented. The series was presented repeatedly until the subject was able correctly to anticipate 70% (i.e., seven) of the coming syllables within a given trial. Pilot work with this procedure demonstrated that this criterion was generally reached within eight to fifteen minutes. At this point, subjects in groups B and C were given a final presentation of the series as a recall test, and they were informed of the "end of the learning task." This recall test takes only about a minute. Group A subjects were instead told that they would be tested for recall immediately after the second AK test, and were told of the cash incentive. All subjects were then retested for autokinesis, but group C received new instructions as described above. Immediately thereafter, subjects in group A were tested for recall. All tracings were measured as to length, and a comparison made for each subject as to his first and second autokinetic trials (difference score). Analysis of this

data is concerned with any significant differences among the difference scores of three treatment groups, as well as any interaction of treatment effects with the initial degree (high versus low) of AK. That is, a 3 x 2 analysis of variance is performed on the difference scores.

If Voth and Mayman are essentially correct regarding their attention cathexis model of AK, there should be an increase in AK for group A, but a decrease for group C. Interaction of these affects with the high-low continuum would also be expected (see Hypotheses).

At the conclusion of the experimental aspect of the study, the various correlative measures were administered. The Imaginal Processes Inventory (Singer and Antrobus, 1966) is a more sophisticated version of the daydream questionnaires described earlier. It consists of 400 items which are responded to on a 5-point scale, and breaks down into 29 subscales. Twenty-two of these subscales have to do with the content or structure of daydreaming, and seven are measures of patterns of attention and curiosity. Items are randomized and spread around in the inventory, and scales are later reassembled for scoring. The following is a list of the specific scales of the IPI:

- Scale #1: General Daydreaming
- #2: Absorption in Daydreaming
- #3: Acceptance of Daydreaming
- #4: Positive Reactions in Daydreams
- #5: Frightened Reactions in Daydreams
- #6: Visual Imagery in Daydreams
- #7: Auditory Imagery in Daydreams
- #8: Problem Solving through Daydreams
- #9: Present Orientation in Daydreams
- #10: Future Orientation in Daydreams
- #11: Past Orientation in Daydreams
- #12: Bizarre Improbable Daydreams
- #13: Mind Wandering and Daydreams

- Scale #14: Night Dream Frequency
- #15: Daydream Frequency
- #16: Achievement-oriented Daydreams
- #17: Hallucinatory Vividness of Daydreams
- #18: Fear of Failure in Daydreams
- #19: Hostile Aggressive Daydreams
- #20: Sexual Daydreams
- #21: Heroic Daydreams
- #22: Guilt Daydreams
- #23: Curiosity: Interpersonal
- #24: Curiosity: Impersonal-Mechanical
- #25: Boredom
- #26: Mentation Rate
- #27: Distractibility
- #28: Need for External Stimulation
- #29: Self-reporting Tendencies

Data on dream recall and dream content are collected by means of a home dream diary. The diary is a booklet of 16 pages with each page carrying the following instructions along with blank space for daily entries:

"This is your dream diary. Please keep it near your bed, along with a pen. Upon arousal, for the next sixteen consecutive mornings, record the content, if any, of your dreams or sleeping thoughts. It is important that the recording be done immediately upon arousal. Include as much detail as possible; do not worry about making sense. All data will be completely confidential. Finally, answer the questions at the bottom of the page.

1. How many hours of sleep did you get?
2. How were you awakened?
3. Were you awakened from a light, medium, or deep sleep?
4. When awakened did you feel well rested, medium or tired?
5. If you recorded content above, did you recall all, most, some, or little of the dream?
6. If you did not record content, did you not seem to dream or did you dream but forget the content?"

The latter series of questions was provided on each page of the diary in order that subjects get accustomed to daily entries regardless of recall. Also, the latter questions distinguish those who recall having dreamed

without recalling content, from those who cannot recall anything, and this is of some interest to the experiment.

The dream diaries were analyzed along the following dimensions by two independent judges who were "blind" as to a subject's score on other variables:

a - Number: on how many nights are dreams reported.

b - Length: how long are the dream reports in terms of idea-units? An idea unit is defined as the shortest sentence or phrase expressing a complete thought. Each dream is scored for the number of different idea-units it contains.

c - Emotion: to what extent is affect of any kind openly displayed in the dream? The affect may be an overall reaction by the dreamer to various events in the dream, or it may be expressed by a specific character in the dream. No attempt was made to interpret unexpressed affective significance. Ratings ranged from 1, a total lack of emotion, to 5, an extremely emotional dream.

d - Bizarreness: to what extent does the dream represent a departure from reality? Are the events in the dream quite commonplace, somewhat improbable or quite impossible in the real world? Ratings ranged from 1, a realistic dream, to 5, a dream characterized by wild and impossible happenings.

e - Affective Polarity: is the dream predominantly expressive of positive emotions or negative emotions, or does no such predominance exist (through lack of emotion or a balance of positive and negative)? A rating of 5 indicates clear predominance of positive affect; 4 indicates some dominance of positive affect; 3 indicates a balanced or neutral dream; 2 is a

somewhat negative dream; 1 is a clearly negative dream.

The above measures were found to be effective, reliable, and easy to accomplish in a previous study by this author (Starker and Goodenough, 1969).

A short version of the Embedded Figures Test was administered to subjects when all other laboratory procedures were completed. Although time considerations precluded administration of the entire EFT, a shortened version can provide meaningful data over a reasonably large number of subjects. Scoring the EFT involves addition of the time intervals required for the subject to locate simple figures within each complex stimulus. A high score on the EFT indicates difficulty in analyzing out the figure, hence a low level of psychological differentiation. Low scores, on the other hand, indicate a more highly differentiated individual.

The dream diary, IPI, and EFT data were punched on IBM cards and read into a computer for the correlational and factor analyses.

IV

RESULTS

The results of this study are presented with reference to the several hypotheses under consideration.

Group 1 - This group of hypotheses is concerned with the inter-relationships among the various measures of inner experience. Before proceeding to the specific hypotheses, it is worthwhile to compare the autokinetic data accumulated in this study to that of Voth and Mayman.

Autokinetic scores on the initial test ranged from a low of 2 inches to a high score of 161 inches, with a mean of 42.8 inches. The distribution of these scores is presented in figure 1, along with the distribution of AK scores in an earlier study by H.M. Voth (1963). The latter distribution is based on a much larger sample (N=538) than that of the current study (N=99) but they are similar with respect to range and skewness, such that cases pile up at the low end and gradually diminish in frequency toward the high end. The main difference between the two curves is with respect to where the greatest number of cases fall, with Voth reporting proportionally more cases in the 0-10 category than occurred in this study. The spread of AK scores in the current study seems clearly sufficient for meaningful correlational analyses to be performed.

Hypothesis 1a.

Autokinesis and Daydreaming - A positive relationship was predicted between AK and measures of daydreaming frequency and vividness. This was based on the Voth and Mayman model of autokinesis, which explains perceived movement of the light source on the basis of attending to inner rather than external stimulation. A negative relationship between these measures

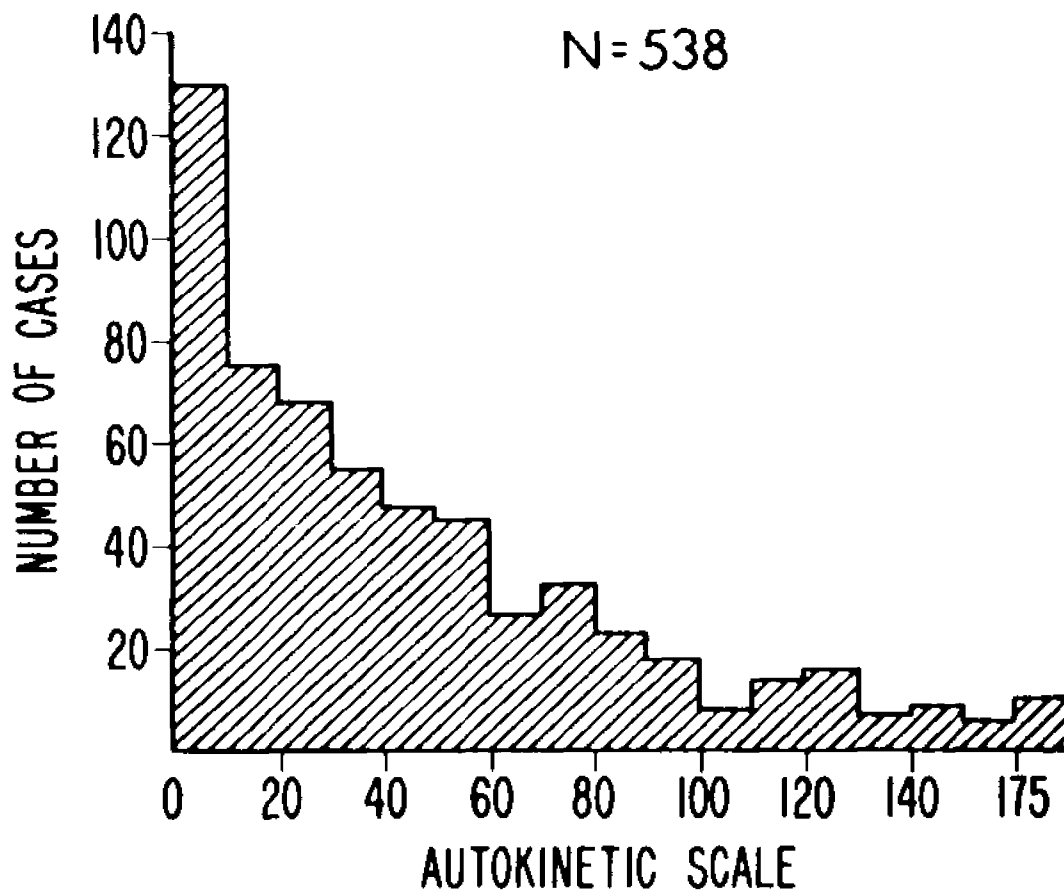
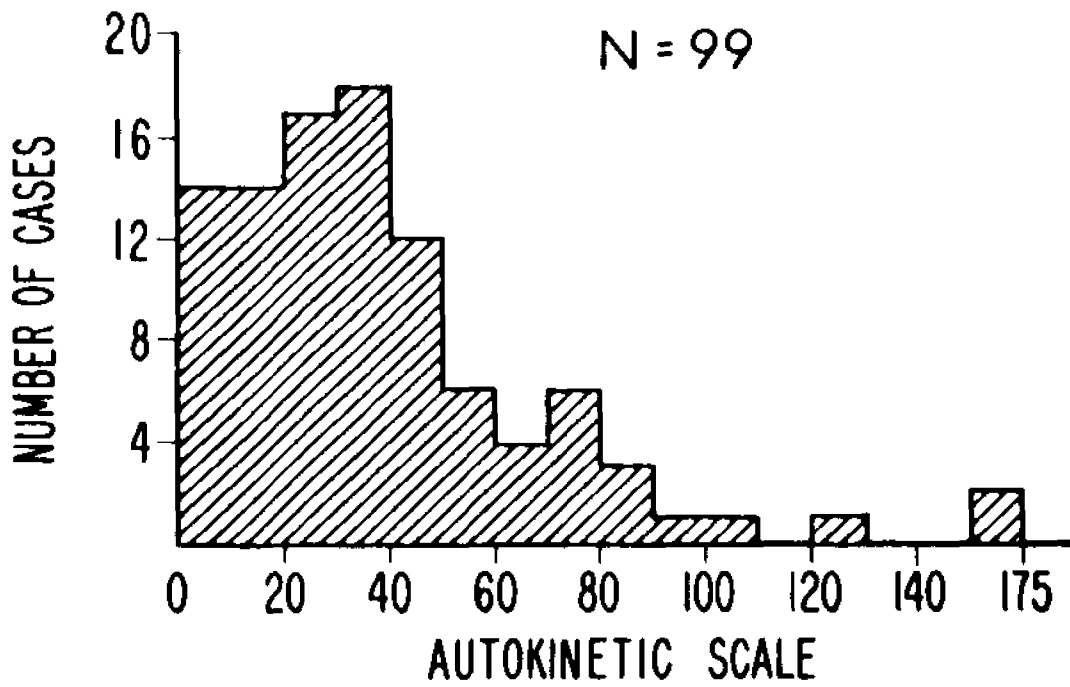


Fig 1 - Comparison of distributions of autokinesis in the present (upper) study and a previous study by H.M.Voth (1963)

would support the alternative view that attending to external stimulation facilitates the perception of autokinesis.

There are two scales of the IPI which are concerned with frequency of daydreaming: General Daydreaming and Daydream Frequency. Based on an N of 55, the autokinetic measure correlated at $r = -.102$ with General Daydreaming and $r = .112$ with Daydream Frequency. Neither correlation approaches a significant level. A log measure of autokinesis yielded similar figures when correlated with these scales.

Four scales of the IPI are related to the intensity of the daydream experience: Absorption in Daydreaming, Hallucinatory Vividness of Daydreams, Visual Imagery in Daydreams, and Auditory Imagery in Daydreams. With an N of 55, the autokinetic scores correlated at $r = -.037$ with Absorption in Daydreaming, $r = .088$ with Hallucinatory Vividness of Daydreams, $r = -.027$ with Visual Imagery in Daydreams, and $r = -.240$ with Auditory Imagery in Daydreams. Only the last of these is of any appreciable size (although not significant) and it is opposite the predicted direction. Again, the use of log AK has little effect on these values.

Finally, there are three scales of the IPI which relate to individual's attitudes toward daydream experiences: Acceptance of Daydreaming, Positive Reactions in Daydreams, and Frightened Reactions to Daydreams. On the latter scale, of course, a negative correlation with AK is predicted by the Voth and Mayman model. Based on 55 subjects, autokinesis correlates at $r = .136$ with Acceptance of Daydreaming, $r = -.314$ with Positive Reactions in Daydreams, and $r = .017$ with Frightened Reactions to Daydreams. Only the correlation with Positive Reactions in Daydreams is significant at $p < .05$, two-tailed,

and the direction is opposite that predicted by the Voth and Mayman model. Using the log AK measure, however, reduced this correlation to $r = -.203$, a non-significant value.

The data provides no evidence to support the hypothesis of a positive relationship between autokinesis and daydreaming. Neither does it support the alternative attention-distribution model of autokinesis.

Hypothesis 1b.

Autokinesis and Dream Recall - A negative relationship was predicted between AK and measures of dream recall, dream length, and dream emotionality. This was based on the observations of Voth and Mayman that ego-close (low AK) individuals recall more dreams than ego-distant (high AK) persons.

There are two measures of dream recall in the data: the Night Dream Frequency scale of the IPI and the total number of dreams reported in the diary. Based on 55 subjects, autokinesis correlated at $r = .093$ with the Night Dream Frequency scale and $r = .315$ with the dream diary measure. The latter is significant at $p < .05$, two-tailed, but is opposite the predicted direction. The log AK measure reduced this correlation to $r = .198$, a non-significant level.

Two other measures relevant to this issue are the "no dream" reports in the diary, and the reports of having dreamt but forgotten all content. With an N of 55, autokinesis correlated at $r = -.200$ with "no dream" reports and $r = -.264$ with contentless recall. The latter correlation is significant at $p < .05$, two tailed. Since these are measures of failure to recall, rather than ability to recall, these negative correlations do not support this hypothesis.

Applying the log AK measure reduced both correlations considerably and eliminated the significance of the latter.

There are four additional measures of dream life: dream length, bizarreness, emotionality, and affective polarity. These variables were not scored unless subjects produced at least three dreams. Consequently, they are based on a reduced N of 48. AK correlated at $r = -.057$ with dream length, $r = -.059$ with bizarreness of dreams, $r = .023$ with dream emotionality, and $r = .297$ with affective polarity of dreams. Only the latter is significant at $p < .05$, two-tailed, and it means that high AK subjects have more affectively positive dreams than low AK persons. The log AK measure reduces this correlation to $r = .252$, a non-significant level.

There is no evidence in the data to support the hypothesized negative relationship between autokinesis and dream recall, dream length, or degree of emotion overtly expressed in dreams.

Hypothesis 1c.

Autokinesis and Psychological Differentiation - It was predicted on the basis of their similar personality correlates that low AK persons (ego-close) would manifest low levels of psychological differentiation (high EFT scores). A lack of significant association between the measures would replicate a report by Cancro and Voth (1969).

Based on an N of 48, autokinesis correlates at $r = -.161$ with the EFT. The log AK measure reduces this to $r = -.106$. Neither of these correlations approaches a significant level, replicating the Cancro and Voth finding.

There did occur a significant relationship between EFT scores and the difference between the first and second AK test scores, $r = .371$, $p < .01$, two-tailed. That is, persons with high EFT scores (low differentiation) exhibited a greater increase in AK upon retest than persons with low EFT scores.

Hypothesis 1d.

Daydreaming and Dream Recall - A positive relationship was predicted between measures of daydreaming frequency and vividness and measures of dream recall, dream length, and dream emotionality. This was based on the notion of a continuum of awareness of inner experience as espoused by Singer, Foulkes and others.

With regard to frequency measures, the total number of dreams reported in the diary correlated at $r = .184$ with the General Daydreaming scale and $r = .155$ with the Daydream Frequency scale, based on an N of 55. Neither of these correlations is significant, although they are both in the expected direction.

With respect to the vividness of imagery experiences, the number of dreams recalled correlated at $r = .101$ with Absorption in Daydreaming, $r = .087$ with Visual Imagery in Daydreams, $r = .105$ with Auditory Imagery in Daydreams and $r = .007$ with Hallucinatory Vividness of Daydreams. None of these correlations approach significance.

The diary measure of dream recall also correlated at non-significant levels with the Acceptance of Daydreaming, $r = .186$, Positive Reactions in Daydreams, $r = -.051$, and Frightened Reaction to Daydreams, $r = .066$.

The total number of dreams recalled did correlate significantly with two scales: Problem Solving through Daydreams, $r = .269$ ($p < .05$, two-tailed) and Night Dream Frequency, $r = .589$ ($p < .001$, two-tailed). The latter result strongly suggests the utility of the Night Dream Frequency scale for future studies in the area of dream recall. This is further reinforced by the significant negative correlation between the "no-dream" report and the Night Dream Frequency scale ($r = -.579$, $p < .001$, two-tailed), and the significant positive relationship of dream length ($r = .422$, $p < .001$, two-tailed) with that scale.

The main point of contact between dream diary data on recall and the scales of the IPI has to do with the report of "contentless recall." This measure correlates at $r = -.366$ with Acceptance of Daydreaming ($p < .01$, two-tailed), $r = -.372$ with Problem Solving through Daydreams ($p < .01$, two-tailed), $r = -.285$ with Future Orientation in Daydreams ($p < .05$, two-tailed), and $r = -.327$ with Achievement-oriented Daydreams ($p < .05$, two-tailed).

There are also some interesting significant correlations between the scores of dream content and the daydreaming scales. Based on an N of 48, the bizarreness measure correlated at $r = .296$ ($p < .05$, two-tailed) with the scale of Bizarre Improbable Daydreams, and $r = .286$ ($p < .05$, two-tailed) with the Night Dream Frequency scale. The correlation of the emotionality measure with the Boredom scale, at $r = .276$, approaches but does not reach significance. Affective polarity of dreams correlated at $r = -.289$ ($p < .05$, two-tailed) with Fear of Failure in Daydreams and $r = -.326$ ($p < .025$, two-tailed) with Hostile Aggressive Daydreams. This means that persons with greater

negative affect in dreams have more Fear of Failure and Hostile Aggressive daydreams.

The data does not completely support this hypothesis, yet it reveals many significant points of contact between the variables of daydreaming and dream recall.

Hypothesis 1e.

Daydreaming and Psychological Differentiation - A positive relationship was predicted between the level of differentiation as measured by the EFT and measures of daydreaming frequency and vividness. This was based on Witkin's description of the highly differentiated person as manifesting greater awareness of inner life.

Based on an N of 48, the EFT correlated at $r = .113$ with the General Daydreaming scale and $r = .068$ with the Daydream Frequency scale. Neither correlation approaches significance.

On the other hand, EFT scores correlated at $r = -.437$ ($p < .01$, two-tailed) with Acceptance of Daydreaming. This means that persons with low EFT scores (highly differentiated) are more accepting of daydreams, as would be expected on the basis of Witkin's model. The EFT also correlated at $r = .307$ ($p < .05$, two-tailed) with the scale of Bizarre Improbable Daydreams, meaning that poorly differentiated persons report more bizarre daydreams.

The data does not fully support this hypothesis, but does indicate some important areas of association between daydreaming and differentiation.

Hypothesis 1f.

Dream Recall and Psychological Differentiation - A positive relationship was predicted between degree of differentiation on the EFT and measures of dream recall, dream length, and dream emotionality. This was

based on Witkin's model of differentiation and previous research in this area (Linton and Schonbar, 1964).

EFT scores failed to correlate at significant levels with the total number of dreams recalled ($r = -.087$) or the Night Dream Frequency scale ($r = -.078$). Similarly, EFT scores correlated at $r = -.073$ with dream length, $r = -.051$ with dream bizarreness, and $r = .035$ with dream emotionality.

The data fails to provide support for this hypothesis.

Group 2 - This group of hypotheses is concerned with how autokinetic scores relate to these scales of the IPI which measure attention processes. Each of the four hypotheses is based on the Voth and Mayman model of autokinesis which predicts increased AK when attention is withdrawn from the environment.

Hypothesis 2a.

Autokinesis and Mindwandering - A positive relationship was predicted between autokinesis and the IPI scale of Mindwandering. Based on a sample of 55 subjects, AK correlated at $r = -.081$ with Mindwandering, failing to support the hypothesis.

Hypothesis 2b.

Autokinesis and Boredom - A positive relationship was predicted between autokinesis and the Boredom scale. These measures correlated at $r = .027$, failing to support the hypothesis.

Hypothesis 2c.

Autokinesis and Distractibility - A positive relationship was predicted between these measures, which correlated at $r = -.090$, failing to support the hypothesis.

Hypothesis 2d.

Autokinesis and Need for External Stimulation - A negative relationship was predicted between these variables because the Voth and Mayman model suggests that high AK persons have less investment in external stimulation. These measures correlated at $r = -.113$, failing to support this hypothesis.

Group 3 - The third set of hypotheses concerns the clustering of daydream subscales and other measures of inner experience when factor analyzed.

Hypothesis 3a.

Styles of Daydreaming - It was predicted that factor analysis of the IPI would yield psychologically meaningful clustering of the subscales in a manner that essentially replicates the factors reported by Singer and Antrobus (1970). Data on 55 subjects was analyzed by a Varimax Analytic Solution on an IBM-360 computer, and yielded the following factors:

Factor 1 (table 1) - The greatest portion of variance within this factor comes from the Guilt Daydream scale (.805), followed by Fear of Failure Daydreams (.797), Hallucinatory Vividness of Daydreams (.709), Hostile-Aggressive Daydreams (.655), Frightened Reactions in Daydreams (.641), Achievement Daydreams (.634), Heroic Daydreams (.618), Problem-Solving in Daydreams (.477), Daydreaming Frequency (.375), and Absorption in Daydreaming (.342).

This factor is strikingly similar to that reported by Singer and Antrobus (1970) in their work with the IPI. Calling their factor Obsessional-

Emotional Daydreaming, these authors feel that it describes the Obsessional-Neurotic pattern of "being tortured by inner thoughts and fantasies usually of a guilty and self-doubting nature." The factor reported here essentially duplicates their factor and certainly suggests a fantasy life laden with great conflict. Hereafter, it is referred to as the "Conflictual Daydreaming" factor.

Factor 2 (table 2) - Highest loading on the second factor is Absorption in Daydreaming (.654), followed by Daydreaming Frequency (.651), Positive Reactions in Daydreams (.622), Visual Imagery in Daydreams (.621), General Daydreaming (.578), Sexual Daydreams (.508), Problem Solving in Daydreams (.478), Bizarre Daydreams (.462), Auditory Imagery in Daydreams (.447), and Acceptance of Daydreaming (.325).

This factor essentially replicates a second factor reported by Singer and Antrobus, which they labeled Positive-Vivid Daydreaming. They suggest that "it represents a constructive or positive attitude toward daydreaming with some enjoyment of the vividly experienced fantasies..." Hereafter it is referred to as the "Positive Daydreaming" factor. Neither the autokinetic, dream diary, nor EFT measures loaded highly on this factor.

Factor 3 (table 3) - This factor has five major loadings: Distractibility (.784), Mindwandering (.767), Boredom (.747), Sexual Daydreams (.502), and Absorption in Daydreaming (.492). It is similar to the Neuroticism factor of Singer and Antrobus in suggesting poor control over attentional and thought processes with great absorption in daydreaming which is often of a sexual nature. Hereafter it is referred to as the "Attentional Processes" factor. It is worthy of mention that AK scores did not load

highly on the factor related to attention.

Factor 4 (table 4) - There are only three major loadings on this factor: reports of "no dream" on the dream diary (-.979), the total number of dreams reported (.907), and the scale of Night Dream Frequency (.636). This is clearly a "Dream Recall" factor. The fourth highest loading scale was General Daydreaming (.204), the fifth was Autokinesis (.183).

Factor 5 (table 5) - Three major loadings emerge in this factor: the raw autokinetic score (.901), the log AK score (.889), and the absolute difference between AK tests one and two (.343). This is clearly an "Autokinesis" factor. Loading at lower levels are Auditory Imagery in Daydreams (-.288) and Hostile Aggressive Daydreams (-.235).

The first three factors described essentially replicate those reported by Singer and Antrobus (1970), thereby supporting this hypothesis.

Table 1

"Conflictual Daydreaming" (Factor 1)

Highest Loading Measures

<u>Name</u>	<u>Loading</u>
Guilt Daydreams	.805
Fear of Failure Daydreams	.797
Hallucinatory Vividness of Daydreams	.709
Hostile-Aggressive Daydreams	.655
Frightened Reactions in Daydreams	.641
Achievement Daydreams	.634
Heroic Daydreams	.618
Problem Solving in Daydreams	.477
Daydreaming Frequency	.375
Absorption in Daydreaming	.342

Table 2

"Positive Daydreaming" (Factor 2)

Highest Loading Measures

<u>Name</u>	<u>Loading</u>
Absorption in Daydreaming	.654
Daydreaming Frequency	.651
Positive Reactions in Daydreams	.622
Visual Imagery in Daydreams	.621
General Daydreaming	.578
Sexual Daydreams	.508
Problem Solving in Daydreams	.478
Bizarre Daydreams	.462
Auditory Imagery in Dreams	.447
Acceptance of Daydreaming	.325

Table 3

"Attentional Processes" (Factor 3)

Highest Loading Measures

<u>Name</u>	<u>Loading</u>
Distractibility	.784
Mindwandering	.767
Boredom	.747
Sexual Daydreams	.502
Absorption in Daydreaming	.492

Table 4

"Dream Recall" (Factor 4)

Highest Loading Measures

<u>Name</u>	<u>Loading</u>
"No Dream" in dream diary	-.979
Total Dream Recall in diary	.907
Night Dream Frequency	.636
General Daydreaming	.204
Autokinesis	.183

Table 5

"Autokinesis" (Factor 5)

Highest Loading Measures

<u>Name</u>	<u>Loading</u>
AK raw score	.901
Log AK	.889
AK absolute difference	.343
Auditory Imagery in Daydreams	-.288
Hostile Aggressive Daydreams	-.235

Hypothesis 3b.

Factorial Structure - It was predicted that autokinesis, EFT, and dream recall measures, being related to broader styles of fantasy functioning, would achieve high loadings on some of the daydream factors.

These measures did not load at high levels on the Conflictual Daydreaming or Positive Daydreaming factors. Dream recall and autokinetic measures, moreover, tended to form factors of their own. Consequently, this hypothesis is not supported.

It is worthy of mention at this point that a factor analysis was also performed on an N of 48 subjects, which included only those subjects who recalled at least three dreams. This analysis included the additional variables of dream length, bizarreness, emotionality, and polarity. The factorial structure which emerged was nearly identical to that already presented, but the loading of one of the additional variables is of interest. Affective polarity loaded high ($-.304$), in a negative direction on the Conflictual Daydreaming Factor, indicating that affectively negative night dreams are associated with conflictual waking fantasy.

Group 4 - The fourth set of hypotheses concerns the experimental test of the Voth and Mayman attention-distribution model of autokinesis.

Hypothesis 4a.

Attention-Distribution Mechanism - It was predicted on the basis of the Voth and Mayman model that greater AK would be perceived when attention was withdrawn from the light source, and less AK would result from focal attention toward the light. An alternative attention oriented model would predict the opposite effects.

Hypothesis 4b.

Interaction Effects - Significant interactions were predicted between the experimental effects and the subjects' baseline measures of AK (high versus low).

In order to test the hypothesized treatment and interaction effects an analysis of variance was performed on the difference scores, defined as the second autokinetic test score (Y) minus the initial AK score (X), or Y-X (Edwards, 1965). The results of this analysis are presented in table six. The F values for the major effects (A and B) and the interaction (AB) all fail to reach significance.

When performing an analysis of variance one must combine the separate variance estimates of the subgroups under the assumption that they were all estimates of the same population variance. To test the validity of this assumption for these data, Bartlett's Test of Homogeneity of Variance was performed (Edwards, 1965, p. 126) and the results are presented in table seven. The corrected chi-square of 40.38 was quite significant ($p < .01$, two-tailed) meaning that the subgroups are not homogeneous in variance, i.e., that they were drawn from populations with unequal variances.

According to Edwards (1965, p. 110) a common explanation for heterogeneity of variance is that some experimental procedure operates differentially with respect to an organismic variable. With regard to this study, perusal of the data suggests that the test-retest procedure may have resulted in greater variance for the High-AK than the Low-AK subjects. Testing the validity of this observation, an F-test for homogeneity

of variance was performed on High- versus Low-AK subjects. The result of this test, presented in table eight, was a significant F-ratio of 10.4 ($p < .01$, two-tailed).

In an attempt to reduce heterogeneity of variance, the data was transformed to a logarithmic scale. That is, logs were taken of the first and second autokinetic test scores, and the difference score was defined as $\log Y - \log X$. Voth and Mayman have reported such log transformation of autokinetic scores quite useful in analyzing their data. Results of the analysis of variance of the $\log Y - \log X$ scores are presented in table nine. Again, there were no significant effects or interactions.

The problem of heterogeneity of variance makes it difficult to test these data adequately for treatment effects. Perusal of the data, however, suggests that a treatment effect may be present in the form of greater variability of difference scores for the distracted (Group A) than for the control (Group B) subjects. One way to investigate this possibility is to work with the absolute values of $Y - X$ as an index of "change", ignoring signs. That is, one can test the hypothesis of greater absolute change in AK scores when retested under the distracted, as opposed to the control condition. When a median test (McNemar, 1962) was performed comparing absolute scores of groups A and B (table ten), a significant difference was found ($p < .01$, two-tailed) such that distracted subjects had significantly higher "change" scores than control subjects. Low AK subjects were the main source of this result. The same statistical approach revealed no such difference when comparing the control group with group C (table ten).

Hypotheses 4a and 4b cannot be considered adequately tested by this experiment because treatment groups were not sufficiently homogeneous.

Table 6

ANALYSIS OF VARIANCE OF DIFFERENCE SCORES

SOURCE	SS	df	MS	F
A	567.22	2	283.61	0.88 n.s.
B	11.49	1	11.49	0.03 n.s.
AB	940.95	5	188.19	0.59 n.s.
Resid.	12,382.15	39	317.49	
Total	13,901.82	47		* not significant

Table 7

BARTLETT'S TEST FOR HOMOGENEITY OF VARIANCE

CELL	df	X	S	Log S
A1B1	7	2670.00	381.42	2.5813
A2B1	7	2952.37	421.76	2.6250
A3B1	7	5565.21	795.03	2.9003
A1B2	7	920.87	131.55	2.1190
A2B2	7	17.21	2.45	0.3908
A3B2	7	251.21	<u>35.88</u>	<u>1.5549</u>
			1768.12	12.1717

Calculations: 1. $\frac{\sum Sk^2}{k} = 294.68$; $\text{Log } \frac{\sum Sk^2}{k} = 2.4693$

2. $K \text{ Log } \frac{\sum Sk^2}{k} = 14.8161$

3. Diff. = 2.6443

4. $\chi^2 = 42.6226$

5. Corrected $\chi^2 = 40.38$ (sig. $p < .01$)

Table 8

F-TEST FOR HOMOGENEITY OF VARIANCE: HIGH vs. LOW AK

HIGH AK	LOW AK	F-RATIO
$\Sigma x^2 = 12672.24$	$\Sigma x^2 = 1212.84$	$S_1^2 / S_2^2 = 10.4$
$S_1^2 = 550.96$	$S_2^2 = 52.73$	(sig. $p < .01$)

Table 9
ANALYSIS OF VARIANCE OF Log-Y MINUS Log-X VALUES

SOURCE	SS	df	MS	F
A	0.02061887	2	0.01030900	0.2287 n.s.*
B	0.10246106	1	0.10246106	2.2730 n.s.
AB	0.05236515	5	0.01047300	0.2323 n.s.
Resid.	1.75797903	39	0.04507638	
Total	1.93342411	47		

* not significant

Table 10

MEDIAN TESTS ON ABSOLUTE VALUES

A - Distracted versus Control Group

	A	B	TOTAL	CALCULATIONS
At, Above GM	4 (8)	12 (8)	16	$\chi^2 = \sum \frac{(F_o - F_T)^2}{F_T} = 8.00$
Below GM	$\frac{12(8)}{16}$	$\frac{4(8)}{16}$	16	df = 1 (Sig. p < .01)

B - Attending versus Control Group

	A	B	TOTAL	CALCULATIONS
At, Above GM	11 (13)	15 (13)	26	$\chi^2 = \sum \frac{(F_o - F_T)^2}{F_T} = 3.27$
Below GM	$\frac{5(3)}{16}$	$\frac{1(3)}{16}$	6	df = 1 (n.s.)

DISCUSSION

The impetus for this study derived largely from certain observations of Voth and Mayman regarding inner experience which diverged from those of other investigators. In discussing the findings, the question of whether autokinesis may be accepted as a valid measure of inner experience is first addressed. Next, consideration is given to the theoretical model by which Voth and Mayman have attempted to link autokinesis and inner experience. Thereafter, the broader matter of the patterning of inner experience is explored.

Autokinesis as a measure of inner experience - That perceptual phenomena may be related to diverse areas of personality functioning is well established (Witkin, 1954, 1962). Such findings are significant in that they suggest "styles" of functioning which are manifest at various levels of behavior. Voth and Mayman have proposed that perception of illusory movement by a pinpoint of light is an objective measure of a general style of relating to one's environment. That is, persons perceiving little autokinetic movement are thought to be greatly invested in the external world; those perceiving considerable illusory movement are said to more readily withdraw external attention cathexis in favor of inner experience. It closely follows upon this model that the relationship between autokinesis and daydreaming is an important area of study, for the daydream is a readily available and widely employed method of withdrawing attention from the environment.

The results of this study revealed no significant relationship

between autokinesis and measures of daydreaming frequency and intensity. Attitudes toward daydreaming seemed similarly unrelated to autokinesis. The singular exception was the finding of a negative relationship between AK and the scale of Positive Reactions in Daydreams. Even this finding, however, did not support the hypothesized relationship of autokinesis to daydreaming. Consequently, no support has been found for a hypothesis which seems quite central to the Voth and Mayman interpretation of individual differences in autokinesis.

It is not possible, on the basis of studies of this kind, to firmly establish that no relationship exists between daydreaming and autokinesis, i.e., one cannot accept the null hypothesis. Nevertheless, the total lack of support for this important aspect of the Voth and Mayman theory is striking, and it raises questions as to whether AK truly relates to a broader continuum of inner experience.

The findings of a study by Bush (1968) are relevant in this regard. Bush's work was intended as a construct-validation study of the reality-closeness/reality-distance concept of Voth and Mayman. He devised a questionnaire which he thought would more directly measure behavioral manifestations of reality-closeness/reality-distance (RC-RD) than autokinesis, but measured AK as well. The personality correlates of the questionnaire were found to parallel the findings of Voth and Mayman in which AK had been the measure of reality-orientation. He goes on to report, however, that "a seemingly major disparity emerged between the evidence for the validity of the RC-RD construct, and the evidence for the validity of autokinetic responsivity as a suitable measure

of reality-closeness/reality-distance." That is, those personality variables which correlated with the questionnaire measure of reality-closeness/reality-distance failed to correlate with autokinesis.

Bush used questionnaire material to assess personality functioning, just as the IPI was employed here to assess daydreaming. In each case the relationship to autokinesis was lacking. A study by Voth and Mayman (1963) which attempted to measure the personality correlates of AK via questionnaire was similarly unsuccessful. When questionnaire methods are substituted for clinical interviews, then, the relationships reported between AK and other areas of functioning do not appear. Of course, it is not uncommon for questionnaire materials to correlate poorly with behavioral measures. Nevertheless, the nearly total lack of relatedness of AK to a sophisticated daydreaming inventory, which has been successfully related to a behavioral measure of daydreaming, seems damaging to the contention that autokinesis provides a meaningful measure of inner experience.

The evidence for a relationship between autokinesis and daydreaming comes from studies of Voth and Mayman which involved extensive interviews with subjects by one of the authors. There are various sources of error which may enter into such interviews, especially when conducted by one of the primary investigators. For example, an interviewer's evaluation of subjects may reflect his own point of view regarding what personality characteristics should be important with regard to AK. This type of error may reduce the value of an extensive interview to that of a yes-no judgment. That is, once the examiner has some intuition

about a subject's autokinetic performance, his judgment of personality characteristics may tend to line up accordingly. Even if the judgment of AK is correct it does not mean that it was based on the personality characteristics described. In fact, the interviewer need not be aware of the factors influencing his judgment, e.g., the subject's motivation to please, general anxiety level, etc. In view of the difficulty in replicating their observations with more objective instruments the possibility of such errors in the Voth and Mayman research must be given serious consideration.

In their recent papers on autokinesis and psychotherapy, Voth and Maymann (1966, 1968) utilize the interview technique with the psychotherapists of the AK subjects. The interviewer asked questions in order to direct the therapist's remarks toward the particular aspects of treatment under study. The subject's AK score was predicted on the basis of the treatment variables and the authors' understanding of the ego-closeness/ego/distance dimension. The methodological criticisms already raised are also applicable to these studies, where the investigators are even further removed from the source of their data (the subject). It was on the basis of such studies that Voth and Mayman reported a negative relationship between autokinesis and dream recall.

The current study, using a behavioral measure of dream recall, found a significant positive relationship ($p < .05$) between AK and dream recall, further underlining the potential for error in the Voth and Mayman methodology. They may have predicted AK at a greater than chance level, but this result may have had little to do with a subject's ability to recall

dreams. The present finding of a positive relationship, however, brings us to reconsider the question of whether autokinesis measures at least some aspects of inner experience.

How is it that the illusory movement of a pinpoint of light is related to the tendency to recall dreams? This interesting finding requires replication, of course, but one may speculate regarding the reasons for this result. One might postulate (after the manner of Voth and Mayman) some attentional link between AK and dream recall. In this case, the alternative attention-distribution model, introduced earlier, might be applicable. That is, if focal attention toward the light source really were responsible for seeing more AK, the ability to focus attention efficiently in a given direction could also facilitate recall of dream material at awakening. Explanation at this level, however, seems quite removed from the data, and simpler interpretations are possible. A far more parsimonious explanation, for example, involves the manner in which persons respond to the perceived demand characteristics of an experiment. Those individuals who feel compelled to "produce" for the experiment might do so in the form of longer AK tracings and more frequent dream reports. This need not involve any misrepresentation by the subject. It may simply reflect a powerful motivational factor which actually influences subjects' performances in the experiment. Even if replicated, then, the meaning of this finding is open to various interpretations, and the mechanism involved may be non-specific to the autokinetic situation, e.g., level of motivation.

More puzzling, perhaps, is the finding that the dreams of high

AK persons tend toward positive affect ($p < .05$), yet these subjects report few positive reactions in daydream ($p < .05$). If either result is replicated it would suggest some relationship between autokinetic performance and the affective accompaniment of inner experience. The fact that AK related differently to affect in dreams versus daydreams may largely reflect a difference between a self-rating method (IPI) and one involving rating by judges (of dream content). One wonders whether individuals rating themselves as having few positive experiences in daydreams would not also rate themselves as having few positive experiences in night dreams. Similarly, objective judges might rate positively many of the daydreams of those individuals who report few positive experiences in daydreams. An attempt to validate these findings, therefore, should attempt to apply identical measurement techniques to the dream and daydream materials.

The data discussed above, with its limitations, comprise the only evidence of this study that autokinesis may relate to some aspects of inner experience. The outcome of the factor analysis is also relevant to this issue. Autokinesis failed to load at an appreciable level on the three daydreaming factors (Conflictual Daydreaming, Positive Daydreaming, and Attentional Processes) but formed a factor of its own (factor 5). The only measures of inner experience to load appreciably on this factor did so in a negative direction (Auditory Imagery in Daydreams and Hostile Aggressive Daydreams). This result, like many others already presented, fails to support the contention that autokinesis is an important index of inner experience.

Before leaving this question, another finding is worthy of inspection. The lack of significant association between autokinetic scores and scores on the Embedded-Figures Test replicates the finding of Cancro and Voth (1970), who interpret this as an indication that the ego-close/ego-distant continuum is unrelated to psychological differentiation. This assertion seems unlikely, as each construct is thought to involve a pervasive style of relating to one's perceptual environment. Based on the findings of the present study it seems more likely that it is autokinesis which is itself little related to the ego-close/ego-distant continuum. The personality constellation may exist without being strongly related to the original source of the construct, the autokinetic phenomenon. The methodological criticisms already presented of the Voth and Mayman work have shown this to be quite possible.

Autokinesis and attention-distribution - The importance of the Voth and Mayman model of attention-distribution to the present study is that it is the mechanism by which autokinesis is theoretically linked to diverse personality manifestations and to inner experience. There is certainly evidence by which to link attention-distribution to fantasy behavior (Antrobus, Coleman and Singer, 1967), but is there evidence that attention-distribution plays a determining role in autokinesis? The present study addresses this question via experimental and correlational techniques.

An attempt was made to study the effects of experimental manifestations of attention-distribution in the autokinetic situation. Failure to achieve sufficiently homogeneous groups made data analysis difficult and results inconclusive. It is of some interest, nevertheless, that the

only experimental effect which appeared was an increased variability of autokinesis when subjects were distracted from the light source. This stands in contrast to the prediction, based on the Voth and Mayman model, of increased autokinesis as a function of shifting attention from the light source to inner stimuli. If there is some relation between attention distribution and autokinesis it does not seem so simple as that postulated by Voth and Mayman.

The second approach to this issue was via the attention scales of the IPI: Mindwandering, Boredom, Distractibility, and Need for External Stimulation. The lack of relatedness of these measures to autokinesis fails to support the notion that attention-distribution is a primary factor in determining autokinetic movement. Similarly, autokinesis failed to load on the Attentional Processes factor (factor 3).

These findings are not terribly surprising for two reasons. First, Voth and Mayman have yet to furnish any hard data to support their model of autokinesis. Second, investigators have long sought to link autokinesis with one or another causal variable but with little success. In an extensive review of the literature regarding such efforts, Royce et al (1966) reported that: "Despite scientific study of autokinesis since 1886 when Charpentier made laboratory observations, there is little basic knowledge of the causes of autokinesis." Their report stresses that "... determinants of AK are many and varied but little can be said about their relative potencies." The present study supports the notion that autokinesis is a reliable measure whose determinants are complex and not yet understood.

Patterns of inner experience - The main purpose of this study was to

investigate patterns of inner experience. Thus far it has become apparent that one of the measures employed, autokinesis, is little related to various aspects of inner life. The remaining measures nevertheless provide some interesting data relevant to this issue.

Perhaps most intriguing were the indications of similarity in content and structure of individuals waking and sleeping fantasy lives. That is, ratings of dream bizarreness were positively related to the scale of Bizarre and Improbable Daydreams ($p < .05$), and a predominance of negative affect in dreams was related to high scores on scales of Hostile Aggressive Daydreams ($p < .05$) and Fear of Failure in Daydreams ($p < .05$). It may be that waking and sleeping fantasy are more closely linked than is commonly thought. Perhaps there are certain dimensions of mental functioning which apply to dreams, daydreams, and even consciousness in general. These would likely be based on central aspects of ego-organization. Individuals whose ego-structure enables easy access to primitive, bizarre material might manifest this fact differently in various states of consciousness, but their degree of bizarreness would appear relatively high in comparison to other individuals. Their dreams, daydreams, artistic productions, drug experiences, etc. would surpass in bizarreness the analogous experiences of others. Similarly, individuals whose personality organizations are largely dominated by powerful negative emotions such as rage and fear might tend to express these emotions across all aspects of their mental lives.

It would be of interest to discover, just how specific are the continuities between waking and sleeping fantasy. That is, one could

further analyze dream content along scales resembling those of the IPI (e.g., hostile-aggressive dreams, achievement-oriented dreams, positive reactions in dreams) and test whether specific themes or emotions predominate in an individual's fantasy productions.

Considering the findings described above, it is curious that the expected relationships between frequency and intensity of day- and night-dreaming did not hold. Speculation regarding a continuum of self-awareness has previously been supported by such findings. The present data suggests a continuity in the quality of inner experience without supporting a continuity in the quantity of such experience. Of course, the latter issue is really quite complicated by problems of definition and of measurement. Individual differences in the quantity of dreaming are minimal, based on laboratory studies of the psychophysiology of sleep. In measuring the "recall" of dreams, we are not really studying the quantity of inner experience but something else, the nature of which is still undetermined. Similarly, in attempting to study the quantity of daydreaming one may actually be measuring "awareness" of daydreaming or the willingness to report it.

There are some indications in the present study that a frequency of dream recall measure may involve certain artifacts. For example, the diary measure of recall was positively related to Problem Solving through Daydreams ($p < .05$); reports of "contentless recall" of having dreamt were negatively related to Problem Solving through Daydreams ($p < .05$), Achievement-oriented Daydreams ($p < .05$), Future Orientation in Daydreams ($p < .05$) and Acceptance of Daydreaming ($p < .01$). This constellation of

findings suggests that persons whose waking fantasy is oriented toward achievement, problem solving, and the future tend to report more dreams and are less likely to report having dreamt but forgotten content. Does this mean that achievement-orientation is usually implicated in dream recall? Perhaps, but it may well be an artifact resulting from the measurement technique. Subjects perceiving the dream diary as a "task" may respond in accordance with their achievement needs. Rather than measuring frequency of dream recall 'per se', this study and many others are really measuring frequency of dream recall in response to a dream recall task, with whatever artifacts this entails. These factors argue in favor of applying the IPI Night Dream Frequency scale to problems of dream recall frequency rather than the diary technique. This scale correlated extremely well with the total number of dreams recalled ($p < .001$) and the length of dreams ($p < .001$), and seems less likely to be extensively influenced by achievement motivation.

The failure of the various "frequency" measures of this study to relate to other variables also extends to the area of psychological differentiation. Witkin suggests that highly differentiated persons exhibit a greater awareness of inner life, both waking and sleeping. EFT scores, however, failed to correlate significantly with measures of dream and daydream frequency. On the other hand, highly differentiated persons did appear significantly more accepting of daydream experiences ($p < .01$). This supports the idea mentioned earlier that attempts to measure the "quantity" of fantasy experience are complicated by such factors as awareness, acceptance, and willingness to respond. Earlier reports of frequency

relationships may have been contaminated by such factors; they are apparent here only because of the sensitivity of the IPI.

Support for Witkin's differentiation hypothesis occurred with regard to the quality rather than the quantity of inner experience, thus lining up well with our other findings. Poorly differentiated persons did tend to report more bizarre, improbable daydreams than did well differentiated subjects. This concurs with Witkin's characterization of the "global" approach to life experience as the more primitive psychological organization.

The notion of a qualitative consistency in mental functioning which spans various states of consciousness naturally implies a consistency within states. The factor analytic approach yielded data relevant to this matter. The results confirm reports by Singer and Antrobus (1963, 1970) of internally consistent "styles" of waking fantasy. The Conflictual Daydreaming factor describes a waking fantasy life dominated by stormy conflict, containing vivid representations of guilts, fears, hostilities and ambitions. In the factor analysis performed on subjects with scorable dreams (N=48), it was found that a predominance of negative affect in dream life was strongly associated with this style. Once again we see evidence of qualitative consistency in mental functioning across states of consciousness. In marked contrast to the latter style of daydreaming is the Positive Daydreaming factor which involves the ability to enjoy vivid imaginal experiences. These two clusterings of waking inner experience very closely replicate factors recently reported by Singer and Antrobus (1970).

What is the long-range significance of discovering consistencies within aspects of waking fantasy life and across states of consciousness? For one thing, such data provide further clues as to the functions of such inner experiences as daydreams and dreams. Continuity of content between waking and sleeping fantasy provides some support for the notion that these phenomena represent repeated attempts to express or even "work out" some important aspects of one's psychological life. Singer (1968) suggests that: "The adaptive function of the ongoing stream of thought and of nocturnal dreams as well involves their role in the ongoing organization and attempted integration of the major unfinished business in our lives."

The practical application of such findings remains to be determined, but their future utility seems promising. They may, for example, help to provide a more meaningful nosological system than currently exists for the classification of personality functioning and dysfunctioning. They certainly suggest an important role for the manifest as opposed to the latent content of dreams and daydreams in assessing dynamics of personality. Such work may also provide some objective, meaningful indices of psychological functioning by which the effects of therapeutic intervention can be assessed. Finally, this type of research suggests new avenues of approach to the matter of personality organization and promotes a more integrated, holistic view of man.

Major conclusions -

1. Strikingly little support was found for Voth and Mayman's contention that autokinesis is an important measure of inner experience.

Examination of the methodology of those authors suggests that many of their observations regarding autokinesis and personality may be artificial. Similarly, the few significant correlations observed in this study between AK and other variables were likely influenced by motivational and other extraneous factors. Autokinesis failed to load on factors describing styles of inner experience. The ego-close/ego-distant construct may have some validity and yet be little related to the autokinetic phenomenon.

2. The Voth and Mayman model of attention-distribution as a major determinant of autokinesis was not supported by this study. A definitive experimental test of this matter was not possible because of a failure to achieve sufficiently homogeneous groups. Nevertheless, the outcome of the experiment and the correlational analysis fail to implicate attention-distribution in autokinesis.

3. Similarities were observed in the content and structure of waking and sleeping fantasy. Dimensions of mental functioning are suggested which apply to dreams, daydreams, and possibly to other aspects of mental life. In particular, a continuity in the quality rather than the quantity of inner experiences was found. Certain measures of dream recall and daydreaming were found to be influenced by such artifacts as achievement motivation and willingness-to-report.

4. The styles of daydreaming reported recently by Singer and Antrobus (1970) were replicated, and the notion of the internal consistency of waking fantasy life was supported.

VI

SUMMARY

Voth and Mayman have reported two pervasive styles of relating to the external environment which are best measured via the autokinetic phenomenon. They hypothesized that an attention-distribution mechanism is the major factor in determining the amount of autokinesis (AK) perceived, and used this conceptualization to link autokinesis with such aspects of inner experience as daydreaming and recall of night dreams. The present study sought to clarify the following issues: May we accept autokinesis as a meaningful measure of inner experience? How does autokinesis relate to better known measures of inner experience such as daydreaming, recall and content of night dreams, and psychological differentiation? Can experimental or other evidence be found to support an attention-distribution model of autokinesis? How do the diverse measures of inner experience mentioned above relate to one another?

Volunteer male college students served as subjects for this study, which involved correlative, factor analytic, and experimental procedures. Only persons falling in the upper or lower quartiles of the distribution of autokinetic scores among City College students were used in the experimental design; correlative and factor analytic procedures involved students from the entire distribution. Subjects were first administered a standard autokinetic test in the manner of Voth and Mayman. Subjects not acceptable to the experimental study were immediately given the correlational materials to be described later; others were divided into "High" and "Low" AK groups of 24 persons each. Both the High and Low groups were randomly subdivided

into three groups of 8 subjects according to the experimental treatment they were to receive. These groups were retested for AK under one of the following conditions: For group A, subjects' attention was diverted from the light source by rehearsal of a serial learning task; for group C, attention was more forcefully directed toward the light source by supplementary instructions; for group B (control), the original AK test was re-administered. At the conclusion of the autokinetic procedure, subjects were administered the Imaginal Process Inventory, a questionnaire exploring many aspects of daydreaming and attention. Data regarding dream recall and dream content were collected by means of a home dream diary which subjects kept for 16 consecutive nights. Psychological differentiation was assessed by a short version of the Embedded-Figures Test.

Strikingly little support was forthcoming for the hypothesized relationship between autokinesis and daydreaming despite extensive assessment of the latter by the IPI, which has correlated well with a behavioral measure of daydreaming in previous research. In the outcome of the factor analysis AK failed to load on factors describing styles of inner experience but formed a factor of its own. With regard to the mechanism of autokinesis, failure to achieve sufficiently homogeneous groups prevented a definitive test of the Voth and Mayman model. Nevertheless, experimental results and correlations of AK with the attention scales of the IPI failed to implicate attention-distribution in autokinesis. Autokinesis was found to be positively related to the diary measure of dream recall, in opposition to the negative relationship reported by Voth and Mayman. The lack of relatedness of AK to an EFT measure of psychological differentiation was confirmed.

With regard to the patterning of inner experience, qualitative similarities were observed between waking and sleeping fantasy. Such dimensions of inner experience as bizarreness and affective tone of fantasy seemed to bridge these states of consciousness. The "frequency" measures of dream recall and daydreaming were little related, and methodological criticisms of these measures were offered. Substantial correlations between the IPI scale of Night Dream Frequency and some dream diary measures support the value of that scale for future research. The EFT also proved unrelated to the frequency measures, but highly differentiated subjects were significantly more accepting of daydreams. Poorly differentiated subjects reported more bizarre and improbable daydreams. Reports of distinct "styles" of daydreaming were supported by the factor analysis, as were some specific constellations of waking inner experience observed by Singer and Antrobus.

The results of this research emphasize continuity in the quality of mental functioning with regard to waking and sleeping fantasy life.

Appendix I

Autokinetic Instructions

This is an experiment in visual perception. You will be left alone for ten minutes in a room which is totally darkened, except for a pinpoint of light. Please look steadily at this light during the entire test period. The light may or may not appear to move. Should it move, trace its path on the paper before you. If the light then stops moving, make a small dot at that point and leave your pencil there, ready to resume tracing if the light should appear to begin moving again. Should the pencil reach the edge of the sheet, begin again from the approximate center of the sheet and proceed as before.

If you do not understand these instructions, please ask the experimenter for clarification.

Appendix II

Dream Diary

This is your dream diary. Please keep it near your bed, along with a pen. Upon arousal, for the next sixteen consecutive mornings, record the content, if any, of your dreams or sleeping thoughts. It is important that the recording be done immediately upon arousal. Include as much detail as possible; don't worry about "making sense." All data will be completely confidential. Finally, answer the questions at the bottom of the page.

1. How many hours of sleep did you get? _____
2. How were you awakened? _____
3. Were you awakened from a light, medium, or a deep sleep? (circle one)
4. When awakened did you feel well rested, medium, or tired?
5. If you recorded content above, did you recall all, most, some or little of the dream content?
6. If you did not record content, did you a) not seem to dream or b) dream but forget the content?

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