BODY TYPE AND FREQUENCY OF DREAM RECALL

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ABSTRACT

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The major purpose of this study has been to test the relationship of body type to ordinary, i.e., non-laboratory recall of dreams. Data from a pilot study provided tentative support for the hypothesis that ectomorphs will report a greater frequency of dream recall than mesomorphs or endomorphs. Also tested in this study were the relationship of reported body movement to frequency of dream recall as well as the relationship of reported body movement to body type.

A pool of subjects was drawn from a group of freshmen who were inspectionally rated in their HPER classes at the extreme upper end on one of the three body types: endomorphy, mesomorphy, and ectomorphy. They filled out a questionnaire on their dream and sleep activity, and activity on awakening. They were simultaneously somatotyped by the Parnell technique, and the criteria set up for delimiting dominant or extreme cases yielded a group of 16 endomorphs, 20 mesomorphs, and 19 ectomorphs. The Parnell technique

measures body type ratings directly from the subject's height and weight as well as measure of his bone and muscle size and amount of subcutaneous fat. The inter-rater reliability for two of the three body scales were .96 and .94; measures for the third scale were taken simultaneously when two rater were used.

No evidence of support was found for differences in frequency of dream recall or amount of dreams remembered across the dominant body type groups. Lack of support for even greater frequency of dream recall by the dominant ectomorphs found in the pilot study might be attributed to changes in the items measuring memory of dreaming. Though seemingly reliable, the dream recall items possibly were not valid; a truer frequency measure would be a dream diary kept over a span of time.

No supporting evidence was gathered for the hypothesized relationship of body movement to either body type or to dream recall on the basis of the questionnaire data. No conclusions can be drawn since the body movement questions were found to be too unreliable to accept as a measure of this variable. Since questionnaire methology failed entirely in this area of measurement, only direct laboratory measurement of body movements seems appropriate for use in future research.

An incidental finding was the extremely high inter-rater reliability found for the Parnell measures of somatotype assessed by untrained raters. Its ease of administration and the high reliability shown establish the Parnell technique of somatotyping as a very useful tool for research involving somatotype. The relatively high correlation of the inspectional measures of the HPER Department with the Parnell measures lend some support for this system as at least a good approximation to the subject's dominant body type.

This study found little evidence for the capability of a questionnaire technique to measure either the variable of body movement or that of dream recall.

Approved Irwin Kremen

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By

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INTRODUCTION

Research during the past decade on the relationship between rapid eye movements (REMs) and low voltage (Stage 1) EEG activity to dreaming has established that the human adult dreams 4 to 5 times nightly, all told roughly 20% of the time while asleep (Dement & Kleitman, 1955, 1957a, 1957b; Dement & Wolpert, 1958; Wolpert & Trosman, 1958; Goodenough, Shapiro, Holden & Steinschriber, 1959; Kleitman, 1960; and Kremen, 1961). Using the rate of dreaming found in these studies the human adult dreams between 1,460 and 1,825 times a year; but whose rate of recall of dreams approaches these figures? A random sample of 25 male and 25 female Michigan State University undergraduate psychology students report an average recall of one dream per week, or only 52 dreams per year. This seems to be a rather sizeable loss in recollection.

Even where people attempt systematically to recall their dreams, recollection does not seem to increase appreciably. According to Kremen (1963), during the four academic terms from September, 1961, through December, 1962, 436 dream diaries gathered from undergraduates in his

psychology courses at Michigan State University yielded an estimated 10,000 dreams. Extrapolating again from the data provided by the laboratory studies using the EEG eye movement criterion, this group must have dreamt some 105,000 to 132,000 dreams during this time. Keeping a dream diary would seemingly facilitate recall, yet a mere 7 to 10% of dream episodes were remembered. Kremen also argues that even in a situation favoring optimal recall, i.e., psychoanalysis, it is the rare analysand who produces one dream per session; and this one dream per session would represent only 17% recovery. This seems to be maximal recovery under normal sleep conditions, and only during laboratory studies in which subjects are aroused during periods when their eyes are moving and the EEG is of a low voltage, random pattern does recall improve to 80 to 90% recovery.

To what do we attribute the decrement in recall? The most obvious explanation is the concept of repression. But this great a loss of dream experience to subsequent recall makes mock of any attempt at explanation that relies upon the concept of repression, as first suggested by Schonbar (1959), who felt that "The high correlation between remembering dreams and the contentless recall of dreaming also supports the view that low dream recall . . .

is related to repression." Goodenough et al. (1959), to account for the loss in low recallers in the experimental setting, felt that his EEG findings differentiated REMs producing recall from those that did not, and he expected these findings to be useful in future experimental study of the Freudian notion of the repression of dream material. Tart (1962) found support for the hypothesis that "sensitizers," who respond to threat with more manifest anxiety, recall more than "repressors," who use avoidance, denial, and repression as primary modes of adaptation to threat. Lachmann, Lapkin, and Handleman (1962) take the relationship of repression and lowered recall as a given and use it as a stepping stone to further theorizing.

But as Kremen (1963) has pointed out, the inability to recall forgotten dreams at a later date, even under analysis is unassimilable to the repression hypothesis. Psychoanalytic theory postulates two forms of repression: the after-expulsive type and primal repression. Implicit in the argument of the above investigators is the idea of a dream having occurred and having been repressed; they are then positing the after-expulsive type. But this view is refuted by the fact that dreams, if recovered, at all, seem to be recovered only during a short span of time after the

dream and beyond that not at all.

It would seem more tenable, in seeking an explanation for this loss of dream material, to inspect the factors which have hampered recall even under laboratory conditions most favorable to the recovery of dream material. A study of Dement & Kleitman (1957b) showed that "the cessation of eye movement periods was often accompanied by a large body movement on the part of the sleeper, and that during the eye movement periods the incidence of gross body movements was markedly lower than during the adjacent intervals."

Dement & Wolpert (1958) thought that this finding might mean that body movement surrounded by REM periods would segment the dream action into two portions, and found support for this hypothesis. They also took dream reports "shorter than expected from the objective duration of eye movement periods" to see if the earlier portion were forgotten; 37 of the 45 dream periods inspected were found to contain a large body movement several minutes after the beginning of the eye movement period. Further study found that a subjective change in dream content often was being experienced by sleepers wakened from REM periods immediately after gross body movements.

Wolpert & Trosman (1960), summarizing the results of 214 awakenings at four different stages of sleep, found

somewhat diminished recall (69% instead of 85% detailed recall) during body movements, and greatly reduced recall (no detailed recall) in two periods following the lightest sleep stages which are ordinarily ended by a gross body movement.

A line of research related to the above studies is that of recall subsequent to varied modes of awakening. Less effective recall was elicited on waking by means other than a loud bell or tone (Berrien, 1930). More recently Shapiro, Goodenough & Gryler (1963) reported that if subjects were aroused from REM periods gradually instead of abruptly, they more often believed they were awake and/or thinking. Research findings, such as those of Dement & Wolpert (1958), might suggest that movement triggered by subthreshold stimuli interferes with recall and alters the experience of bizzarreness often reported as subjectively differentiating dreaming and waking states.

The search for an understanding of the great loss of dream material to recollection has, therefore, led some investigators into the area of body movement. Consistent findings have been reported of diminished recall under the laboratory setting after some gross movement of the body. This relationship is interesting, particularly in view of the position taken by Schachtel (1959) on the basis of

clinical scrutiny of dreams. He points out that the human activity essential for dealing with the environs is cut to a minimum during sleep while the dream itself is a field of movement. He comments: "It is often possible to catch hold of a dream on awakening by lying still and keeping eyes closed. Jumping out of bed often chases the dream into oblivion - a return to the outer world destroying it." He notes Rorschach's view that dreams are primarily kinesthesias, and states that a passive attitude, rather than one of cramped attention by straining the mind toward control and good performance, is favorable to kinesthetic perception and memory. The dream is the opposite of work so a resistance is operative in the awake person, not only against the dream thought but against the whole quality and language of the dream - a different type of resistance yet basically related to that which represses and censors a dream thought.

What is the nature of the physiological mechanisms which maintain this low level of motility during dreams? Dement & Wolpert (1958) pointed out the release of movement at the dream's end. Also Oswald (1961), on the basis of reticular formation studies conducted on animals, found that the lower anterior portion facilitates motor functions of the spinal cord, but the lower posterior section inhibits motion when stimulated. This inhibition was accompanied

by a low voltage EEG pattern, that is to say, an activated EEG rhythm, and moreover, one in which rapid eye movements are found. It is just such a pattern which is associated with dreaming in humans.

If there is a general reduction of motor activity during dreaming, and if there is a loss of recall following movement, then part of the inter-individual variance in daily dream recall might be explainable by variation in the level of body movement during sleep. Knowing that there are people who recall (relatively) much of their dream experience and those who recall little, what types of people might move greater or lesser amounts to account in part for these differences in recall?

One conceptual framework which could handle such differences was introduced by Cubberly (1923) who observed: "In a certain muscular, phlegmatic type of person, it (dream vividness) is correspondingly low, which is possibily the reason why some people of that type assert they never dream." A similar report came from Sheldon (1945) in his Varieties of Temperament:

> Somatotonics feel good in the morning. They love to jump out of bed, take a shower, make a lot of noise, and greet the sun . . . Somatotonic sleep is deep and seems to be relatively dreamless. Such sleep is refreshing and it may be that an explanation of the lower sleep requirement of people high in the second

> component lies partly in the fact that they sleep better or more thoroughly than do cerebrotonics. Whoever has attempted to use a dream analysis technique in the therapeutic or diagnostic study of somatotonic people is aware of the peculiar early difficulty which they present. Most somatotonics will state that they rarely dream and never remember their dreams on awakening.
>
> Cerebrotonics nearly always, and viscerotonics usually, are more or less aware of the trend of their own dreaming, and can without practice recite their recurrent dreams in some detail. But for individuals of predominant somatotonia an introduction to their own dream world often amounts to revelation, and the event not infrequently constitutes a religious (conversional) experience.

The extremely high correlations found by Sheldon between somatotonia and mesomorphy, cerebrotonia and ectomorphy, and viscerotonia and endomorphy have led him to use the terms almost interchangeably. Knowledge of the various body types and the factors which go into creating a dominance of a particular type have led to the suggestion that the variables of body movement and somatotype might be involved in a simultaneous or concurrent relationship to dream recall.

If movement dissipates recall, then those people who move a lot during sleep (and on awakening) should more likely recall fewer dreams than people who move little during sleep. This leads to the testable proposition that amount of dream recall should be related to somatotype, specifically that (a) subjects who are dominant on the

ectomorphy component will tend to report greater recall of dreams than subjects dominant on the component of mesomorphy. Secondary hypotheses that can be tested are: (b) that the dominant mesomorphs will report more movement during the night and on awakening in the morning; (c) that subjects who report greater body movement during the night will report less dream recall.

PILOT STUDY

As a first test of the hypothesis that ectomorphs as compared to mesomorphs will tend to report that they recollect their dreams more frequently, somatotype data from 93 male Boston College High School seniors were used, together with the results of a simple questionnaire on dreams administered within the framework of a study on delinquency, somatotype, and need Achievement.* The following are the dream questions subjected to statistical analysis:

Q1. How often do you dream?

Q2. How often do you recall what you dream about?

Q3. How many dreams that you had in the past can you now recall?

The first two questions were answered on a seven point scale ranging from "never" (1) to "almost every night" (7); the options are given in Appendix A. The third question required a simple quantitative estimate from the subject. The statistic first used to test the above hypothesis was the Pearson product-moment r which

*The items for this questionnaire were taken from a larger questionnaire designed by Kremen, and it was administered by Juan Cortez, of the Dept. of Social Relations, Harvard University.

assessed the relationship of the three body type ratings, ranging from 1 to 7 in half point steps, to the values of Q1 and Q2. The results of Q2 (rated frequency of dream recall) are listed in Table 1, where it can be seen that ectomorphy rating and frequency of dream recall are positively and significantly related while ratings on the other scales tend to be negatively related. (It must be noted that frequency of dream recall as used here is not a true measure of frequency, but rather a rating of that frequency.)

Table 1. Relationship of body type value to frequency of dream recall (Q2). N = 93

Body Type	Pearson *r*
Endomorphy	-.1275
Mesomorphy	-.1006
Ectomorphy	+.1704*

*$p < .05$

Sheldon (1940) has reported high intercorrelations of body types--for mesomorphy and ectomorphy -.64, for mesomorphy and endomorphy -.32, and for endomorphy and ectomorphy -.27. This means, for instance, that as mesomorphy goes up, not only ectomorphy but to some extent endomorphy also tends to go down. For the clearest picture of how this covariance effects the relationship to other

measures, one would have to use partial correlational techniques where it would be necessary to hold two components constant as one looks at the other. Techniques for such an analysis have been devised, but these require special computor programming for large samples, which unfortunately was not available at Michigan State University. Thus such an analysis could not be carried out.

The appropriateness of the Pearson r in testing the hypothesized relationship of body type to frequency of dream recall was placed further in question by the realization that Sheldon and Cubberly in their descriptions had referred to extreme or dominant types, i.e., persons characterized by a predominance of one component, i.e., a predominant body type, largely to the exclusion of the other types, while correlational techniques sampled the entire range of body type ratings. Parnell (1958) also observed that correlational techniques draw heavily on mid-range values in working with somatotypes and thus are a poor statistical tool for use in this area of research.

In order then to free the analysis from contamination by the uncontrolled effect of extraneous somatotype components, it is possible to approach the problem by use of extreme cases. However, previous research was far from clear-cut in defining a "dominant" or extreme type, favoring correlational

techniques to such a procedure. The rules for defining a "dominant type" decided on for use in this study were that the person's highest rating should be greater than 4, and that no cases would be considered dominant on a given type which had two components with a value of 4 or greater. This method delimited a group consisting of 17 dominant endomorphs, 4 mesomorphs, and 14 ectomorphs from the original sample of 93.

In comparing the mean rated frequency of dream recall and mean amount of dreams recollected for these extreme body types, the F test was used; only the second question: "How often do you recall what you dream about? and third: "How many dreams that you had in the past can you now recall?" questions were tested since the first: "How often do you dream?" had shown a negative, insignificant correlation to the three body types. Table 2 presents the mean frequency of recall and mean number of dreams reported for the dominant body types.

Though in the expected direction these means were not significantly different; an F value of 3.30 is needed for significance in this instance. Two factors which might account for this non-significance are the small sample size, especially for the mesomorphic group, and high "within groups" variance, noted especially in Q3. Individual comparisons by means of the t test also proved to be insignificant.

Table 2. Mean rated frequency of dream recall (Q2) and mean number of dreams recollected (Q3) for the dominant types. N = 35.

Body type	Q2 Means	MSw	Q3 Means	MSw
Endomorphs (17)	3.53	2.13	4.41	4.59
Mesomorphs (4)	4.00	2.00	3.50	1.25
Ectomorphs (14)	4.57	3.81	5.57	12.81
F value	1.36 (n.s.)		1.07 (n.s.)	

Since Q2 was somewhat difficult to answer precisely, it was conjectured that the seven step scale in use may have lent itself to artifact. To eradicate the possibility of such a factor, a grosser measure was devised by dichotomizing Q2 into low, i.e., 1 through 4, and high, i.e., 5 through 7, for a non-parametric analysis. Table 3 gives the results of the Chi-square analysis of these data.

Table 3. Observed and expected ( ) frequency dream recall (Q2) responses of the dominant types. N = 35.

Dominant Type	Low Recall	High Recall
Endomorphs	13 (10.2)	4 (6.8)
Mesomorphs	3 (2.4)	1 (1.6)
Ectomorphs	5 (8.4)	9 (5.6)
$X^2 = 5.71$; ($X^2_{.90} = 4.60$ and $X^2_{.95} = 5.99$ for 2 df)		

The above Chi-square, significant between the .10 and .05 levels, as well as the Pearson values to a more

limited degree, lends support for the hypothesized relationship between dream recall and body type to a sufficient degree to warrant further investigation. This is especially true in the light of two factors which might be operating to dampen the differences between types, namely, the smallness of the mesomorphic group and an apparent bias found in either sampling or somatotyping. Sheldon's original sample of 2,000 men contained the following percentages of cases rated 4 or greater; mesomorphs 59%, endomorphs 31%, and ectomorphs 41% whereas this pilot group had 21% of mesomorphs, 35% of endomorphs, and 23% of ectomorphs rated above that value. This could mean that whatever factor was influencing mesomorphy ratings might also be operating on the other components.

Several procedural modifications were suggested by this pilot study. First, a technique of sampling which would ensure subjects dominant on a given type was necessary. Secondly, a reliable body typing technique was important. Thirdly, these data should be assessed by F and *t* tests on the dominant type differences with use being made of a Chi square analysis if high variance or other factors should dampen out the magnitude of the differences of the dominant's means though in the hypothesized direction.

METHOD

Subjects

The subjects drawn from the Health, Physical Education, and Recreation (HPER) classes at Michigan State were predominantly freshmen. In the fall term approximately one half of the students received estimate somatotypes by group consensus in their classes. Under the supervision of their instructor they inspected the physiques of their classmates and agreed upon the body type rating which would best fit the person rated.

Of the 1,585 students in the sections which carried out this operation, 418 subjects either failed to report their somatotype or had a somatotype rating with a tie for the dominant type, e.g., 4-4-3. These inspectional somatotypes were gathered from cards kept by the student on his performance throughout the fall term in his HPER class. In order to classify the remaining students, the rules of the pilot study were used, namely, the dominant type must be above 4, and there must not be two body components 4 or over. Some examples of cases not fitting these rules would be 6-5-1 and 4-3-3 ratings. Of cases not meeting the criteria,

387 were high on mesomorphy, 272 high on ectomorphy, and 107 high on endomorphy.

The remainder of the sample, i.e., those meeting the criteria and therefore more extreme on a given body type by subjective judgment, are given in the table below:

Table 4. Number of subjects meeting the criteria for dominance listed by level of body type rating. N = 401.

Value	Endomorphs	Mesomorphs	Ectomorphs
4.5	7	33	7
5.0	40	156	50
5.5	2	12	4
6.0	14	41	27
7.0	2	1	5
Totals	65	243	93

From these students a pool of 50 extreme cases of each type was established; those with the highest rating (7.0) were taken first and so on down the line until the quota of 50 for each type was filled. Where there was a tie for the dominant type rating, for example, in selecting subjects # 19 through # 50 from those rated 5.0 on endomorphy, the criterion used was the largest gap to the second highest rated body component. From this group of 150, all subjects were drawn; however, they were only included

for final analysis in this study if they met the criteria for body type dominance after being typed by the Parnell technique described below.

A slight modification was made in the rules for qualification as a dominant type when the Parnell technique was employed. Subjects were included if their dominant component were greater than 4.0, and if there was a gap of at least 1.0 to the next highest type. Subjects having two types greater than 4 were included, if they had a gap of, at least, 1.5 to the next highest type. This latter rule was added to include subjects who were obviously dominant types, but who would have been rejected by the previous rules. Of the 86 members from the above pool who were willing to serve as subjects, 16 endomorphs, 20 mesomorphs, and 19 ectomorphs were demarcated as dominant on their respective types.

Procedure

The inspectional ratings of body type given in the HPER courses were, obviously, of questionable reliability and validity. Among the possible factors of bias were the inexperience of the raters, central tendency of ratings, social desirability, and other group suggestibility phenomena. Sheldon's photoscopic method of body typing, which assesses

measures by detailed judgments of three standardized, posed photographs, has been most popular in research to date, but was considered unfit for this study on several counts. It requires an expensive camera and other equipment, trained investigators are needed to rate the photographs of the three standard poses, and volunteer subjects might refuse to be photographed nude as required by this method.

The Parnell technique, described fully in Behavior and Physique: an introduction to practical and applied somatometry, presented an alternative means of somatotyping which was reasonably fast and required only several pieces of easily accessible apparatus. It uses direct body measures of height and weight as well as two muscle measures two bone measures, and three measures of subcutaneous fat. All of these are referred to a table, given in Appendix B, from which the somatotypes are calculated. A more detailed explanation of the Parnell technique is given in Appendix C.

In attempting to establish the validity of his method as a measure of somatotype, Parnell cites its relation to the Sheldon technique:

> The present M.4 method (that used in the present study) and photoscopic interpretation differ slightly more, not particularly in the first (endomorphy) and third (ectomorphy) components, but in the second component (mesomorphy) discrepancies exceeding ½ a unit occurred in about one third. The second

> component is, however, the most difficult to assess photoscopically, and discrepancies exceeding ½ a unit occurred in 17% of mesomorphic estimates by expert photoscopic somatotypists (Tanner, 1954).

Apparatus

The instruments used for somatotyping were very similar to those described by Parnell. An engineer's sliding steel calipers for bone measures were equipped with a vernier scale; and the calipers used for subcutaneous fat measures were made by the Wenner-Gren Company. These are like the Harpenden calipers used by Parnell in that both have a spring pressure of 10 gm./sq. cm. which remains relatively constant over the entire range of apertures. The Wenner-Gren calipers have a face or gripping surface 6.5 mm. x 4.7 mm. while the Harpenden calipers measure 15 mm. x 6 mm. in surface dimensions. A flexible measuring tape with subdivisions for every 1/8 inch was used for the muscle measures.

Questionnaire

(See Appendix D.) This questionnaire contains 54 items on dreams and on sleep and waking. The dream section has, in addition to a descriptive item of dream experience, 8 items on frequency of or qualitative aspects of dream recall, 2 on waking during the night, and 3 concerning

relationship between dreams and subsequent moods. To complete the dream section there are 9 questions on subjective control of waking and dreaming, 3 concerning awareness of dreams while dreaming, and 6 questions about hypnagogic imagery.

The 22 questions of the sleep and waking section are divided into 7 on sleep arrangements or ease of going to sleep and 8 on movement during sleep (2 on body movement, 2 on talking, and 4 on walking); 5 questions on activity upon awakening, and 2 general questions round out the list. A face sheet asks for demographic data.

Many of the items come from questionnaires used in previous studies by Kremen (1961), one for general assessment of dream experience and another, on sleep, to screen subjects for laboratory investigation; the questions used by Cortez came from the dream questionnaire used by Kremen to elicit certain quantitative and qualitative aspects of ordinary dreaming.

In addition to these items which comprised the bulk of the questionnaire, special items were devised for this study. First were the body movement items which were included to see if the amount reported were related to either somatotype or to frequency of dream recall and amount of dreams remembered. These new items are given below:

S6 How often do you move around in bed while you sleep? (3 options)

S6a How do you know that you move around in bed while you sleep?

S16a When you wake in the morning, do you ordinarily . . . (4 options)

S17 When you wake in the morning, do you ordinarily . . . (4 options)

These items were included because people are sometimes told by others that they move a lot in their sleep; or they might be able to assess their movement by other means. Questions from the earlier studies, namely,

S3 Do you fall asleep easily? and

S5 In general, do you sleep . . . (4 options), also might give some reflection of body movement and were accordingly analyzed along with the above body movement items. Also six questions about sleep walking and talking were included with a view toward possibly greater mesomorphic activity along these lines.

Two dream items were revised for this study. The second question of the dream section (D2): "How often do you recall what you dream about?" is Q2 of the pilot study; however, the seven point scale was extended to eight options. This was done to make the intervals between the choices more

uniform. Another revised item was D3: "Of the dreams you have had in the past, how many can you recall something of now?" This is Q3 from the pilot study with the addition of a standardized time, five minutes, for trying to recollect dreams.

RESULTS

The somatotype measures in this study raised two questions of reliability. First, there was the reliability of the Parnell measures; this was assessed by having two raters, the author and Mr. John Ross, a graduate student from the HPER Department, independently take body measures on twenty subjects used in this project. The Pearson product-moment correlation showed the two ratings to be correlated .94 on the endomorphy component and .97 on the mesomorphy component. Only one set of ratings of the 40 sets compared was discrepant by more than half a unit. No correlation is available for ectomorphy since the height and weight measures were taken simultaneously, hence in complete agreement, by both raters. The rating for ectomorphy is computed from a height/weight ratio.

Table XI: Percentile values of r when $\rho = 0$ in Walker and Lev, Statistical Inference, shows both of the above correlations to be highly significant ($p < .0005$). No test-retest inspection was attempted but the above values have established that the Parnell technique can be extremely reliably measured intersubjectively, i.e., by different raters.

The second question of reliability pertains to the correlation of the HPER somatotype ratings, those given by group consensus after inspection, to the Parnell ratings. Using all 86 subjects who volunteered for the research, the inspectional endomorphy ratings correlated .69 with the author's Parnell endomorphy values; mesomorphic estimates correlated .75 for the two methods while the ectomorphy component had a slightly higher .78 relationship. These three correlations are highly significant ($p < .0005$).

Another problem of reliability involved in this study was that of the questionnaire items. In order to establish a measure of the intra-subjective reliability of various items, the questionnaire was mailed to the 54 subjects used in this study after an elapsed interval of one to three months from somatotyping and filling it out the first time. Twenty-four subjects complied to this second step - providing a group for test-retest reliability. Unlike many devices, the items of this questionnaire did not lend themselves to the compilation of a total score. This meant that individual items would have to be examined for reliability estimates; only those pertinent to this study were inspected.

For question D2: "How often do you recall what you dream about?" with its 8 options and for the open-ended

question D3: "Of the dreams you have had in the past, how many can you recall something of now?" a correlational measure appropriately assesses the test-retest reliability. The Pearson *r* for the first question was .73 and for the latter it was .86. That the probability for such values is less than .0005 is good evidence that subjects answer essentially the same on retest.

The other items did not lend themselves to a correlational approach to measuring their reliability since they had four or less choices in most cases. The only appropriate analysis under such limited options was to use the technique devised by Bush and Mosteller for matching problems, and presented in the Handbook of Social Psychology, Vol. 1, Chapter 8. Upon viewing Table 5 it can be seen that, like D2 and D3, the selected dream questions seem moderately reliable. However, the sleep items become more dubious and those pertaining directly to body movement: S6 "How often do you move around in bed when you sleep?" and S16a: "When you wake in the morning, do you ordinarily . . ." are especially questionable. While all probabilities are significant beyond the .05 level, it must be remembered that the Bush and Mosteller statistic was established for matching problems such as predicting diagnoses from Rorschachs and thus a higher significance should be set for reliability estimates.

Table 5. Test-retest reliability for selected questionnaire items. N = 22 through 24.

Dream Section	t_{∞} value	Probability
Question D6	3.44	($p < .001$)
Question D27	2.53	($p < .005$)
Sleep and Waking Section		
Question S3	1.78	($.05 > p > .01$)
Question S5	2.76	($p < .01$)
Question S6	1.71	($.05 > p > .01$)
Question S16a	1.76	($.05 > p > .01$)
Question S17	2.44	($p < .01$)

The major hypothesis was tested by means of F tests on the dominant somatotypes' mean answer to D2 "How often do you recall what you dream about?" and to D3 "Of the dreams you have had in the past, how many can you recall something of now?". While the means were in the expected direction, the statistical tests do not reveal even a trend toward significance. Table 6 presents these findings.

Further analysis of D2 dichotomized into more global "high" and "low" frequency of recall categories as well as investigation of D6 "How often do you wake up with the impression that you had dreamt, yet you are unable to recall what your dream was about?" by means of the Chi square test was carried out. Table 7 likewise shows no support for the main hypothesis.

Table 6. Frequency of dream recall and amount of dreams remembered for the dominant somatotypes.

Question		Endos	(N)	Mesos	(N)	Ectos	(N)	F Value
D2	Mean	4.68	(16)	4.60	(20)	4.79	(19)	.049
	Variance*	3.21		4.40		2.79		
D3	Mean	5.33	(15)	5.17	(18)	6.05	(18)	.036
	Variance*	20.55		17.80		29.05		

F value for .10 level two tailed for 2,48 df = 3.19
and for 2,52 df = 3.17

*Within.

Table 7. Further measures of the frequency of dream recall - body type relationship.* N = 55.

Question	Chi square value	
D2	.40 (.90 > p > .75)	2df
D6	2.60 (.75 > p > .50)	4df

*See Appendix E - Tables A and B for the obtained frequencies.

To test hypothesis (b) that the dominant mesomorphs will report more movement during the night and on awakening in the morning, several questions related to body movement were inspected:

S5 In general, do you sleep . . .

S6 How often do you move around in bed while you sleep?

S16a When you wake in the morning, do you ordinarily . . .

S17 When you wake in the morning, do you ordinarily . . .

Table 8 shows that only two items approach significance: the first (S5 "In general, do you sleep . . .") because ectomorphs tended to report lighter sleep, endomorphs more often claimed to sleep "like a log," and mesomorphs preferred the median sleep "soundly" category. This might be seen as contradicting the hypothesis since ectomorphs sleeping more lightly might move more often than the others. At least, no support is found for the hypothesis; nor is any support found in S11: "Have you been told by others that you walk in your sleep?" where more endomorphs reported sleep walking, supplying a trend toward significance. Table 8 lists these results.

Table 8. Body movement reported by the dominant somatotypes.* N = 55.

Question	Chi square value	
S5	8.66 (.10 > p > .05)	4df
S6	.53 (.98 > p > .95)	4df
S9	3.39 (.25 > p > .10)	2df
S11	5.67 (.10 > p > .05)	2df
S16a	1.61 (.95 > p > .90)	6df
S17	1.31 (.90 > p > .75)	4df

*See Appendix F - Tables C through H for the obtained frequencies.

To test hypothesis (c) that subjects who report greater body movement during the night will report less dream recall, the entire sample of 86 subjects was used to select extreme answers to four questions related to body movement:

S5 In general, do you sleep . . .

__*__like a log

____soundly

_x__lightly

_x__so lightly as to be easily disturbed

S6 How often do you move around in bed while you sleep?

_x__frequently

____moderately often

_*__occasionally

S16a When you wake in the morning, do you ordinarily . . .

_*__lie in bed trying to go back to sleep

____lie in bed thinking of one thing or another

____get immediately out of bed, but sit around drinking coffee, etc.

_x__get immediately out of bed, wash, shave, etc.

S17 When you wake in the morning, do you ordinarily . . .

_x__feel wide awake immediately

____require five to fifteen minutes before you feel wide awake

__*__ remain sluggish for as long as an hour or even longer

This presented a dichotomization into high movement (those answering questions above *) and low movement (those selecting x answers) groups. Table 9 presents t tests for the means of rated frequency of dream recall.

Table 9. Mean rated frequency dream recall for subjects "high" and "low" on reported body movement. Variable N.

Question (N)	"High" Ss	"Low" Ss	t value
S5	5.14 (14)	4.00 (16)	1.76 (.10 > p > .05)
Variance	1.90	3.20	
S6	5.03 (35)	4.72 (22)	.53 (p > .50)
Variance	2.78	3.08	
S16a	4.94 (24)	3.85 (12)	1.85 (.10 > p > .05)
Variance	3.00	2.96	
S17	5.35 (17)	4.36 (11)	1.76 (.10 > p > .05)
Variance	1.49	3.05	

Inspection of Table 9 reveals several items in which the high movement group reports greater frequency of dream recall. This is in opposition to the hypothesized relationship, so no support for the third hypothesis is found. Investigation of D3: "Of the dreams you have had in the past, how many can you recall something of now?" by means of t tests on the dichotomized movement groups yielded the results shown in Table 10.

Table 10. Mean amount of dreams remembered by subjects "high" and "low" on reported body movement. Variable N.

Question (N)	"High" Ss	"Low" Ss	t value
S5	6.25 (13)	4.12 (15)	1.17 (.40 > p > .20)
Variance	26.02	19.58	
S6	5.52 (35)	5.41 (19)	.09 (p > .50)
Variance	23.27	17.38	
S16a	7.13 (23)	4.44 (11)	1.66 (.20 > p > .10)
Variance	1.49	1.13	
S17	6.50 (16)	5.54 (11)	.48 (p > .50)
Variance	19.12	31.88	

This table again shows the trend for higher recall for the high movement group in contradiction to the hypothesis.

DISCUSSION

The major hypothesis that subjects who are dominant on the ectomorphy component will tend to report greater recall of dreams than subjects dominant on the component of mesomorphy received no direct support from the questionnaire since not even a trend toward significance was shown for either dream recall or amount of dreams remembered. The explanation for the non-significant relationship may lie in the "fuzziness" of dream recall under these conditions, for the reliability reported may represent a good memory for what was reported upon first administration and not for actual frequency of dream recall. Another factor aiding non-significant results might have been the change from 7 to 8 options on the frequency of dream recall item. Though done in an attempt to make the gap between options more uniform, it might have presented too confusing a choice and thus led to haphazard answering. A dream diary taken daily for, say, a month would present, perhaps, a more valid as well as a more reliable measure.

No seeming bias was evident in the sample chosen since Sheldon's observations for recall differences across types were made on males; and the present study's exclusive

use of college freshmen would not seem to be an important variable, as Schonbar found no age differences in her high and low recall groups. However, it must be noted that Sheldon's original sample was a rather unique group for Harvard undergraduates are a population different from, say, public university students; also the technique of assessing dreaming along with other personality characteristics by a series of interviews over a year's time might have led to a conditioning effect with this group. Possibly the change in sleeping habits, for example, shorter hours or pressure on awakening to rush to classes, might have flattened out differences between groups in this study, but no comments on lessened recall at school was noted. In considering the trend toward significance of the pilot group from Boston and the lack of such a tendency found in this study, the suggestion of a cultural bias arose. Since the sample was drawn from a Catholic high school in Boston there should be a very high percentage of Irish and Italians. It could be that in these ethnic subcultures some special value is placed on dreaming. However, no higher rated frequency of dreaming was noted in these groups.

The second hypothesis that the dominant mesomorphs would report more body movement was not upheld; S5 "In

general, do you sleep . . ." and S11 "Have you been told by others that you walk in your sleep?" were the only related questions showing meaningful differences. The first question approaches significance because ectomorphs tended to report lighter sleep, mesomorphs chose the median value more, and endomorphs claimed more often being very sound sleepers. This would lead to the impression that ectomorphs being more fitful sleepers either reach marginal states of awareness more often during the night or else remember more of these states. This does not directly indicate greater movement without additional information from the other movement questions, but there is an implication of greater motility -- contradicting the hypothesis. The greater sleepwalking reported by endomorphs also is in opposition to the expected results.

One possible explanation for differences on S5 is suggested by inspecting the relation of body type to choice selected on this item. In many cases choice may have reflected self-concept rather than actual sleep experience. Thus the more fragile ectomorphs report "light" sleep with the slower, bulky endomorphs claiming "log-like" sleep.

The non-significance of other items related to the second hypothesis may have been a function of the unreliability noted for the body movement questions. This unreliability might be accounted for by two factors: lack

of direct information and semantic differences. Knowledge of movement comes from a second-hand source or from inferences drawn about the condition of the bed coverings in the morning. The semantic problem is best illustrated by the subject who reported occasional falling out of bed from excessive movement during sleep as well as covers in a complete mess; he marked the least movement alternative.

It has been noted earlier that the reliability may seem spuriously high because the technique was devised for matching problems and a higher significance level would seem appropriate for reliability investigations. Two other factors falsely elevating the correspondence of test-retest answers must be pointed out. First, there is the possibility of remembering the answer given on the first testing and, secondly, the subjects who repeated, the procedure -- by the very fact that they went through it -- are a select group. Their greater interest may have heightened the reliability. Only 24 of 52 subjects responded; what effect the non-respondents would have had on the reliability estimates would be of some interest.

The final hypothesis that greater body movement report would be associated with less reported recall of dreams was also contaminated by the lack of reliability of the body movement questions. However, the trend for this

relationship from the questionnaire was not in the hypothesized direction. From the more reliable questions, both the "light sleepers" of S5 and the "immediately wide awake" group of S17 ("When you wake in the morning, do you ordinarily . . .") reported greater dream recall, both of these carrying the implication of greater movement during sleep or on rising.

How might the relationship of frequency of dream recall and amount of dreams remembered to body movement be more successfully assessed? It seems mandatory that further research utilize objective movement records which, unfortunately, was not feasible in this study. The questionnaire approach simply does not measure this variable of body movement. Laboratory studies of body movement might support the relationships hypothesized.

Another question arises in relation to the "dream" measures used. As has been pointed out, the frequency of dream recall is not a true frequency, but only a recollection of what the true frequency was. While this means of assessing dream recall may be reliable inasmuch as subjects will consistently answer the same, it is not necessarily a valid measure.

Some very indirect reasoning from the results of different questions might seem to support greater dream

recall by the ectomorphs. For they more often report sleeping lightly, and the light sleeper group of S5 reported greater frequency of dream recall. Inspection of the "light sleeping" ectomorphs shows no greater recall compared to the other light sleepers and thus does not account for the appreciably higher rated frequency of dreaming for this group.

An incidental finding of this project was the high reliability of the inter-rater measures of body type. The correlations found for untrained raters might, indeed, offer support for Parnell's suggestion that his method removes some of the artistic element from somatotyping in favor of more reproducible, scientific elements.

Another finding deals with the inspectional body type estimates used by the HPER Department for several years. The reliability of these estimates compared with the Parnell measures is reasonably high and the results, at least, support this inspectional system as a good measure of the predominant type. Only one subject was inspected as being dominant on one type (mesomorphy) and received another type (endomorphy) upon measuring by the Parnell technique; he reported a 20 pound weight gain in the interval between the two measurings. It might seem that the high correlations found resulted solely from the use of dominant types. However, it must be remembered

that the correlation given for, say, mesomorphy represents also the mesomorphic estimates for dominant endomorphs and ectomorphs as well as the measure of the dominant mesomorphs.

SUMMARY AND CONCLUSIONS

The major purpose of this study has been to test the relationship of body type to ordinary, i.e., non-laboratory recall of dreams. Data from a pilot study provided tentative support for the hypothesis that ectomorphs will report a greater frequency of dream recall than mesomorphs or endomorphs. Also tested in this study were the relationship of reported body movement to frequency of dream recall as well as the relationship of reported body movement to body type.

A pool of subjects was drawn from a group of freshmen who were inspectionally rated in their HPER classes at the extreme upper end on one of the three body types: endomorphy, mesomorphy, and ectomorphy. They filled out a questionnaire on their dream and sleep activity, and activity on awakening. They were simultaneously somatotyped by the Parnell technique, and the criteria set up for delimiting dominant or extreme cases yielded a group of 16 endomorphs, 20 mesomorphs, and 19 ectomorphs. The Parnell technique measures body type ratings directly from the subject's height and weight as well as measures of his bone and muscle size and amount of subcutaneous fat. The inter-rater

reliabilities for two of the three body scales were .96 and .94; measures for the third scale were taken simultaneously when two raters were used.

No evidence of support was found for differences in frequency of dream recall or amount of dreams remembered across the groups of dominant body types. Lack of support for even greater frequency of dream recall by the dominant ectomorphs found in the pilot study might be attributed to changes in the items measuring memory of dreaming. Though seemingly reliable, the dream recall items possibly were not valid; a truer frequency measure would be a dream diary kept over a span of time.

No supporting evidence was gathered for the hypothesized relationship of body movement to either body type or to dream recall on the basis of the questionnaire data. No conclusions can be drawn since the body movement questions were found to be too unreliable to accept as a measure of this variable. Since questionnaire methodology failed entirely in this area of measurement, only direct laboratory measurement of body movements seems appropriate for use in future research.

An incidental finding was the extremely high inter-rater reliability found for the Parnell measures of somatotype assessed by untrained raters. Its ease of

administration and the high reliability shown establish the Parnell technique of somatotyping as a very useful tool for research involving somatotype. The relatively high correlation of the inspectional measures of the HPER Department with the Parnell measures lend some support for this system as at least a good approximation to the subject's dominant body type.

This study found little evidence for the capability of a questionnaire technique to measure either the variable of body movement or that of dream recall.

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APPENDIX A

PILOT STUDY QUESTIONNAIRE

Q1 How often do you dream?

_____ almost every night

_____ 2 to 5 times a week

_____ once a week

_____ 2 to 3 times a month

_____ once a month

_____ less than once a month

_____ never

Q2 How often do you <u>recall</u> what you dream about?

_____ one dream almost every day

_____ 2 to 5 dreams a week

_____ one dream a week

_____ 2 to 3 dreams a month

_____ less than one dream a month

_____ never

Q3 How many dreams that you had in the past can you now recall?

APPENDIX B

ADULT DEVIATION CHART OF PHYSIQUE (Male Standards)

NAME..... AGE..... *18* ..... DATE .....

OCCUPATION..... Married/Single. Ch.: M.....F..... REF. No. .....

Fat : (Skinfold)		Age	Total 3 Skinfold Measurements													
(mms.)	Over triceps ... *18* ...	16—24	12	15	18	22	27	33	40	48	(59)	68	83	100	120	
	Subscapular ... *22* ...	25—34	15	18	22	27	33	42	50	59	70	84	101	120	142	
	Suprailiac ... *17* ...	35—44	17	21	25	30	37	46	55	66	78	95	116	138	162	
	Total fat ... *57* ...	45—54	18	22	27	32	40	49	59	71	84	102	124	147	172	
ENDOMORPHY Estimate			1	1½	2	2½	3	3½	4	4½	(5)	5½	6	6½	7	
Height (ins.) ... ... *67·0*		... 55·0	56·5	58·0	59·5	61·0	62·5	64·0	65·5	(67·0)	68·5	70·0	71·5	73·0	74·5	76·0	77·5	79·0	80·5
Bone : Humerus *6·8*		... 5·34	5·49	5·64	5·78	5·93	6·07	6·22	6·37	6·51	6·65	(6·80)	6·95	7·09	7·24	7·38	7·53	7·67	7·82
(cms.) Femur ... *9·5*		... 7·62	7·83	8·04	8·24	8·45	8·66	8·87	9·08	9·28	(9·49)	9·70	9·91	10·12	10·33	10·53	10·74	10·95	11·16
Muscle : Biceps ... *31·6*		... 24·4	25·0	25·7	26·3	27·0	27·7	28·3	29·0	29·7	30·3	31·0	(31·6)	32·2	33·0	33·6	34·3	35·0	35·6
(cms.) Calf ... *36·3*		... 28·5	29·3	30·1	30·8	31·6	32·4	33·2	33·9	34·7	35·5	(36·3)	37·1	37·8	38·6	39·4	40·2	41·0	41·8
First estimate of mesomorphy ...			1	1½	2	2½	3	3½	4	4½	(5)	5½	6	6½	7	
Correction for fat (T.F. mms.) ...			12	15	18	22	27	33	40	48	(59)	68	83	100	120	140
Age : 16—24			+½	+½	+½	+½	0	-½	−½	−1	(−1½)	−2	-2½	-3	−4	
25—34			(+½)	+½	+½	+½	0	½	−½	−½	−1½	−1½	-2½	-2½	−3½	−4
35+			(+½)	(+½)	+½	+½	0	-½	−½	−½	−1	-1½	-2	-2½	-3	−3½
MESOMORPHY (corrected estimate)			1	1½	2	2½	3	(3½)	4	4½	5	5½	6	6½	7	

Weight	Wt. lb.	H.W.R.	Age													
Present			18	12·1	12·3	12·5	12·7	(12·9)	13·1	13·3	13·5	13·7	13·9	14·0	14·2	14·4
H.K.W.			23	11·7	12·0	12·2	12·5	12·8	13·0	13·2	13·4	13·6	13·8	14·0	14·2	14·4
Usual			28	11·5	11·8	12·1	12·4	12·6	12·9	13·0	13·3	13·5	13·7	13·9	14·2	14·4
At 18 years			33	11·3	11·7	12·0	12·3	12·5	12·7	12·9	13·2	13·4	13·6	13·8	14·1	14·4
At 23 years			38	11·2	11·5	11·8	12·1	12·3	12·5	12·8	13·1	13·3	13·6	13·8	14·1	14·4
Recent change			43+	11·1	11·4	11·7	12·0	12·3	12·6	12·8	13·1	13·3	13·6	13·9	14·1	14·4
ECTOMORPHY				1	1½	2	2½	(3)	3½	4	4½	5	5½	6	6½	7

FIG. 1. The M.4 style of adult deviation chart for physique. The measurements of a phenotype 554 have been ringed and the phenotype may be read direct from the chart.

APPENDIX C

PARNELL TECHNIQUE OF SOMATOTYPING

Height is taken in inches. The subject stands back to a wall scale, takes a deep breath and stretches up to maximum height, his heels remaining in contact with the ground.

Weight is recorded to the nearest pound. Up to one pound is deducted for the weight of underclothes permitted and worn.

Bone measurements (in centimetres). The distance between the median and lateral epicondyles of the humerus and of the femur are measured. The humeral epicondyles are the bony points at the elbow felt on either side when the upper arm is held forward horizontally and the forearm is bent upwards at right angles.

The femoral epicondyles are measured with the subject sitting on a chair with his foot on the floor and leg vertical; the distance required is the maximum bony width immediately above the line of the knee joint, with which the leg in this position may be felt as a horizontal groove on both the inside and outside of the knee at the level of the lower border of the patella or knee cap. Engineer's sliding steel calipers fitted with 3 inch arms are used.

The venier scale commonly fitted is an unnecessary refinement. Indeed, ordinary steel outside curved calipers with screw adjustment and quick release were originally used; calipers of this kind are less expensive but the technique takes longer and time is important where large numbers have to be measured. The points of the calipers, with the measurer's index finger alongside, are placed against the tip of each epicondyle and the subject himself tightens the screw. A steel centimetre rule allows the distance between caliper points to be measured to 0.5 mm. To prevent scratching the skin, the caliper points, which have previously been smoothed with a file, are carefully eased away with the forefingers from the underlying skin. Alternatively, the split screw may be released so many turns to withdraw the calipers and subsequently tightened by the same amount. In very obese persons, straight arm sliding calipers give femoral readings up to 0.3 mm. more than pointed calipers because the points dip more closely to the bone. The chart standards were derived from the original measurements with pointed calipers, not the sliding arm instrument, but in the absence of obesity, if firm pressure is applied the difference between may be ignored.

Muscle girth measurements (in centimetres). Biceps girth is taken with a soft and very flexible steel tape

over a tensely contracted biceps with the elbow fully flexed. Calf girth is taken with the subject standing with legs slightly apart; the maximum girth being recorded. Both girth measurements are taken with the tape in light contact with the skin. In the case of bone and muscle girths, both sides of the body are measured both as a check and to select the larger, if they differ, for entry on the chart. The larger measurement commonly indicates the dominant side of the body.

Skinfold measurements of subcutaneous fat (in millimetres) are recorded with subcutaneous tissue calipers at three sites:

1. Subscapular. The skinfold is raised with the thumb and forefinger of the left hand over the angle of the right scapula (lowest angle of the shoulder blade), the skinfold running downwards and outwards in the direction of the ribs.
2. Suprailiac. The skinfold is raised, as before, with the left hand in a position 1 to 2 inches above the anterior superior iliac spine (the promontory at the front end of the hip bone) so that the fold runs forwards and slightly downwards.
3. Over triceps muscle, halfway between the acromion and the olecranon (the outermost bony tip of the shoulder and the point of the elbow) on the back of the upper arm. Muscle fibres are excluded, if necessary, by locking the elbow joint momentarily in full extension.

The sum of these three subcutaneous fat measurements is used as an indication of the total amount of subcutaneous fat in the body.*

All of the above measures are referred to the M.4 chart listed in Appendix B.

(Taken from Parnell, 1958, pp. 14-15)

*In the present study Parnell's suggestion that the fat measures be taken after an interval of five seconds to allow for settling was found to be very important. The first set of fat measures were not as reliable as hoped for but when a standardized interval was imposed upon the fat measures, inter-rater reliability increased. It is felt that this suggestion should be incorporated as an integral step in the procedure. Inter-rater reliability does not include the first set of measures, however, the author did reassess this group with the standardized five second interval for fat measures.

APPENDIX D

Name:

Age:

Date of Birth:

Today's Date:

Sex:____M____F

College:

Year:

Major:

Home Town:

Approximate Population of Town:

Do you live on a farm?

Father's Occupation:

Mother's Occupation:

Father's Education (Through what grade or year in college):

Mother's Education (Through what grade or year in college):

Race:

Ethnic Background:

Religious Affiliation:

Name _____

. . . . . .

Code Number_____
Date_____

A QUESTIONNAIRE ON SLEEP AND WAKING

INSTRUCTIONS: Please read each of the questions carefully. Most of the questions involve choosing between various alternatives. But where you are asked to give more specific information, please do so with as much completeness as you can.

1. At what hour do you usually retire?_____

2. How many hours do you normally sleep per night?_____

3. Do you fall asleep easily?

___rarely
___always
___usually
___never

4. Have you ever had any difficulty in going to sleep?

___yes
___no

5. In general, do you sleep. . .

___like a log
___soundly
___lightly
___so lightly as to be easily disturbed

6. How often do you move around in bed while you sleep?

___frequently
___moderately often
___occasionally

6a. How do you know that you move around in bed while you sleep?

7. When you sleep in new surroundings (in a room and bed other than your own), do you sleep. . .

___like a log
___soundly
___so lightly as to be easily disturbed
___lightly

8. Do you sleep without difficulty in noisy surroundings?

___always
___usually
___never
___rarely

9. Have you been told by others that you talk in your sleep?

___yes
___no

10. If the answer to question 9 is "yes," is it reported that you talk in your sleep. . .

___frequently
___moderately often
___occasionally

11. Have you been told by others that you walk in your sleep?

___yes
___no

12. If the answer to question 11 is "yes," is it said that you walk in your sleep. . .

___frequently
___moderately often
___occasionally

13. Do these sleep-walking episodes still occur?

___yes
___no

14. If the answer to question 13 is "no," at what age did sleep-walking cease?

15. In general, do you rely upon. . .

___being wakened by extraneous means (alarm clock, someone calling)
___waking naturally
___both equally often

16a. When you wake in the morning, do you ordinarily. . .

___a. lie in bed trying to go back to sleep
___b. lie in bed thinking of one thing or another (going over a dream, daydreaming, planning for the day, some other)
___c. get immediately out of bed, but sit around drinking coffee and/or smoking
___d. get immediately out of bed, wash, shave (if male), and generally ready yourself for the day's activities

16b. If the answer to question 16a is b, which of the alternatives given in the parentheses to b, is the one you most frequently think about.

17. When you wake in the morning, do you ordinarily. . .

___feel wide awake immediately
___require five to fifteen minutes before you feel wide awake
___remain sluggish for as long as an hour or even longer

18. When do you usually feel most like working?

___mornings
___afternoons
___evenings
___late at night

19. Below you will find a list of activities that commonly occur following arousal from sleep. Arrange by number the activities in some sequence that corresponds to your most usual one, though you need not include each activity.

___ exercise
___ lie in bed 5 minutes or longer
___ urinate
___ defecate
___ wash
___ shave
___ drink coffee
___ eat breakfast
___ daydream
___ dress
___ reflect on one's dreams
___ work (study, class, other)
___ smoke
___ plan the day's activities
___ engage in extended social activities

20. After retiring, but before falling asleep, do you tend most often. . .

___to daydream
___to go over the highlights of the preceding day
___to think about the morrow

(Check one alternative only.)

Name_____

. . . . . .

Code Number_____
Date_____

QUESTIONNAIRE ON DREAMS

INSTRUCTIONS: Please read each of the questions carefully. Most of the questions involve choosing between various alternatives. But where you are asked to give more specific information, please do so with as much completeness as you can.

1. In the light of your own experience, describe what you think distinguishes dreaming from waking experience. Use your own words to express what you think distinguishes your experience in dreams from other experience. We are concerned with what you perceive to be the difference and with how you define dreaming--<u>not</u> with what you may have heard or learned in some class or read about dreaming.

Use other side if necessary.

2. How often do you recall what you dream about?

___one dream or more almost every day
___3 to 6 dreams a week
___approximately 2 dreams per week (5 to 7 dreams per month)
___one dream a week
___2 to 3 dreams a month
___one dream a month
___less than one dream a month
___never

3. Of the dreams you have had in the past, how many can you recall something of now? Think about this for five minutes, placing a tally mark in the space below for each dream of which you recall something.

4. For whatever reason, how often do you wake up during the night?

___often
___rarely
___never
___always

5. Do you go back to sleep readily after waking or being awakened during the night?

___always
___rarely
___never
___usually

6. How often do you wake up with the impression that you had dreamt, yet you are unable to recall what your dream was about?

___rarely
___never
___often
___always

7. When this occurs, how often do you recall what your dream was about later in the day?

___rarely
___never
___always
___often

8. When you recall a dream later in the day, do you recall. . .

___the entire dream
___a major part of the dream
___fragments of the dream
___an isolated detail of the dream
___sometimes one, sometimes another, of these alternatives (specify which ones). . . . . .
. . . . . .

9. When you recall a dream later in the day, does the dream or some part of it come back to you. . .

___gradually
___suddenly
___some other way (specify). . . . . .
. . . . . .

10. When you recall a dream later in the day, is it accompanied by a subjective feeling of. . .

___doubt
___certainty
___other (specify). . . . . .
. . . . . .

11. Check the items which describe the context in which you are apt to recall a dream later in the day.

___striving actively to remember the dream
___daydreaming about something else
___not thinking about anything in particular
___a chance encounter with some object or person related in some way to the dream material
___without the dream being immediately in mind, the occurrence of a thought about some object, event, or person that is related in some way to the dream material
___hearing something that makes reference in some way to the dream material
___other

12. How often do your dreams affect your moods or feelings during the day?

___never
___often
___rarely
___always

13. How often do you wake up to find that your mood or feelings are the same as those that you think you experienced while dreaming?

___often
___always
___never
___rarely

14. If you check either of the first three alternatives to question number 13, do these moods or feelings persist into the day?

___yes
___no

15. Have you on occasion instructed yourself when going to sleep to wake at a given hour?

___yes
___no

16. How successful has this been? (Answer only if you check "yes" to question 15.)

___never successful
___always successful
___often successful
___rarely successful

17. Have you ever been able to decide beforehand what you would dream about during your sleep?

___yes
___no

18. If the answer to question 17 is "yes," describe what techniques you use to induce the desired dream.

19. Have you ever been aroused from a dream and then gone back to sleep, resuming the dream again?

___yes
___no

20. If the answer to question 19 is "yes," was the dream resumed because. . .

___you decided that you wanted the dream to continue
___it just occurred; you had no control over it

21. Have you ever been able deliberately to alter the drift of events while dreaming?

___yes
___no

22. If the answer to question 21 is "yes," describe such a dream and the nature of the alteration.

23. How did you deliberately alter the dream?

24. Have you ever realized <u>without first waking</u> that you were actually experiencing a dream as it was occurring?

___yes
___no

25. If the answer to question 24 is "yes," did your realization that you were dreaming. . .

___occur momentarily at some point in the dream
___persist throughout the dream

26. If the answer to question 24 is "yes," on what basis did you make the judgment without first waking that you were dreaming?

Many normal people report that they experience hypnagogic imagery; that is, "imagery of any sense, frequently of intense, almost hallucinatory vividness, experienced in the drowsy state before sleep."

27. Have you ever experienced hypnagogic imagery? ____yes ___no

28. If you have experienced such hypnagogic imagery, describe them:

29. How often do you experience hypnagogic imagery?

___occasionally

___often

___regularly

30. In your experience, hypnagogic images involve which sense modalities?

___the sense of touch (tactual)

___the sense of sound (auditory)

___the sense of smell (olfactory)

___the sense of sight (visual)

___the sense of movement (kinesthetic)

___the sense of taste (gustatory)

31. In what way or ways does the experience of hypnagogic imagery differ from dream experience?

32. In what way or ways does the experience of hypnagogic imagery differ from images experienced ordinarily during the day?

APPENDIX E

Table A. Chi-square data for D2: "How often do you recall what you dream about?" N = 54.

Frequency of Recall	Endos	Mesos	Ectos	Totals
Low frequency	8	8	8	24
High frequency	8	12	10	30
Totals	16	20	18	54

X^2 = .40 (.90 > p > .75) 2df

Table B. Chi-square for D6: "How often do you wake up with the impression that you had dreamt, yet you are unable to recall what your dream was about?" N = 54.

Frequency	Endos	Mesos	Ectos	Totals
Never	3	6	1	10
Rarely	7	8	10	25
Often	6	6	7	19
Totals	16	20	18	54

X^2 = 2.60 (.75 > p > .50) 4 df

APPENDIX F

Table C. Chi-square data for S5: "In general, do you sleep . . ." N = 53.

Depth of sleep	Endos	Mesos	Ectos	Totals
Lightly	1	2	6	9
Soundly	9	15	9	33
Like a log	6	3	2	11
Totals	16	20	17	53

$X^2 = 8.66$ $(.10 > p > .05)$ 4df

Table D. Chi-square data for S6: "How often do you move around in bed while you sleep?" N = 51

Frequency	Endos	Mesos	Ectos	Totals
Occasionally	5	7	6	18
Moderately Often	6	5	6	17
Frequently	5	6	5	16
Totals	16	18	17	51

$X^2 = .53$ $(.98 > p > .95)$ 4df

Table E. Chi-square data for S9: "Have you been told by others that you talk in your sleep?"

Answer	Endo	Meso	Ecto	Totals
Yes	11	7	11	29
No	5	11	7	23
Totals	16	18	18	52

X^2 = 3.39 with 2df (.25 > p > .10)

Table F. Chi-square data for S11: "Have you been told by others that you walk in your sleep?" N = 52.

Answer	Endo	Meso	Ecto	Totals
Yes	6	3	1	10
No	10	15	17	42
Totals	16	18	18	52

X^2 = 5.67 with 2df (.10 > p > .05)

Table G. Data for S16a: "When you wake in the morning, do you ordinarily . . ." N = 47.

Answer	Endos	Mesos	Ectos	Totals
a	3	2	3	8
b	7	8	9	24
c	0	0	0	0
d	3	7	5	15
	13	17	17	47

X^2 = 1.61 (.95 > p > .90) 6df

Table H. Data for S17: "When you wake in the morning, do you ordinarily . . ." N = 52.

Answer*	Endos	Mesos	Ectos	Totals
Feel awake immed.	2	3	3	8
Median value	11	12	11	34
Stay sluggish . . .	3	3	4	10
Totals	16	18	18	52

X^2 = 1.13 (.90 > p > .75) 4df

*Confer Appendix C for these answers.