

Dreaming I: Phenomenology and Influences on Contents

For thousands of years, probably well before recorded history, people have been fascinated by dreams. The emotional impact of dreams can be so powerful that it seems unlikely that they are a completely accidental or trivial phenomenon. The attribution of meaning to dreams has taken different forms in different times and different cultures. People in some cultures have believed that dreams are messages from the gods, and/or that they predict the future (Jaynes 1976; Van de Castle 1971). There are numerous dreams in the Bible, most of them of this type.¹ Some cultures have believed that the dream world is an alternative reality (Stewart 1972). In the modern Western world, psychoanalysts believe that dreams reveal profoundly important aspects of the dreamer's personality, and that dream analysis is a valuable psychotherapeutic technique.

Currently popular views about the meaning of dreams derive directly or indirectly from the psychoanalytic theory of Sigmund Freud, who published his fascinating book *The Interpretation of Dreams* in 1900. Freud characterized dreams as "the royal road to the unconscious." That is, he believed that the dynamic processes of the unconscious mind could be discovered through dream analysis. He distinguished between the *manifest* or *surface content* of a dream, which refers to the dream objects and events as directly experienced by the dreamer, and the *latent* or *hidden content*, which refers to the underlying ideas or wishes that are expressed symbolically in the surface content. He believed that *day residues*—perceptions and memories of waking life that appear in dreams—serve a symbolic function. In recent years some

researchers with a cognitive-psychology orientation have become interested in dreams as a source of information about how the mind works, though their conclusions are quite different from those of Freud, as we will see in the next chapter (Foulkes 1985).

In the study of dreams it is important to bear in mind the distinction between the psychology of dreaming versus the psychology of dream interpretation (Jones 1970). The *psychology of dreaming* is concerned with the scientific investigation of issues such as the physiological correlates of dreaming, factors that influence the content and structure of dreams, dream recall, and the function of dreaming. *Dream interpretation*, on the other hand, is an attempt to discover the hidden meaning of dreams through the analysis of dream symbols.

Psychoanalysts believe that dream interpretation is a useful psychotherapy technique for revealing a patient's unconscious desires and conflicts. Whether dreams do, in fact, have any hidden meaning is a controversial issue. The major problem for theories of dream interpretation is that there is no way to determine empirically whether a particular dream interpretation is correct. Different psychoanalysts with different theoretical views will interpret the same dream in different ways. Thus, while dream interpretation may under some conditions be useful for psychotherapeutic purposes, it appears that dream interpretation is more an art than a science. In the chapters on dreaming I will be going into some detail on the psychology of dreaming, but I will have relatively little to say about dream interpretation.

In this chapter I will discuss research on the characteristics of typical REM dreams, NREM mental activity, and sleep-onset (hypnagogic) images. You will find that what you think of as "typical" dreams may not be so typical after all. I will compare home dreams versus laboratory dreams, and consider the question of why home dreams often seem to be more dramatic than those reported in sleep laboratory research. Then I will go into some detail on factors that influence the manifest contents of dreams, emphasizing the dreamer's personality (as in chronic nightmare sufferers), current personal concerns (such as health problems and divorce), and recent waking events. We will see that there is reason to believe that dreams often have some sort of associative or symbolic connection with current concerns and waking experiences, which can be discovered without going through psychoanalysis of deep hidden meanings. In the next chapter I will discuss theories of dream production and dream recall, and research that is particularly pertinent to the theories.

DEFINITION OF DREAM

All conscious mental events that occur during sleep are instances of *sleep mentation*. But not all instances of sleep mentation are dreams. The answers to a number of questions about dreams and the dreaming process depend upon how "dream" is defined. This definition is descriptive and consistent with popular usage, while avoiding heavily theoretical assumptions about the characteristics of dreams: A *dream* is a subjective experience, occurring

during sleep, that involves (a) complex, organized mental images that (b) show temporal progression or change (Snyder 1970).

Several comments on this definition are in order. (1) By *mental image* I mean a quasi-perceptual conscious experience of an object or event that exists in the absence of its genuine perceptual counterpart. Although most dreams involve vivid visual images, I do not specify that dream images must be either visual or vivid, since there are individuals whose dreams are nonvisual, or visual but not vivid. Sleep mentation that does not involve any sort of images may be classified as *sleep thoughts*, not dreams. (2) The stipulation that dream images show temporal progression conveys the idea that dreams tell stories, or at least they are like scenes from a story. Dream images change over time. A report of an image that was static, like a snapshot, or that showed simple repetitive movement without true temporal progression or story development, would not qualify as a dream. Such static images are rare during sleep, though they often occur in the *hypnagogic* (presleep) state (to be discussed later in this chapter). (3) The definition says nothing about dreams being dramatic, bizarre, or emotional. As we will see, though some dreams have these characteristics, most do not; so these characteristics are not included in the definition of dream. (4) The definition says nothing about the delusional quality of dreams, the fact that our “dream world” usually seems to be real, while we are dreaming. As we will see, people sometimes know that they are dreaming while they are dreaming—an experience termed *lucid dreaming* (to be discussed in Chapter 13).

PHENOMENOLOGICAL CHARACTERISTICS OF REM DREAMS

What are the *phenomenological characteristics* of typical dreams, that is, the characteristics of dreams—their manifest contents—as they are experienced by dreamers? Are most dreams dramatic, emotional, and bizarre? How often do dreams tell plausible stories? Here we are concerned with *normative data*, the statistics from a large representative sample of the population.

Methods of Studying Dreams

The only way researchers can know about peoples' dreams is through their verbal introspective reports, and dream reports are subject to all of the limitations of introspective reports described earlier, such as forgetting, reconstruction errors, and verbal description difficulties (see Chapter 3). Occasionally dream diaries are supplemented by the individual's drawings (as in Hobson 1988), which can provide additional information but are nonetheless subject to the limitations of introspective reports.

There have been several attempts to collect normative data on dream contents using the *group questionnaire method* (Hall and Van de Castle 1966). Questionnaires are an efficient way to collect data from large numbers of people and to compare different groups, such as male versus female, or different cultural or socioeconomic or age groups. But questionnaire data are plagued by serious problems of forgetting and selective recall and reporting.

YOUR DREAM DIARY

You will get the most out of the chapters on dreaming if you can relate the information to your own dreams. In order to do this most effectively, you need to take a systematic approach to observing your dreams. I recommend that you keep a personal dream diary for at least three or four weeks.

The greatest problem in keeping a dream diary is that we often forget our dreams. *Interference* is probably the most important factor in dream forgetting. When we awaken from a dream, the dream is held in short-term memory. Short-term memory (STM) is particularly susceptible to interference from other thoughts and activities—this is true of all sorts of information in STM, not just dreams. The problem, then, is to transfer the dream information to long-term memory (LTM) before it is wiped out of STM by interference. The way to do it is by *rehearsal*.

When you awaken from a dream, the first thing you should do (after shutting off the alarm clock, if you used one) is to lie still and try to recall the dream in as much detail as possible. Do this before you try to write a description of the dream. Retell the dream events to yourself, trying to picture them in your mind as vividly as you can. Rehearse the full dream at least two times, and until you think that you have recalled all of the details that you can. Then write down a complete description of the dream. If, sometime later in the day, you recall additional details of the dream, record them as an “addendum” to the dream report; don’t revise the original report, as it is uncertain whether the later-recalled details are as accurate as the original report. If you awaken during the night and recall a dream, you should rehearse and record it at that time, before going back to sleep; otherwise you probably will recall little or nothing about it in the morning.

When you write the dream description, try to be accurate. Do not try to make the dream report more orderly or logical or complete than what you really remember. You need to distinguish between what you really remember versus what you inferred, or what you assumed to have happened. (For example, you need to distinguish whether you clearly heard somebody say such and such in the dream, or whether in the dream you just knew what they were saying without really hearing it, or whether you inferred what was said after awakening.) In the initial report, just record what you are confident that you remember, and note where there are gaps in your memory—that is, points at which you believe that something happened in the dream, but you cannot recall what it was. Also, distinguish personal reflections on the dream that occurred during the dream itself from those that occurred after the awakening. (For example, during a dream you might talk to yourself about somebody’s motives in doing something; keep this separate from speculations about motives made after you awaken.)

The third phase, after rehearsing the dream and then recording it, is to record your associations to the dream contents. The associations are critical if you are to attempt to interpret the dream. Are there any day residues in the dream? That is, do experiences of the preceding day appear in the dream, either directly or in some modified form? Do your current concerns, such as personal plans or problems, appear in the dream? Do you find any evidence for wish fulfillment in the dream? If you do not see any evidence of current concerns or wish fulfillment in the manifest content of the dream, could they be represented by some fairly straightforward dream symbolism? Keep in mind the fact that there are no

hard and fast rules for dream interpretation. Most dreams are probably meaningless, though some may be meaningful. If there is any validity to an interpretation of supposed symbolic content in a dream, then the main way you will know it is if it “rings true” to you.

Clinical *case studies* may present dreams and the psychoanalyst's interpretation in great detail, but neither the dreamers nor their dreams are likely to be typical. The *dream diary* method, when it is done systematically, may be an improvement over the questionnaire and clinical case-study methods in terms of better and less selective recall, more complete reporting, and better representation of typical dreams and normal dreamers. However, the best method is to collect dream reports under controlled conditions in a sleep laboratory.

The problem with “home dream” reports using the diary method is that they give us a biased sample of dreams. Modern sleep laboratory research tells us that we have several dreams each night, in several REM periods. Yet if we remember any dream at all in the morning, it is likely to be from the last REM period of the night—the one from which we awakened. Dreams from later REM periods tend to differ somewhat from those of earlier REM periods. As the night progresses and REM periods become longer, dreams tend to become more vivid and intense, show more verbal activity and better ego function, and be better recalled (Cohen 1979a; Schwartz et al. 1978). Furthermore, if dreams sometimes stir up emotional reactions sufficient to awaken us, then in home-dream diary-studies we will be likely to recall and report a disproportionately high number of dramatic and emotional dreams.

In order to get good normative data on typical dreams, we need to collect dream or sleep mentation reports throughout the night under controlled conditions. In the *laboratory arousal method*, EEG and other physiological measures are monitored while subjects sleep, and subjects are awakened periodically from known sleep stages (either REM or NREM) and asked for immediate reports of whatever was going through their mind just before they were awakened. Subjects' oral reports are tape recorded and later transcribed on paper for such purposes as the scoring of contents. Problems of forgetting and selective reporting are minimized—though not eliminated—with this method.

Normative Study of REM Dreams

The most thorough normative study of dreams using the laboratory arousal method was done by Snyder (1970). Over the course of several years Snyder and his colleagues collected 635 REM dream reports from about fifty subjects that spent a total of 250 nights in the laboratory. Thus, the average subject spent five nights in the laboratory, and provided about thirteen REM dream reports. Snyder's subjects were normal young adult middle-class college and medical students, both males and females. This is the population on which most laboratory dream research has been done. Thus, while the sample is relevant to most of the readers of this book, its data may not apply to less educated people or elderly people.

Of all of the sleep mentation reports collected after REM awakenings, some three-fourths (635) met the criterion for a dream (complex images with temporal progression). The dream reports were analyzed for their descriptive characteristics. They were sorted into three classes according to their lengths—the number of words used by the subject to describe the dream (short, less than 150 words; medium, 150 to 300 words; long, over 300 words). In summarizing Snyder's dream data, I will, to simplify matters, give only the total percentages for medium and long dream reports combined. (Thus I will be presenting data for 285 dreams, some 45 percent of the dream reports analyzed by Snyder.) It should be noted that several of the descriptive characteristics were more frequent the longer the dream report. The length effect could be an artifact, to the extent that longer reports are simply more complete descriptions of dreams. Or it could be that longer reports come from longer dreams, and that longer dreams tend to have different characteristics than shorter dreams.

TABLE 11.1 Descriptive Characteristics of REM Dreams in Snyder's (1970) Normative Study*

<i>Sensory Qualities</i>	Credibility: medium to high, 90%.
Visual images: 100%.	Dramatic quality: medium to high, 27%.
Color images: explicitly mentioned, 68% (actual % probably higher).	Physical activity: medium to high, 48%.
Non-verbal auditory images: 13%	
Touch, taste, or smell: 1%.	<i>Emotionality</i>
Speech or conversation: 94%.	Emotions mentioned: 30% (of these, 2/3rds were unpleasant).
<i>Setting and Events</i>	Sexual content: 1%.
Setting: familiar, 38%; unfamiliar but ordinary, 43%; exotic, 5%; fantastic, 1%.	<i>Cognition</i>
Laboratory: 7% (mostly first night).	Volition: 30%.
Automobiles: 15%.	Reflection: 50%.
Eating or drinking: 15%.	Inferential reasoning: 22%.
	Memory experience: 4%.
<i>People</i>	<i>Formal Characteristics</i>
Dreamer was central actor: 95%.	Temporal progression: all, by definition.
Other people present: large majority.	Coherence as a story: medium to high, 97%.
Friends or relatives: 35%.	Complexity of plot and characterization: medium to high, 65%.
<i>"Dream-like" Qualities</i>	Clarity: medium to high, 80%.
Bizarreness: nil, 60%; low, 27%; medium to high, 13%.	

*Percent of dreams with various characteristics, in a sample of some 285 REM dream reports over 150 words in length, collected from 50 subjects.

Source: Data from Snyder, F. (1970). The phenomenology of dreaming. In L. Madlow and L. H. Snow (Eds.), *The Psychodynamic Implications of the Physiological Studies on Dreams* (pp. 124-51). Springfield, IL: Charles C Thomas.

The characteristics of REM dreams in Snyder's (1970) sample are summarized in Table 11.1. It will help to make sense of Snyder's data if I first quote his conclusions:

The broadest generalization I can make about our observations of dreaming consciousness is that it is a remarkably faithful replica of waking life, and many aspects of that statement are almost independent of length or detail of reports. . . . In almost every instance the progression of complex visual imagery described was a realistic facsimile of the visual perception of external reality; that is, it was "representational" (Snyder 1970, p. 133).

Now, to describe and comment further on selected aspects of Snyder's dream data:

Sensory qualities. Less than 10 percent of the reports spontaneously mentioned color, but when the dreamer was questioned about the visual details of the dreams, color was mentioned in about 68 percent of the cases. Apparently most people dream in color most of the time, so they tend to take color for granted and usually fail to mention it spontaneously in their dream report. Speech or conversation was mentioned in 94 percent of the dreams, but it is not clear what proportion of these involved actual auditory imagery versus merely understanding the meaning of what was said, without actual auditory imagery.

Setting, events, and people. Most of the reports described a setting for the dream action, with the setting being either a familiar place (such as the dreamer's house) or an unfamiliar but ordinary place (such as an office building) in a large majority of cases (total 81 percent). Settings that were exotic (such as a jungle) or fantastic (such as a strange planet) were rare (total 6 percent). The dreamer was the central actor in a large majority of the dreams, and the first person pronoun ("I") was used in 95 percent of the reports. The dreamer's self as a child appeared in only one dream, and the self flying or falling occurred in only one dream each. Explicit references to the laboratory situation occurred in 7 percent of the dreams; references to the laboratory were most common on the sleeper's first night in the laboratory (called the "first night effect").

"Dream-like" qualities. Snyder defined *bizarreness* as "the extent to which the described events were outside the conceivable expectations of waking life; to put it bluntly: the craziness of the dream" (p. 146). He tried to distinguish between bizarreness and *credibility*: an event is credible if it is conceivable that it could happen in the real world. For example, a cat turning into a rabbit is bizarre. Daddy taking an airplane to work is unlikely, but moderately credible. If he flew a broomstick to work it would be highly bizarre. Interestingly, and contrary to popular beliefs about dreams, only 13 percent the dream reports were rated as medium or high in bizarreness.

Emotionality. Some writers have included emotionality as a defining characteristic of dreams. Snyder had some difficulty in scoring the dream

reports for emotionality, since he had to guard against the tendency to infer what would have been the appropriate emotion in the situation described in the report. There were some cases in which one might infer a particular emotion, yet the subject explicitly denied that emotion. Emotions were explicitly mentioned in only about 30 percent of the reports. Over two-thirds of the emotions were unpleasant, fear or anxiety being most common, and anger the next most common. Friendliness was the most common pleasant emotion. Clearly defined sexual content occurred in only 1 percent of the dream reports. Snyder concluded "The feelings expressed in dreams are usually bland and rather nebulous, attracting attention only when they become unpleasant; and perhaps that's the way life is" (1970, p. 142).

Cognition. Volition was present in 30 percent of the dreams, *volition* being defined as the dreamed self deciding to do something or not do something, or engaging in sustained activity directed toward some specific goal. *Reflection*, defined as the subject silently commenting on something to himself or herself, occurred in 50 percent of the dream reports. For example: "We were at home in Pennsylvania and someone had just been fishing because there were dead fish lying around to be cleaned. I know I was interested in seeing what they caught, but at the same time I was thinking 'Look at those fish we're going to have to eat.' I don't like fish." *Inferential reasoning*, such as judging someone's motives from their behavior, occurred in 22 percent of the reports. A *memory experience*, defined as the dreamed self remembering something, occurred in only 4 percent of the reports. For example: "While I was sitting there on the subway I suddenly remembered that I had forgotten to bring my sister's dress" (Snyder 1970, p. 139). All of the cognitive characteristics occurred more frequently, the longer the dream report.

Formal characteristics. Several global judgments of the formal characteristics of the dream reports were made. By definition, the dreams had to have some degree of temporal progression, and 50 percent had a medium to high degree of temporal progression. Some 97 percent had a medium to high degree of coherence as a story. "Extremely few were really disjointed or mixed up, and by far the largest number were about as coherent as we might expect from descriptions of real life events, especially so if they had been obtained after abrupt awakenings in the middle of the night" (Snyder 1970, p. 142). *Complexity*, having to do with the intricacies of plot and characterization, was medium to high in 65 percent of the dreams. The *clarity* of the dream report—the degree to which the reader of the transcript could recreate the dream in his or her own mind—was medium to high in 80 percent of the cases. Note that all of the formal characteristics of dream reports, particularly their clarity, would depend partly on the verbal-descriptive ability of the subject, as well as the characteristics of the dream itself.

Conclusions. The exact percentages in the various descriptive categories are less important than the general conclusion to which they lead: the overwhelming majority of dreams are remarkably representative of everyday life in the real world. Most dreams are perceptually vivid, with vision being the dominant sense. Emotional tone is usually not noticed, though negative

emotions are more likely to make an impression than positive ones. Most action occurs in familiar or realistic settings, with other people present, and conversation with other people is frequent. We have some degree of self-awareness in our dreams, we often reflect on our experiences, and we sometimes engage in inferential reasoning. In dreams we frequently act with a sense of volition, though much of our action occurs rather automatically, without conscious choice.

The fact that dreams are rarely bizarre, and only sometimes emotional or dramatic, seems surprising at first. It conflicts with our usual impression. But bear in mind the fact that you forget most of your dreams before you awaken. You are only likely to remember the last dream of the night, and you will not even remember that one unless you pause and think about it for a moment immediately after awakening. You are not likely to replay or "rehearse" the dream unless it had some bizarre or dramatic or emotional quality to it. Thus, the dreams that you ordinarily recall at home are not typical. Dream reports from the sleep laboratory, collected from REM awakenings throughout the night, give us a more accurate picture of typical dreams.

The experience of time in dreams. Dreams are experienced as extending in time, like a story told in a movie. Phenomenologically, dream actions usually seem to take about the same amount of time that the same action would take in real life.

Yet, a retrospective interpretation has led some people to believe that dreams occur instantaneously. Schwartz et al. (1978) traced this belief to the guillotine dream reported by Maury (1861; cited in Freud 1900/1965) to have occurred during his youth in France, shortly after the French revolution. In his dream, Maury was watching condemned people being decapitated by a guillotine. He himself was one of the condemned. He dreamed that he mounted the scaffold, placed his neck across the block, and at the moment that he felt the blade fall on his neck he awoke in terror, only to discover that the top of his bed had fallen and struck him on the neck exactly as the blade had struck his neck in the dream. Maury inferred that the entire dream had occurred during the fraction of a second between the time the bed top struck him and the time that he awakened.

Other people have had experiences similar to Maury's, in which an external event was incorporated into a dream at virtually the same moment that it awakened the dreamer. For example, as I was returning with my family from a trip to Prince Edward Island, my wife was driving while I dozed in the front passenger seat. I dreamed that I was driving, and that I saw another car pull dangerously into my lane. I quickly pressed the horn button with my right thumb, and I actually felt my thumb move and heard the horn sound. At that moment I awoke, and realized that my wife had actually honked the horn. This unusual dream experience most likely occurred in the hypnagogic (sleep onset) state rather than during REM. We have no way of knowing whether Maury's experience occurred during REM sleep. In any case, such experiences seem to support the notion that dreams can be elicited by external events, and that a lot of dream imagery can occur in a very short period of time.

Nonetheless, there is good evidence that REM dreams ordinarily are

extended in time, and that the sleeper has reasonably accurate time discrimination ability even while dreaming. Dement and Kleitman (1957) awakened subjects after either five or fifteen minutes of REM sleep, and asked them whether they had been dreaming for five minutes or fifteen minutes. Four of five subjects were able to discriminate reliably between the short and long intervals. Furthermore, in all subjects the length of the dream reports (in number of words) was longer for the fifteen-minute interval than for the five-minute interval.

Koulack (1968) found evidence for time discrimination in an experiment on the incorporation of external events into dreams. During REM, subjects were given electrical stimulation, and then they were awakened either thirty seconds or three minutes after the stimulus. In eleven of twelve cases in which the stimulus was incorporated into the dream, the subjects were able to report correctly whether the stimulus had occurred thirty seconds or three minutes prior to their being awakened. Thus, the evidence indicates that REM dreams ordinarily do not occur instantaneously, and that people usually can discriminate shorter dreams from longer dreams.

DREAMING IN NREM SLEEP

The Controversy over NREM Dreaming

One of the most controversial issues of the first two decades of laboratory dream research was the question of whether dreaming is limited to the REM sleep stage. In the first study of the association between rapid eye movements and dreaming, Aserinsky and Kleitman (1953) reported that dreams occurred in 74 percent of the REM periods, but in only 11 percent of the NREM periods. Other early studies also found dreaming to be prevalent in REM, but rare in NREM (Dement 1955; Dement & Kleitman 1957), with the combined percentages from several studies being remarkably close to the percentages reported by Aserinsky and Kleitman (Dement 1976). It seemed to make a lot of sense that dreams would occur only in REM stage, since the sleeper's eye movements could be interpreted as scanning of the visual dream images. Dement and Kleitman (1957) suggested that on those infrequent occasions when dreams were reported in NREM awakenings, the subjects were probably recalling a dream from a previous REM period. The association between REM and dreaming seemed to be so strong that some researchers used the terms "REM sleep" and "dream sleep" interchangeably, as if they meant the same thing.

However, things are not so simple. Since Dement and Kleitman's (1957) report, several studies have found strikingly high percentages of dream recall in NREM sleep awakenings. There is no doubt that dreaming is reported more often after awakenings from REM sleep than after awakenings from NREM sleep, but the question arises as to why some experimenters have found NREM dreaming to be common, while others have found it to be rare. Something more than random variation between samples seems to be involved. Another question is whether there are qualitative differences between REM and NREM dreams.

Herman, Ellman, and Roffwarg (1978) suggested several factors that could account for the different NREM dream-recall frequencies found in different studies: (1) how dreaming was defined; (2) how the subjects were interrogated (3) expectancy effects; (4) different subject samples; and (5) different schedules of awakenings. I will discuss the first point.

Different definitions of "dream." Probably the most important factor in the issue of NREM dreaming is the experimenter's criterion for classifying sleep-mentation reports as dream reports. At one extreme, any report of any mental experience occurring during sleep, no matter how vague, could be classified as a dream. By this lenient criterion, dreaming occurs in 99 percent of REM reports, and 87 percent of NREM reports (Foulkes 1962). At the other extreme, one could use a very narrow criterion including not only vivid perceptual imagery but also factors such as complexity, plot continuity, bizarreness, and emotionality. Such a narrow criterion would reduce the apparent frequency of both REM and NREM dreaming, since strong emotionality and bizarreness are not characteristic of most REM dreams (Snyder 1970).

In published reports, experimenters have often failed to describe their criterion for classifying sleep-mentation reports as dreams. Apparently they thought it was obvious when a report represented a dream. Vivid perceptual imagery has usually been part of the stated or unstated definition, along with other factors that might differ from one study to the next, such as coherence, temporal progression, and complexity or detail.

A useful solution to the dream-criterion problem is to classify sleep-mentation reports into different categories, according to their characteristics. Orlinsky (reported by Kamiya 1961) developed an eight-point scale for classifying mentation reports. The points on Orlinsky's scale, and the percentage of some 400 NREM reports (from twenty-five subjects) that he classified at each point, are shown in Table 11.2.

Orlinsky seems to have taken it for granted that his subjects' sleep mentations involved perceptual images—he did not use the presence or absence of images as a factor in his scale classifications. By my (and Snyder's 1970) definition of a dream (images with temporal progression), reports in Orlinsky's categories 4 through 7 can be classified as dreams. By this criterion, 27 percent of Orlinsky's subjects' NREM reports were dreams. By the same criterion, 85 percent of their REM reports were dreams.

Using a laxer dream-criterion of identifiable content accompanied by perceptual images (though not necessarily with temporal progression), Foulkes (1962) classified 54 percent of NREM reports, and 82 percent of REM reports as dreams. He classified 20 percent of NREM reports as thoughts, that is, identifiable contents without perceptual imagery. (Foulkes also showed that dreams reported in NREM awakenings were not merely being recalled from prior REM periods—they were reported from early NREM periods that occurred before the first REM period as often as from later NREM periods that followed a REM period.) It is clear that the criterion for classifying sleep-mentation reports as dream reports is a critical factor influencing different experimenters' conclusions about the relative frequency of dreaming in NREM versus REM periods.²

TABLE 11.2 Orlinsky's Sleep-Mentation Scale and Percent of NREM Reports in Each Category*

(0)	Subject cannot remember dreaming; no dream is reported on awakening. [43%]
(1)	Subject remembers having dreamed, or thinks he may have been dreaming, but cannot remember any specific content. [11%]
(2)	Subject remembers a specific topic, but in isolation: for example, a fragmentary action, scene, object, word, or idea unrelated to anything else. [14%]
(3)	Subject remembers several such disconnected thoughts, scenes or actions. [5%]
(4)	Subject remembers a short but coherent dream, the parts of which seem related to each other: for example, a conversation rather than a word, a problem worked through rather than an idea, or a purposeful rather than a fragmentary action. [14%]
(5)	Subject remembers a detailed dream sequence, in which something happens, followed by some consequence, or in which one scene, mood, or main interacting character is replaced by another (different from category 3 either in coherence of change or in the development of the several parts of the sequence). [6%]
(6)	Subject remembers a long, detailed dream sequence involving three or four discernible stages of development. [7%, for categories 6 and 7 combined]
(7)	Subject remembers an extremely long and detailed dream sequence of five or more stages; or more than one dream (at least one of which is rated 5) for a single awakening.

*Based on 400 NREM sleep reports from 25 subjects.

From Kamiya, J. (1961). Behavioral, subjective, and physiological aspects of drowsiness and sleep. In D. W. Fiske & S. R. Maddi (Eds.), *Functions of Varied Experience* (pp. 145-74). Homewood, IL: Dorsey Press.

Conclusion. It is now clear that the mind is active in NREM sleep as well as in REM sleep. Some NREM mentation consists of imageless thoughts, but a certain proportion consists of true dreams with perceptual images and temporal progression. Though dreams do occur in NREM sleep, their typical characteristics tend to differ from those of REM dreams. The nature of those differences will be discussed in the next section.³

Comparison of REM and NREM Sleep Mentation

REM mentation has been characterized as more "dreamy" than NREM mentation. That is, REM mentation is more visually vivid, dramatic, emotional, and bizarre, whereas NREM mentation tends to be more like daydreaming or imageless conceptual thinking. But however convenient it might be, this generalization is an oversimplification. The differences between REM and NREM mentation are relative, not absolute, and most REM dreams are not particularly dramatic, emotional, or bizarre. REM mentation usually is better recalled than NREM mentation, and we cannot be sure how much of the apparent differences in mentation quality are due to differences in recall of REM versus NREM mentation.

Deep sleepers versus light sleepers. Zimmerman (1970) found that the differences between REM and NREM mentation are greater for deep sleepers than for light sleepers. He selected groups of light or deep sleepers according to their auditory awakening thresholds: the tone intensity required to awaken them was about 15 db louder for deep sleepers than for light sleepers. Sleep-mentation reports were collected from REM and NREM periods in the latter half of the night. Subsequently the reports were scored on several dimensions derived from a factor-analytic study of dream reports (Hauri, Sawyer, & Rechtschaffen 1967).

REM mentation reports did not differ for light and deep sleepers, but NREM reports of the two groups differed in some important ways. Light sleepers described their NREM experiences as dreaming (rather than thinking) 71 percent of the time, compared to only 21 percent for deep sleepers. It appears that NREM mentation is more dreamlike for light sleepers than for deep sleepers. In fact, light sleepers' NREM reports were virtually identical to their REM reports for several dimensions, including: (1) dreaming rather than thinking, (2) more perceptual than conceptual, (3) lack of volitional control, (4) belief in the reality of what is being experienced, and (5) distortion of content. But deep sleepers' REM reports scored higher than their NREM reports on those dimensions.

Equally important was the finding that REM and NREM mentation differed significantly on several dimensions for *both* light and deep sleepers. Compared to REM, NREM mentation involved: (1) less active participation by the subject, (2) less thematic continuity, (3) less emotion, (4) less clarity and vividness, (5) less dramaticity, (6) more contemporary content, (7) less physical activity, and (8) poorer recall. These are the *core dimensions* of distinction between REM and NREM mentation.

Though the differences between REM and NREM mentation are not absolute, they are great enough that "blind" judges—judges who do not know which sleep stage the reports came from—can classify reports as REM or NREM with about 75 to 85 percent accuracy (Monroe et al. 1965).

Continuity of content between REM and NREM periods. Though it does not always happen, it is not unusual for the same topic to be continued across two or more successive sleep stages. Rechtschaffen, Vogel, and Shaikun (1963) compared successive REM and NREM reports within a single night and found that the same general topic may be represented in either type of report, though the REM reports typically are more perceptually vivid. The following example comes from five successive awakenings of the same subject on the same night:

1. REM period (time 62 minutes since initial sleep onset): I was dreaming. I remember the feeling that the dream contained a few people other than myself—contemporaries of mine. We were all in a *boat*. I remember worrying about the boat overturning and what we would do. And I remember the thought that we would just have to swim to save our souls.
2. NREM Stage 3 (time 95 minutes): I have the feeling that I was in a *boat* again, a small boat, like a rowboat. It being rather *sunny* out. . . . I don't remember think-

ing of what would happen if the boat overturned, as I did before. I was preoccupied with a thought. I really can't remember what it was.

3. NREM Stage 4 (time 187 minutes): I had been dreaming about getting ready to take some type of an *exam*. It had been a very short dream. . . . I don't think I was worried about them.
4. REM period (time 223 minutes): I was dreaming about *exams*. In the early part of the dream I was dreaming I had just finished an exam, and it was a very *sunny* day outside. I was walking with a boy who's in some of my classes with me. There was sort of a . . . break, and someone mentioned a grade they had gotten in a social science exam. And I asked them if the social science marks had come in. They said yes. I didn't get it, because I had been away for a day.
5. NREM Stage 2 (time 274 minutes): . . . dreaming about *exams*, and about having taken different exams . . . (Rechtschaffen et al. 1963, p. 544).

LABORATORY DREAMS COMPARED WITH HOME DREAMS

I have concentrated on laboratory dream research, rather than dream-diary research, because I believe that we are likely to get the most accurate information about dreaming from controlled laboratory research in which physiological responses are measured during sleep and mentation reports are collected immediately after awakening from known sleep states. However, some researchers have argued that dream reports collected in the laboratory setting do not accurately reflect the normal dreaming experience.

Two studies found significant differences between home dream-diary reports and laboratory dream-reports from the same subjects. Domhoff and Kamiya (1964) found a greater frequency of sexual and aggression/misfortune elements in home dreams, while laboratory dreams contained more bizarre elements. Hall and Van de Castle (1966) concluded that home dreams tend to be more dramatic than laboratory dreams. It could be argued from these results that laboratory dreams or dream reports are affected by the subjects' being in the novel laboratory setting, and/or the novel social interaction involved in reporting their dreams to strangers. Alternatively, or in addition, the differences might be due to the fact that the laboratory reports were always collected from REM awakenings, whereas subjects made their home dream reports after awakening spontaneously (or by alarm clock) from unknown sleep stages that might have been sometimes REM and sometimes NREM.

Weisz and Foulkes (1970) compared home and laboratory dream reports collected under conditions that were as similar as possible for the two different settings. Dream reports were collected from twelve subjects for two nights in the laboratory and two nights at home (in a counterbalanced sequence). For the home dream reports, subjects slept alone in their own bedrooms. When they slept in the laboratory they were wired for polygraph recordings in the usual manner, but, unlike most laboratory dream studies, they were never awakened by the experimenter. Both at home and in the laboratory the subjects slept undisturbed until they either awoke spontaneously or were awakened by an alarm clock at 6:30 a.m. When the alarm rang

they privately recorded their sleep mentation recollections, if any, on a portable tape recorder.

Out of twenty-four subject-mornings in the laboratory, when the alarm rang the subjects were in REM sleep 29 percent of the time, in NREM 46 percent, and awake 25 percent. Presumably the proportions were about the same for the mornings at home (though there is no way of knowing for sure since polygraph recordings were not made at home). Independent blind judges—who did not know which mentation reports came from the laboratory and which from home—rated the reports on six scales (derived from Hauri et al. 1967). The percent of awakenings yielding scorable mentation reports was about the same (80 percent) for the laboratory and home, and the median report length was about the same (130 words) in both cases.

Home dream reports showed more verbal and physical aggression than laboratory reports, a finding that replicates the results of the earlier studies. However, home and laboratory dreams did not differ significantly in overt sexuality, and they were virtually identical on the dimensions of vivid fantasy, hedonic tone (pleasantness or unpleasantness), and active participation. The *vivid fantasy dimension* is particularly important, since it reflects the most distinctive dream processes: “feelings of *unreality* (imagination, distortion) coupled with *intensity* of experience (dramatization, clarity, emotion)” (Hauri et al. 1967, p. 18). Weisz and Foulkes (1970) concluded that the similarities between home and laboratory dreams are really more important than the differences. Particularly, their identity on the vivid fantasy dimension refutes the hypothesis that basic dream processes are somehow altered in the laboratory setting.

In specific dream contents, the home and laboratory dreams differed in that elements related to the experimental situation appeared in 50 percent of the laboratory dreams, but in only 6 percent of the home dreams. It is hardly surprising that the novel laboratory setting would appear as a “day residue” in the laboratory dreams. As for the greater frequency of aggression in the home dream-reports compared to the laboratory reports, it is not yet clear whether this difference represents an actual inhibition of aggressive content in laboratory dreams or a social inhibition on the *reporting* of aggression in the laboratory. Also, it is not known whether this difference is transient or permanent.

Selective recall. All in all, Weisz and Foulkes’s study shows that the similarities between home and laboratory dreams are more important than their differences, when they are collected under comparable conditions. Why is it, then, that the dreams that we remember at home are so often dramatic and emotional, whereas the dreams reported from REM awakenings in the laboratory are usually mundane (Snyder 1970)? Weisz and Foulkes (1970) argued that the most important factor is *selective recall* of home dreams. Only those home dreams that are particularly *salient*, due to their high degree of drama, emotion, or bizarreness, are likely to be spontaneously recalled at home. This is particularly true for the average person who has no particular interest in dreams, but it applies also to people who are especially interested

in their dreams and attempt to recall them each morning. In Chapter 13 I will discuss salience and other factors influencing dream recall in more detail.

BETWEEN WAKEFULNESS AND SLEEP: THE HYPNAGOGIC STATE

As you fall asleep you go through a transition period in which you feel increasingly drowsy, not fully awake but not yet asleep. The drowsy transition period between wakefulness and sleep is called the *hypnagogic state* (derived from the Greek words, *hypno*, sleep, and *agogos*, to induce).⁴ The hypnagogic state can be identified by brain wave patterns, and it involves mental phenomena termed *hypnagogic hallucinations* or images that are in some ways similar to REM sleep dreams, and in some ways different. You usually recall nothing of the contents of the hypnagogic period, since you usually pass through it into full sleep. However, if you are somehow aroused from this drowsy state, you may recall a brief dreamlike experience. Or you may have the impression that you were thinking or dreaming, and be able to recall some vague impression of it, like an aftertaste, without being able to recall any details. Brief daytime naps (about ten to fifteen minutes) may be spent largely in the hypnagogic state (Evans et al. 1977).

Schacter (1976) summarized some conclusions about hypnagogic imagery derived from dream-diary studies done before the advent of EEG technology.⁵ Most hypnagogic images are in the visual mode, while auditory images are not unusual and tactile-kinesthetic images occasionally occur. Sometimes the visual images include flashes of light and geometric patterns that cannot be identified as objects. But more often the images portray people, objects, or scenes that are quite vivid, as vivid as night dreams. So far there have been no systematic, large-scale normative studies of the relative frequencies of different types of hypnagogic images. As with night dreams, hypnagogic images are quite variable, and they are strongly influenced by the individual's personality, personal concerns, and recent experiences.

EEG research on the hypnagogic state. Sleep onset occurs at the beginning of descending NREM Stage 2. The transition to sleep may be described in terms of four stages: (1) Relaxed wakefulness, characterized by nearly continuous alpha EEG brain waves (8–13 Hz). (2) Alpha SEM, involving discontinuous alpha EEG with slow eye movements. (3) Descending NREM Stage 1, with EEG of mixed frequencies (mostly fast but including slow theta waves [4–7 Hz] and slow eye movements). (4) Descending NREM Stage 2, sleep onset. The hypnagogic state consists of alpha SEM and, especially, descending NREM Stage 1 (Foulkes & Vogel 1965; Foulkes, Spear, & Symonds 1966).⁶

In a laboratory study, Foulkes and Vogel (1965) awakened subjects from the hypnagogic state to obtain mentation reports. Almost all reports contained some sort of mental content, and about 50 to 75 percent of them

included dreamlike content. Foulkes and Vogel noted a particularly interesting difference between hypnagogic dreams and REM dreams: the hypnagogic period is distinctive in that its visual images are often rather static, in contrast to the dynamic, movie-like images of REM dreams. Hypnagogic dreams may show a sequence of events as a sequence of still frames. For example, one subject reported a hypnagogic dream that involved "driving from California to Tijuana, Mexico, of entering a bar there which featured a dancing girl, and of leaving the bar in the company of this girl." The dream report indicated that the subject had seen only three brief dream images: "an image of himself driving at one particular place in California, an image of the inside of the bar, and an image of the girl walking with him in the street" (Foulkes & Vogel 1965, p. 240). The apparent continuity of the dream report seems to have depended upon secondary revision or filling in the gaps between the images, either while in the hypnagogic state or afterward, while the dream was being reported. The snapshot character of some hypnagogic dreams suggests that the actual duration of hypnagogic dreams is briefer, on the average, than the duration of REM dreams, even when the verbal reports are of the same length.

While there are some differences between hypnagogic and REM dreams, the similarities are as striking as the differences. Both involve vivid visual images of hallucinatory (believed-in) quality, and both are usually storylike, though hypnagogic dreams tend to be briefer and are more likely to involve static scenes. Both types may involve distortions of reality and apparently symbolic transformations of reality. In both types the subject himself/herself is usually an active participant. Hypnagogic and REM dreams do not differ in ratings of aggression, sexuality, or hedonic tone. Mean scores on a dreamlike fantasy scale are about equal (though top-of-the scale scores occur more often in REM). Both types of dreams include personal material with possibly psychodynamic significance. The most dramatic difference between hypnagogic and REM reports is the subjects' depth-of-sleep ratings: they reported that they had been deeply asleep just before REM awakenings, but that they had been merely drowsy and just drifting off to sleep prior to hypnagogic awakenings (Foulkes et al. 1966).

The EEG research suggests the interesting conclusion that vivid dreamlike images are by no means limited to REM sleep—they also occur in the hypnagogic period. In fact, the similarity between REM and hypnagogic dreams is in many ways greater than the similarity between REM and NREM (Stages 2, 3, and 4) dreams.⁷

FACTORS THAT INFLUENCE DREAM CONTENTS

Dreams are constructed from knowledge stored in the individual's long-term memory. This knowledge includes: (a) the characteristics of people, animals, and objects, including how they look and what they can do; (b) personal past experiences (episodic memory); (c) types of story themes and scripts (such as typical sequences of events at a restaurant or dentist's office); and (d) the spatial organization of typical scenes, and how people and objects can move in them. But of course your dreams are not mere replays of remembered

experiences or stories. Rather, they are creative stories constructed from your personal knowledge.

The question here is, what factors influence the manifest contents of dreams? That is, what variables affect the selection of particular memory contents—such as people, places, and story themes—to appear, perhaps in odd combinations, in dreams? I will be concerned here with empirical research on factors that influence the manifest or surface dream contents, not with theories about latent or hidden dream contents. This research is important for developing and evaluating theories about how dreams are produced. Most theories of dreaming endorse the *continuity hypothesis*, which says that peoples' dreams directly reflect their personalities, current concerns, and daytime experiences. Conversely, Jung's (1933) *compensation hypothesis* said that dreams may express virtually the opposite of the individual's waking personality, emotional reactions, and concerns. As we will see, the research evidence strongly supports the continuity hypothesis, though some evidence is consistent with the compensation hypothesis.

The factors that affect dream contents can be divided into several categories: (1) demographic and cultural factors; (2) personality and psychopathology; (3) current personal concerns and mood; (4) recent waking experiences; and (5) stimuli during sleep.

Demographic and Cultural Factors

The dreams of different groups of people—such as groups differentiated by gender, age, socioeconomic status, or culture—may show statistical differences in the relative frequencies of different types of contents. This type of research is typically done with relatively large samples, using questionnaires about dreams recalled at home. For example Winget, Kramer, and Whitman (1972) collected dreams reports from 300 people in four age groups, ranging from 21 to 65+ years. Some of their findings: (1) *Gender differences*: Women reported dreams more often than men (65 versus 53 percent). Compared to men, women were more likely to report dreams with characters, emotions, friendly interactions, and home and family. Men were more likely than women to report dreams with aggression and achievement-striving themes. (2) *Age differences*: Subjects 65 and older had more dreams with death anxiety and overt death themes, compared to younger subjects. (3) *Socioeconomic status*: Lower-class subjects had more dreams with people and more misfortunes; upper-middle-class had less death anxiety, compared to lower and lower-middle-class subjects.

Gender differences have often been the most potent demographic factor in questionnaire studies. However, in a laboratory study involving eleven males and eleven females awakened during REM sleep, no gender differences were found regarding aggression, misfortune, or social-interaction dream themes (Kramer, Kinney, & Scharf 1983a). One interpretation is that the typical dreams of males and females are similar, but males and females recall different aspects of their dreams in home dream-diary or questionnaire studies. An alternative interpretation is that large samples are needed to detect group differences, whereas laboratory studies usually have a rela-

tively small number of subjects, perhaps too small to detect group differences.

Some studies have attempted cross-cultural comparisons. For example, Van de Castle (1971) compared dreams of Cuna Indians of Central America and age-matched Nicaraguans, and found less aggression in the dreams of the Cuna, which is consistent with differences in waking behavior between the two groups.

Findings regarding demographic and cultural factors may vary widely from one study to another depending on sample size, sampling method, and method of data collection. Demographic and cultural groups are heterogeneous—that is, they contain a wide variety of individuals, with different personalities, waking experiences, and personal concerns. Insofar as groups differ, it is because of differences in commonly shared experiences and concerns. Progress in understanding the variables that affect dream contents is more likely to be made by studying more homogeneous samples, in which known characteristics of the individuals and their experiences and concerns can be related to dream contents.

Personality and Psychopathology

Here the emphasis is on dream characteristics as related to personality types and traits, and psychopathology diagnostic categories. In general, the evidence indicates a continuity between waking personality and sleeping personality. For example, Starker (1978) compared dream-diary reports in subjects of three different daydreaming personality types (as classified by the Imaginal Processes Inventory, Chapter 8). Positive-vidid daydreamers, the mentally well-adjusted group, showed more positive emotionality and less bizarreness in their night dreams than did either guilty-dysphoric or anxious-distractible daydreamer types. Of the three groups, night dreams of the anxious-distractibles (anxiety neurotics) showed the most emotionality, the most bizarreness, and the greatest number of idea units per dream. (The latter result suggests that anxious-distractible types tended to have dreams that were more fragmented, jumping around from one scene to another, compared to other types.) Nightmares were most common among the anxious-distractibles; they never occurred among positive-vidid daydreamer types.

In a dream-diary study, Cann and Donderi (1986) found that introverts recalled dreams more often than did extraverts. In particular, introverts recalled more ordinary, plausible dreams than extraverts whereas introverts and extraverts were equally likely to recall unrealistic or bizarre dreams. Subjects rated high on the Jungian personality dimension of “intuitiveness” recalled more dreams of a highly emotional, irrational, and bizarre nature, which the authors interpreted as Jungian archetypical dreams. (In Jung’s [1933] theory, archetypical dreams are [symbolically] about universal themes of human existence.) Subjects high in neuroticism recalled fewer archetypical dreams than those low in neuroticism. (See Cann and Donderi [1986] for references to other studies on dreaming and personality types.)

Methodological problems have made it hard to draw conclusions about the dreams of schizophrenic subjects (review by Schwartz, Weinstein & Arkin

1978). For example, schizophrenic patients are usually maintained on anti-psychotic drugs that might affect their dreams, and it is hard to determine how their reports are affected by their waking cognitive state. There is some support for the notion that schizophrenics' dreams are relatively impoverished, which supports the compensation-hypothesis insofar as the waking experience of some schizophrenics seems to be a blooming-buzzing confusion; but even this finding is tentative. Depressed patients tend to report relatively brief dreams, with more depression and masochism themes compared to normal people. There is a large literature of clinical case studies with dream reports, but it is beyond the scope of this book.

Chronic nightmare sufferers. *Nightmares* are vivid dreams that cause enough fear or anxiety to awaken the dreamer. Nightmares occur almost exclusively during REM sleep, usually during relatively long REM periods in the latter half of the night. Nightmares are distinguished from *night terrors*, which are a sleep disorder involving suddenly awakening in a panic state. Night terrors occur during NREM sleep Stages 3 and 4 during the first half of the night, with either no dream report or a single frightening image. (See the section on sleep disorders in Chapter 10.)

Ernest Hartmann (1984; Hartmann et al. 1987) compared personality characteristics in a group of fifty chronic nightmare sufferers (20 to 35 years old) to those of subjects in two control groups: vivid dreamers and nonvivid dreamers. The chronic-nightmare subjects reported a lifelong history of nightmares (since early childhood), and were currently experiencing nightmares at least once a week (average 3.5 per week); the controls rarely or never experienced nightmares. Typical nightmares were long, vivid, frightening dreams that seemed "real" at the time. The nightmares were not repetitive; every dream was different, though the themes were often similar. The most common theme was being chased—by a monster in childhood, and in adulthood usually by a large man or a group of people. Sometimes the dreamer awakened in response to a frightening threat, before an actual attack occurred, though often the dreamer was attacked and beaten, shot, or stabbed. For example, one woman reported:

I was swimming along in cool blue water. A strange man swam after me and started slicing me with a knife. It was all in brilliant color and I could feel everything. I felt the cool water and the hot pain of the knife slashing into my arm; I saw my blood spreading out in the water and I could see slices of my flesh drifting off away from me. It was very real. I could definitely feel the knife and feel the pain in this dream (Hartmann 1984, p. 60).

The subjects reported that nightmares occurred more often at times of personal life stresses (such as moving, or breakup of a personal relationship), and that highly stressful events (such as being mugged) affected their nightmares for several weeks afterward.

Hartmann compared the three groups' responses to structured interviews and several diagnostic personality tests, including the Minnesota Multiphasic Personality Inventory (MMPI) and the Thematic Apperception Test (TAT). The vivid and nonvivid dreamer control groups did not differ from

each other. Compared to the controls, the nightmare group scored more on the "psychotic" side of the MMPI profile, suggesting oddities of perception and thinking. Several had *DSM-III* diagnoses, such as schizotypal or borderline personality disorders.⁸ However, none were diagnosed as psychotic, nor were they diagnosed as being highly anxious, phobic, dissociative, or having conversion-state or obsessive-compulsive disorder. Nor were the chronic nightmare sufferers unusually hostile or aggressive or fearful. Typically they reported that as children they were especially sensitive and introspective and felt "different" from other children, though there was no pattern of childhood abuse or traumatic experience. The nightmare sufferers, compared to controls, reported less stable personal relationships, and were more likely to be unemployed or underemployed; many had jobs or hobbies relating to the arts (musicians, painters, poets, craftspersons).

Hartmann (1984) summarized his findings by characterizing chronic nightmare sufferers as having "thin boundaries" in a number of senses. They tend to be open, vulnerable, defenseless, and artistic. Their boundaries between fantasy and reality, between self and others, between male and female identities, between adulthood and childhood, and between present and past, are less rigid than normal. Hartmann concluded:

The nightmares themselves may be considered an aspect of thin boundaries. The TATs indicate that these nightmare sufferers are not persons with powerful hostilities, and our impression from the interviews is that they are not persons with an unusual number of fears. It rather appears that the ordinary fear, feelings of helplessness, and rage of childhood, which we probably all experience, 'get through' in these persons and enter into their dreams more than they do in most of us" (Hartmann et al. 1987, p. 56).

Hartmann's lifelong chronic nightmare sufferers were compared with a group of fifteen Vietnam combat veterans suffering from *posttraumatic nightmares* as part of a *posttraumatic stress disorder* (PTSD) (Hartmann 1984; Van der Kolk et al. 1984). The veterans typically had started having nightmares after the loss of a close buddy in combat, and several years later they were still having nightmares at least once a month. The unique thing about the PTSD veterans was that, unlike ordinary chronic nightmare sufferers, their nightmares represented events that had actually happened, and they were repetitive, replaying the same traumatic scene on each occasion. The PTSD veterans were abnormally anxious, particularly in regard to events that might remind them of their combat trauma, but they were not characterized by the "thin boundaries" and semi-psychotic features of the chronic nightmare group. (A comparison group of ten veterans with lifelong nightmares was more like the original chronic nightmare group.) Unlike ordinary nightmares, posttraumatic nightmares apparently can occur in any sleep stage. Hartmann (1984) tentatively concluded that posttraumatic nightmares represent a third diagnostic category, separate from ordinary nightmares and night terrors. Of course, posttraumatic nightmares are not limited to combat veterans. They can occur in people who have experienced traumas such as violent crimes, near-fatal accidents, or the death of a loved one. Children are more prone to them than adults. Posttraumatic nightmares usually

decrease over a period of a few weeks, though they may continue longer depending on the individual's personality and the seriousness of the trauma.

Current Personal Concerns and Mood

We know that current personal concerns are a major topic of day-dreams, and it is not surprising that they also influence night dreams. In both cases, the current concerns are most likely to have an impact if they are tied to strong mood states. For example, hospitalized patients who are awaiting surgery often have dreams with elevated anxiety levels and themes that are symbolically associated with the impending surgery. In one case, a railroad worker who was awaiting surgery to remove a vascular blockage in his leg dreamed of trying to unclog a railroad switch that was jammed with sand and rust (Breger, Hunter, & Lane 1971). Pregnant women are more likely than other women to dream about babies, motherhood, and anxieties relating to childbirth (Van de Castle 1971). A female student's dream diary included several dreams, over a month's time, showing her anxiety and feelings of losing control of her body, related to her concerns over an abnormal pap smear and anticipation of surgery. For example:

I dreamed that I was strapped to an examining table. My feet were in stirrups and I was sedated. I couldn't move or cry out. There were bright lights and a sensation of panic. I heard voices of people, but I couldn't see them because of the lights (RM, Sept. 1988).

At the end of the diary she commented:

I have learned a lot about myself through keeping a dream diary. I see how the problems and concerns of each day "creep" into my consciousness through dreams. Many of the painful, hurt-filled or scary thoughts that I had "pushed away" during the day came out (often with a vengeance) in my sleep.

These examples show that dreams may be affected by current concerns including anticipated events as well as ongoing problems.⁹

Divorce and depression. Rosalind Cartwright (1986; Cartwright et al. 1984) showed that the themes and emotions of people's dreams may be affected by their emotional reactions to major life events and current concerns. Her subjects were twenty-nine women who had recently been divorced (or were in the process of getting divorced). Divorce is usually associated with negative affect, and nineteen of the women were diagnosed as depressed according to the Beck Depression Inventory (BDI), while ten were not depressed. A control group of nine nondepressed, happily married women was also used. Dream reports were collected after REM sleep awakenings over a period of six nights. Among the most depressed subjects, the latency of the first REM period was reduced below sixty minutes—a result consistent with prior research on clinically depressed patients. Depression (BDI) scores were significantly correlated with scores on a questionnaire measure of traditionality of sex role orientation. In other words, more traditional

women, for whom the social role of wife was an integral part of their self-identity, had the greatest emotional difficulty in dealing with their divorces.

The dreams of the depressed divorcées differed from those of nondepressed divorcées and happily married women in several ways. For example, in time orientation, depressed subjects favored the past, married subjects favored the present, whereas nondepressed divorcées used the full time-range of past, present, and future. Anxiety dreams were frequent in all of the groups, but in the depressed group it was attributed to the self-character significantly more often (82%) than in the nondepressed (60%) and control (55%) subjects. Nondepressed divorcées were more likely to dream of themselves in the role of wife, compared to depressed subjects. The dominant dream motives for nondepressed divorcées were esteem and control, whereas belongingness and safety were the most common motives among depressed and control subjects. Dream reports were about twice as long, on the average, in nondepressed divorcées than in depressed and control subjects. Here is a dream report by a depressed divorcée that shows her distrust of men and includes an association to her husband, who physically abused her, as well as associations to the sleep laboratory setting:

I was ready to get up and two men who were with me in this sleep program were ready to go, and this other man was letting two policemen that were trying to steal my place rush ahead to get out first, get their electrodes off. We were rushing to a little booth to get electrodes off. We were sitting in cars in front of the hospital. One car was a convertible like my ex-husband had (Cartwright 1986, p. 423).

Here is a dream report by a nondepressed divorcée who was adapting successfully, ready to take risks to reach a better future:

I was trying to get to where I live, an apartment on the second story with El [commuter train] tracks going by. I had to climb on the train tracks and lie down on a trampoline and jump from it into a window. It was only three feet but it was shaky, risky, and awkward to stand up. There were two other women wanting to do the same thing. One did it. It looked easy so I got up to do it. I felt scared. It felt like flying in the future, being jet-propelled (Cartwright 1986, p. 424).

In discussing her findings, Cartwright concluded:

In general, the study supports the proposition that dreams are more adaptive during a period of life change [nondepressed divorcées] than during a period of relative stability [happily married], providing the change is not accompanied by a major mood disturbance [depressed divorcées]. When there is significant depression, dreams appear to be slowed down in the process of working through or accommodating to changes in reality. The self is seen as helpless, damaged, needing to be cared for, not motivated to affiliate but to engage in abasement in order to be nurtured. Dreams for the depressed are not employed as rehearsal for future wish fulfillment in which the self acts decisively in some desired new roles (1986, p. 425).

Cartwright's study shows that peoples' manifest dreams reflect their emotional reactions to major life events and current concerns. Both awake and asleep, different people's emotional reactions to similar experiences (such as divorce or death of a loved one) differ, depending upon their personal interpretations of the experience and their abilities to cope with the it. Breger (1969) hypothesized that dreams help people to cope with recent emotional experiences by organizing them and relating them to knowledge of similar, past situations. There is little doubt that, over time, peoples' improved dream emotionality may reflect improved coping with their waking life situation. However, it would be hard to prove that dreaming helps people to cope with their waking life situation. Though it might sometimes happen, there is little evidence that dreams help people to discover specific solutions to their personal problems. Most commonly, dreams reflect problems, rather than solve them.

Recent Waking Experiences

Since dreams are constructed from memories, dreams are often influenced by recent waking experiences that are particularly prominent in memory. *Recent waking experiences* refers to recent specific, identifiable events in people's waking lives, in contrast to their more general ongoing concerns and anticipated events. Admittedly, the distinction between recent experiences and current concerns is not always clear, since people's recent experiences are often related to their ongoing personal concerns.

Types of effects. Waking experiences can have any of four different types of effects on dream contents. The same categories can be applied to current concerns and stimuli (such as sounds) that occur during sleep. After describing the types of effects I will give some dream examples to help make them clear.

(1) *Direct incorporation* is the appearance in a dream, in an essentially unmodified form, of any person, object, location or event from a recent waking experience. Day residues, in the narrowest sense, are direct incorporations of recent waking experiences into the manifest dream content—for example, if someone with whom you spoke during the day were to appear in your dream that night. The fact that it was an incorporation from a daytime experience would be especially clear if the person were someone whom you rarely saw or thought about. In general, dream contents—people, objects, locations, and events—may be more clearly classified as incorporations (either direct or associative) from recent daytime experiences if they are not common, everyday occurrences. Otherwise, it is not clear whether their appearance in the dream is due to recent experiences or to memories of older experiences. Direct incorporations are less common than associative or symbolic incorporations.

(2) *Associative or symbolic incorporation.* Two words, objects, or events are *associated* with each other if thinking of one tends to make you think of the other (as in salt-pepper). Associative connections can vary in strength or degree. Associative connections between two things might arise because of sim-

ilarity of appearance, sound, function, family relationship, category membership, location, or temporal contiguity (as in classical conditioning). Dreams may include contents—such as people, objects, places, or events—that are associated with those of recent waking experiences. For example, if during the day you are examined by a doctor, and that night you dream about some interaction with a different doctor, or different type of medical specialist, it could be an associative dream incorporation.

A *symbol* is something (such as a pattern or object) that is chosen to represent a particular idea, person, object, or event. Advertising logos and religious symbols (cross, star) are familiar examples. According to psychoanalytic theories of dream interpretation, objects in dreams may symbolize something quite different from their surface appearances. For example, in Freudian dream interpretation, a cigar might symbolize a penis, and a purse might symbolize a vagina. Freud (1900) thought that dream symbols function mainly to represent repressed wishes or desires, but the modern view is that people, objects, or events from waking experiences may be symbolically represented in dreams. On some occasions, the overall pattern of a dream story may be a symbolic metaphor of a waking experience, even though specific objects in the dream do not all necessarily symbolize specific objects from waking experience (Antrobus 1977).

In principle, symbolic and associative incorporations are distinguished from each other by the idea that symbols are created by intentional thought, or through some sort of dynamic, purposive unconscious process (such as “dreamwork” in Freudian theory). Associations, on the other hand, are relatively simple connections that may be formed through automatic, unintentional processes.

In practice, however, it is virtually impossible to distinguish between associative and symbolic dream incorporations. As in waking thought, a dream-symbolization process might represent an object or event by selecting one that is associatively related to it (such as by family or category membership). To knowledgeable people analyzing their own dreams, it is often obvious that objects and events in their dreams are associatively related to their recent waking experiences. But there is no way of knowing whether dream contents are related to daytime events through a relatively simple, automatic association process, or through a more complex, purposive symbolization process. Furthermore, the idea of dream symbolization is controversial, because different dream interpretation theories (such as Freudian or Jungian) have different ideas about what dream symbols mean, and there is no way to prove which interpretation is correct.

You do not have to embrace any particular theory of dream interpretation to recognize associative relationships between dream contents and objects/events from your recent waking experience. If dream symbolization does occur, I suggest that it is a shallow symbolism, transparent to knowledgeable persons analyzing their own dreams. The best way to know whether a symbolic or associative connection between dream content and waking experience is true or accurate is whether it “rings true” to you—whether it seems intuitively to be accurate. If a psychoanalyst (whether amateur or professional) suggests some far-fetched symbolic interpretation of one of your dreams, and it sounds to you like a lot of baloney, you are probably right!

(3) The *emotional tone* of dreams may be affected by waking emotional experiences, either with or without any identifiable content incorporations (such as persons) from the waking event. The emotional tone of a dream is often related to a general story theme that parallels a waking experience, even though the specific details are different. For example, a waking experience of frustration over your inability to contact your parents by telephone might be followed by a dream involving frustration over your inability to drive across a bridge to visit a friend. Emotional tone is perhaps the most common type of effect of waking experience on dreams.

(4) *Nonspecific effects* are scorable dream characteristics other than content incorporations and emotional tone. Nonspecific effects include dream characteristics such as vividness, length, coherence, and bizarreness.

Retrospective analysis of home dreams. Here is an example of one of my own dreams that shows several types of influence by a daytime event:

I was a foot soldier in an ancient army, dressed in leather armor and carrying a sword and shield. It was nighttime, and we were sneaking up a hill, getting ready to attack the castle on top of the hill. As I approached closer to the castle suddenly I heard a loud scream and I turned to see a large Viking warrior, sword drawn, jumping down onto me from a ledge. The warrior had a shaggy reddish-brown beard and a frightening grin. When he raised his sword to strike me, I woke up (GWF dream, March 1982).

After I woke up I thought about the dream, and it was easy to connect it with a daytime event. That evening I had participated in a chess tournament. At one point in the game I thought that I could get a checkmate in three more moves, and I was excited about the prospect of winning against my higher-rated opponent. I made my first move, and my opponent did not make the obvious recapture but instead launched a surprise counterattack in which I myself was defeated in three moves! I was upset with myself for losing, enough so that that night I lay awake thinking about the game for awhile before falling asleep. To a chess player the associations (symbols?) are obvious: chess has ancient origins, and all of the pieces originally represented military figures. The dream theme of being a soldier on the attack and then being defeated in a surprise counterattack obviously parallels the events of the chess game. To top it off, the Viking warrior had a reddish-brown beard like that of my chess opponent! This dream shows associative incorporations of objects (the dream castle represents the castled king in chess) and events (attack and counterattack), as well as a direct incorporation (the beard), and, quite clearly, an effect on emotional tone (unpleasant surprise). The dream seems to be a metaphoric representation of the daytime event (Antrobus 1977).

This next dream of mine is less dramatic, but it shows a direct incorporation of a name from a recent waking event, and it includes people associated with that name in my past experiences:

I dreamed that I went to a library reading room to meet B. F. Skinner, the leading behaviorist, for a discussion of theoretical issues in psychology. I waited

alone for a while, sitting at one of the wooden tables in a large room with a high ceiling, tall windows, and walls lined with tall bookshelves. Then three other experimental psychologists—Phil Dunham, Barry Dworkin, and Tom Zentall—arrived. We waited together, but Skinner never showed up. Finally we left the library (GWF, August 1990).

The previous morning I had read in the newspaper that B. F. Skinner had died recently. The other psychologists are people I knew in the early years of my career, who shared my interests in operant conditioning and learning theory. Dunham and Dworkin were graduate students with me at the University of Missouri, where Dworkin and I participated in a televised interview with Skinner in May 1968; I met Zentall at a convention shortly after graduate school, and corresponded with him about our mutual interests. I have not seen any of them for ten to twenty years, and I do not recall any of them ever before appearing in my dreams. This dream does not have any profound symbolism. It simply expresses the thought that, if I wanted to talk with Skinner again, it is too late. The large, high-ceilinged library room may be associated with the idea that Skinner was a prominent intellectual figure.

What kinds of waking events are most likely to affect dream contents? Ullman (1969) suggested that the qualities of novelty, intrusiveness, and unpreparedness are important. *Novel events* are outside of our range of past experience. *Intrusive events* are related to important unresolved personal issues. In either case we may be *unprepared* to deal with the event at the time that it occurs. Dreaming may represent an attempt to cope with the event. Tolaas (1980) suggested that dreams are concerned more with our affective reaction to intrusive waking events than with our cognitive reaction. He gave an example of one of his own dreams:

Once when I was trying to avoid a young woman who used to ask me uncomfortably difficult questions about a university extension course, I jumped into our little green car and asked my wife to drive off. In the following night we had a dream-confrontation at a skiing center. I was driving a strange, motorized mini-bobsleigh made of green plastic. All of a sudden, the young woman in question came driving towards me at great speed in a kind of red mini-snowmobile and I was hard put to get away. She has a small red car and her husband drives the snowmobile of the Red Cross corps stationed there (p. 189).

Again, the dream seems to be a metaphoric depiction of waking experience. The waking experience is identifiable in terms of both the emotional reaction, and person and object incorporations—either direct, associative, or symbolic. There is no deep symbolism or hidden meaning. If the dream is symbolic, it is a shallow symbolism of meaning that is obvious to the dreamer when he or she is familiar with the ideas of association, symbolism, and metaphor. Waking events probably influence dreams more than we usually realize, though their influence may not always be as obvious as in these examples.

Laboratory studies. One problem with using home-dream reports to study the influence of waking events on dreams is that the waking events are

uncontrolled. Laboratory studies have the advantage of deliberate manipulation of presleep events, plus the fact that subjects can be awakened from REM sleep for periodic dream reports.

Several laboratory studies have used films as presleep stimuli. For example, Goodenough et al. (1975) collected REM dream reports from twenty-eight male subjects. Following a laboratory adaptation night, on four later nights the subjects viewed one of four different films, in a counterbalanced sequence. Two of the films were intended to be emotionally stressful (for example, the "subincision" film, showing an initiation ceremony in an Australian aborigine tribe during which adolescent boys' penises were slashed with a stone knife), whereas two films were nonstressful (for example, a travelogue about springtime in Paris). Compared to the neutral films, the stressful films produced greater delay of sleep onset. (Other research has shown that spontaneous awakenings during REM periods occur more frequently following stressful than nonstressful films; Baekeland et al. 1968.) There was little evidence for direct incorporation of film elements into the dreams. However, stressful films produced greater anxiety in dreams (as rated by the subjects), and greater respiratory irregularity during REM periods. Respiratory irregularity is an indicator of anxiety, and it is noteworthy that subjects who had shown the greatest respiratory irregularity while watching the stressful films subsequently showed the greatest respiratory irregularity during sleep. This study makes the point that a particular event can have different effects on sleep and dreams for different people, depending upon how they personally interpret and react to the event. (A conclusion similar to that from Cartwright's [1984] study of divorced women's dreams.)

Other studies have not consistently replicated Goodenough et al.'s results regarding anxiety reactions to stressful films. All studies agree, however, that direct or obvious symbolic incorporation of film events into dreams is relatively rare (no more than 5 percent of dreams), and is not consistently more common for stressful than for nonstressful films (see review by Arkin & Antrobus 1978). Cartwright et al. (1969) found no direct incorporation of pornographic film contents into the dreams of heterosexual male medical students, though there were some possibly symbolic incorporations. One cannot be sure whether the subjects did not have sexy dreams, or whether they failed to report dreams that they had had (Cartwright & Kaszniak 1978). One limitation of laboratory studies of presleep events is that it is not possible, for ethical reasons, to expose subjects to authentic, strongly stressful or pleasurable events.

An unintentional but informative laboratory finding is that it is common for dream reports to include some direct or associative reference to the laboratory situation itself, particularly on the first night in the laboratory (the "first-night effect") (see Cohen 1979a; Cartwright and Kaszniak 1978; Dement, Kahn, and Roffwarg 1965). This probably occurs because sleeping in the laboratory is a novel and somewhat stressful event. For example, in Cartwright's (1984) study of divorced women, 28 percent of the married control subjects' dreams had laboratory references. The fact that only 12 percent of the recently divorced subjects' dreams had laboratory content shows that the laboratory effect can be overridden by other emotionally significant concerns.

Stimuli During Sleep

Specific, identifiable sensory stimuli, either external or internal, can affect dream contents. In the next chapter I will discuss Hobson and McCarley's (1977) theory that dreams are influenced by sensory-system events that form part of the unique physiological response pattern of REM sleep. Here the concern is with external stimuli, and internal stimuli that are not specific to REM sleep. In principle, a stimulus during sleep might have any of the four types of effects on dreams that were discussed above in regard to recent waking experiences.

Organic stimuli. Among internal stimuli that can affect dreams, one of the most potent is pressure from a full bladder. You have probably had dreams in which you felt the need to urinate, and dreamed that you were actually urinating or getting ready to do so, upon which you awakened to the sensations of a full bladder. Or a full bladder might induce dreams with associated contents, such as running water. A female student suffering from bronchitis reported: "I dreamed I was suffocating under something wet and heavy like a pile of wet, warm blankets . . . I was unable to move or breathe" (RM, December 1988).

Freud reported that if he ate anchovies or any other highly salted food in the evening before going to bed: "I dream I am swallowing down water in great gulps, and it has the delicious taste that nothing can equal but a cool drink when one is parched with thirst. Then I wake up and have to have a real drink" (1900/1965, p. 156). Thirst as an internal stimulus was examined in a laboratory study by Dement and Wolpert (1958), who asked subjects to avoid drinking anything for twenty-four hours. There were no cases of REM dreams involving actual feelings of thirst or drinking something. However, five of fifteen reports contained images associated with the thirst drive. For example: "While watching TV I saw a commercial. Two kids were asked what they wanted to drink and one kid started yelling, 'Coca-Cola, orange, Pepsi,' and everything" (p. 549). Using more liberal scoring criteria, Bokert (1968) found actual thirst themes in a minority of his thirsty subjects' dream reports.

External stimuli. Figure 11.1 shows a plausible example of how an external stimulus, a baby's cry, might be incorporated into a dream. "The French Nurse's Dream" was reproduced by Freud from a Hungarian comic paper. According to Freud, the dream was a response to the sleeping nurse's unconscious recognition of the child's cry and its significance. "The ingenious artist had in this way cleverly depicted the struggle between an obstinate craving for sleep and an inexhaustible stimulus towards waking" (Freud 1900/1965, p. 403).

Several studies have examined the effects of external stimuli on dreams. One of the first was a self-experiment by Maury (1861), in which he arranged for someone to bring a hot iron close to his face while he was asleep. He dreamed that robbers "had made their way into the house and were forcing its inhabitants to give up their money by sticking their feet into braziers of hot coal" (cited in Freud 1900/1965, p. 59).

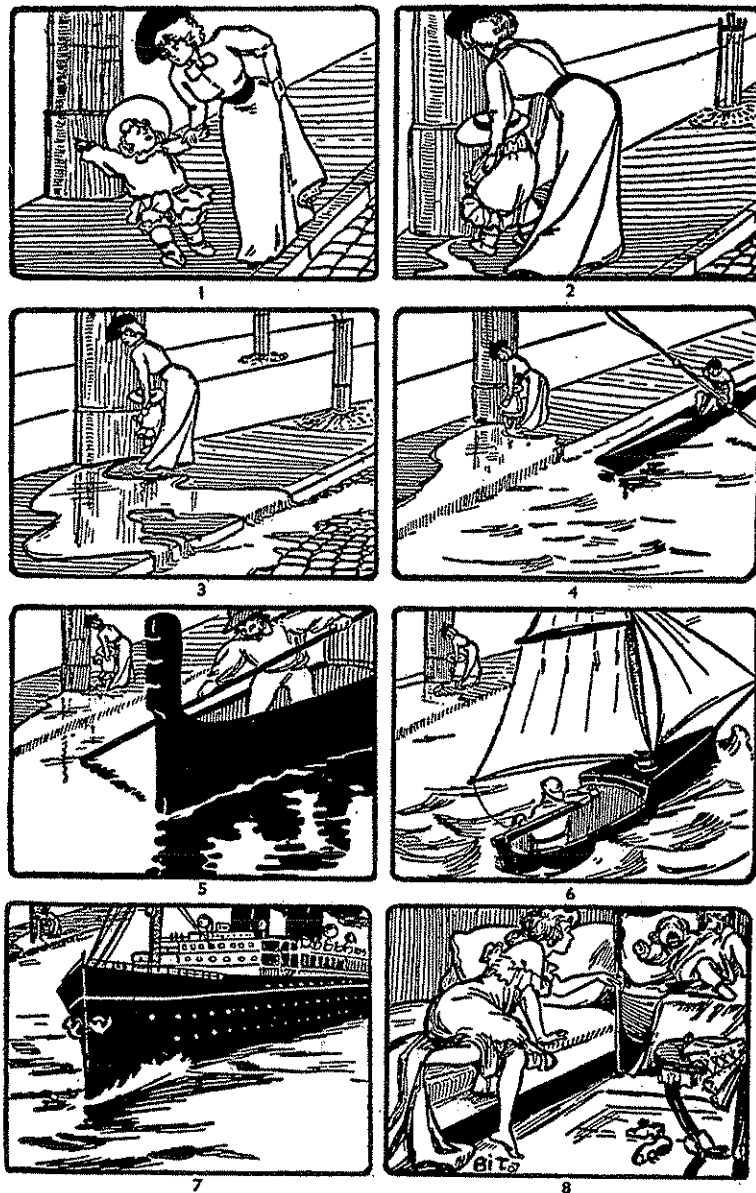


FIGURE 11.1. "A French Nurse's Dream." This cartoon was used by Freud to illustrate the fact that dream contents can be affected by stimuli occurring during sleep. [From Freud, S. (1900/1953). *The Interpretation of Dreams*. Translated from the German and edited by James Strachey. In *The Standard Edition of the Complete Works of Sigmund Freud* (Vols. 4 and 5). Published in the United States by Basic Books, Inc. by arrangement with George Allen & Unwin and The Hogarth Press Ltd. Reprinted by permission of Basic Books (a division of HarperCollins Publishers) and The Hogarth Press Ltd.]

The first modern laboratory study of the effects of external stimuli was done by Dement and Wolpert (1958), who tested twelve subjects for several nights each. In different REM periods the subjects were stimulated with either a 1000 Hz tone, a bright flashing light, or a fine spray of cold water, and a minute later they were awakened by a loud doorbell. The water spray was clearly the most effective stimulus. It awakened the subjects on 39 percent of the trials, but when it did not awaken them it was incorporated into dreams 42 percent of the time, either directly or indirectly (as in images of sudden rainfalls, leaking roofs, and being squirted by someone). The light flashes were incorporated into dreams on 23 percent of the trials (through such images as a fire, a flash of lightning, and the experimenter shining a flashlight into the subject's eyes). The tone was incorporated on 9 percent of the trials, and the waking doorbell was incorporated on 10 percent of trials (as a telephone or a doorbell, for example). The latter effect is similar to what sometimes happens when you use an alarm clock, and you incorporate the alarm sound into your dream (perhaps as a ringing telephone) and go on dreaming for a few seconds before you awaken.

The influence of verbal stimuli—names of people known to the sleeper—on dreams was studied in sixteen subjects by Kramer, Kinney, and Scharf (1983b). The names were tape recorded by the subject himself, and included twenty names of high personal emotional significance, and twenty names of low significance. Each name was played to the subject in a different REM period, and the subject was awakened for a report two to ten minutes later. Stimulus incorporations occurred more often for names of high emotional significance (about 50 percent) than for those of low significance (about 8 percent). The most common type of incorporation was representation, in which the named person appeared in the dream. Other effects included direct incorporations of the spoken name itself, and associations—such as rhyming names and phrases, and other associated contents. For example, after a man's girlfriend's name was spoken to him while he was asleep, he subsequently reported a dream about sailing, with no mention of the girlfriend in the dream report. In the morning, while reviewing the dream report, he commented that he had recently been talking with his girlfriend about their plans to go sailing over summer vacation. (Other studies with verbal stimuli have obtained less frequent incorporations than Kramer et al.; Kramer et al.'s use of significant names spoken by the subject himself may have been critical [see review by Arkin & Antrobus 1978].)

While there is clear evidence that stimuli applied during sleep can affect dream contents, this ordinarily occurs on only a minority of trials. To be effective, a stimulus must be strong enough to be detected during sleep while sensory thresholds are increased, yet not strong enough to awaken the sleeper. Some stimuli affect dreams more than others do, particularly personally meaningful stimuli such as emotionally significant names. A baby's cry may awaken parents when other equally loud stimuli would not. The few studies that tested stimuli during NREM sleep found less effect on NREM dreams than on REM dreams. Sleep stimuli do not cause dreaming *per se*, though they may be incorporated into ongoing dreams.

Conclusion

The influences of recent experiences and so forth on dream contents are not always readily apparent, but they can often be discovered by people who analyze their own dreams and who are familiar with the processes of association and symbolism. Such influences can sometimes be discovered by other people (such as therapists and researchers) who have sufficient knowledge of both the dream and the dreamer and his or her recent experiences.

Though dreams are constructed from knowledge in the individual's memory, they are, not mere repetitions of stored knowledge and experiences. Rather, dreaming is a creative process, and the exact contents and narrative sequences of dreams cannot be reliably predicted or experimentally controlled. In the next chapter I will discuss three major theories of dream production, and I will raise the question whether dreaming serves any important psychological function.

SUMMARY

Sleep mentation refers to any conscious mental event that occurs during sleep. A *dream* is a subjective experience, occurring during sleep, that involves complex, organized mental images that show temporal progression or change—in other words, dreams tell stories.

Snyder's (1970) normative study of REM dreams in young adults led to the conclusion that most REM dreams are a "remarkably faithful replica of waking life," insofar as they depict realistic-looking people, objects, and scenes. Most dream events are credible though fictional creations of the dreamer's mind. Most dreams tell coherent stories. The self is the central character in almost all dreams, and verbal communication occurs in most dreams. Contrary to common assumptions about typical dreams, only a small percent of REM dreams are very dramatic, emotional, or bizarre. Misconceptions about "typical" dreams probably arise because of selective recall of more dramatic, emotional, and bizarre dreams under home conditions, compared to laboratory conditions under which more representative dream samples can be collected.

Contrary to beliefs in the early days of laboratory dream research, we now know that dreaming occurs in at least a large minority of NREM sleep periods; other NREM periods may have imageless sleep thoughts. Differences between REM and NREM mentation are relative rather than absolute, and they are greater for deep sleepers than for light sleepers. Compared to REM, NREM mentation tends to be less visually vivid, have less emotion, dramaticity, physical activity, and thematic continuity, more contemporary content, and be more poorly recalled.

The *hypnagogic state* is the drowsy transition period between waking and sleeping, and consists of an alpha SEM phase (alpha EEG with slow eye movements) followed by descending NREM Stage 1. In the hypnagogic state, vivid visual images (hypnagogic hallucinations) occur, which are often relatively

static as contrasted with the movie-like temporal progression shown in typical REM dreams. Hypnagogic images are forgotten very rapidly upon awakening. In other respects, hypnagogic images are much like REM dreams.

Five classes of variables that affect dream contents were discussed. (1) Demographic and cultural groups may differ statistically in the frequency of different types of dream contents. Such groups are heterogeneous, and average differences between groups are likely to reflect differences in the current concerns and waking experiences of their members. (2) Different personality and psychopathological types may differ in typical dream characteristics. Chronic nightmare sufferers often show psychotic-like personality characteristics, with oddities of perception and thinking, and report having been sensitive and introspective as children. (3) Current personal concerns, such as anticipated events and unsolved problems, often affect dream contents, particularly when they are related to strong mood states. Cartwright studied dreams of recently divorced women, and found that the most common dream motives of depressed subjects were belongingness and safety, whereas nondepressed subjects' dreams reflected self-esteem and control themes. (4) Recent waking events often affect dream contents, in any of several ways, including (a) direct incorporation, (b) associative or symbolic incorporation, (c) emotional tone, and (d) nonspecific effects (vividness, length, and so forth). Novel and intrusive waking events are most likely to produce day residues in dreams. (5) Stimuli during sleep can affect dreams in the same ways as presleep events. Personally meaningful stimuli, such as names of emotionally significant people, are more likely to affect dreams than are meaningless stimuli. In general, the evidence strongly supports the continuity hypothesis, which says that dreams reflect the individual's waking personality, personal concerns, and recent experiences.

ENDNOTES

¹A computer search of a Bible (King James Version) database revealed that the word "dream" or "dreams" is used in at least seventy-eight verses (in twenty-seven different chapters) in the Old Testament, and in seven verses (in four chapters) in the New Testament. Dreams are mentioned most often in books Genesis and Daniel. The word "vision" or "visions" is used in at least seventy-eight verses (in forty-eight chapters) in the Old Testament, and in seventeen verses (in thirteen chapters) in the New Testament. Visions are mentioned most often in books Ezekiel, Daniel, and Acts. Some uses of "vision" clearly refer to dreams, and some of the other visions may have been dreams. (Thanks to Jerry Metz and Pat Carol for doing the computer search.) For an interesting example of a biblical dream, read about King Nebuchadnezzar's dream, and Daniel's interpretation of it, in Daniel 4:4–37 in the Old Testament or the Torah.

²In discussions of NREM mentation, data from NREM Stages 2, 3, and 4 have usually been lumped together since reliable differences in mentation between those stages generally have not been reported. However, descending Stage-1 NREM, at sleep onset, is a different matter. Stage 1, which is part of the *hypnagogic state*, may differ from other NREM stages, particularly in having more perceptually vivid images. The hypnagogic state is discussed in more detail in a later section.

³Though I believe that nowadays most laboratory dream researchers would agree with the picture of NREM sleep mentation that I have presented here, the issue of NREM dreaming is not yet dead. Allan Hobson—whose activation-synthesis theory (Hobson & McCarley 1977; discussed in the next chapter) stipulates that vivid, dramatic, bizarre dreaming is produced by physiological processes specific to REM sleep—has argued recently that reports of dreaming after

NREM awakenings may be a result of experimental demand characteristics. Hobson (1988) said that subjects awakened from NREM Stages 2, 3, and 4 are increasingly disoriented and have difficulty in reaching full arousal and in recalling previous mental activity. Particularly after arousal from Stage 4, subjects appear to be very disoriented, and their EEG may still be in Stage 4. "Following many arousals from Stage 4, subjects often seem to be actively confabulating. . . . This experimental sleep talking, with its completely disorganized brain activity, puts in grave doubt the validity of any reports obtained from Stage 4 awakenings; and subtracting such confabulatory reports may further reduce the amount of dreaming that is actually occurring in the non-REM phase of sleep. . . . Subjects who perceive that the experimenter wants a dream report may be encouraged to confabulate [make up] such a report so that they will be allowed to go back to sleep." (p. 145). Of course, subjects could confabulate dream reports after REM awakenings, too. Most researchers do not seem to feel that confabulation is a serious problem.

⁴The drowsy period of transition from sleep to wakefulness is termed the *hypnopompic state*. There has been little research on the hypnopompic state. Sometimes it is rather arbitrary whether a particular episode is termed hypnopompic or hypnagogic, for example, the drowsy interval after briefly awakening, before falling asleep again.

⁵The difficulty of doing home studies of hypnagogic imagery is that people usually fall asleep before they can recall and record their hypnagogic experiences. In order to wake yourself up just before you fall asleep, Tart (1972c) suggested balancing your forearm vertically (as you lie on your back), such that when you lose muscle tone as you fall asleep, your arm will drop, thus awakening you. Tying a bell to your hand might help. Bertini, Lewis, and Witkin (1964) described a technique for producing and sustaining a drowsy state by using constant, homogeneous sensory stimulation.

⁶Other researchers have found that relatively slow, high-amplitude theta waves (4–7 Hz) in descending NREM Stage 1 are a distinctive feature of the hypnagogic state (Dement & Kleitman 1957; Stoyva 1973), and that the onset of the hypnagogic state is indicated by relaxation of the forehead muscles (reduced frontalis EMG; Stoyva 1973).

⁷Some personal observations lead me to believe that it would be worthwhile to examine the relationship between hypnagogic images, external stimuli, and muscle movements. While falling asleep people sometimes make reflexive muscle jerks that awaken them. Sometimes these jerks are accompanied by hypnagogic images. For example, on one occasion my reflexive leg twitch was accompanied by a hypnagogic image of slipping and falling on a wet, slick floor. Also, recall my thumb-twitch, horn-honking image (described in the section on time experience in dreams). Though in such cases it might seem subjectively that the dream image causes the muscle movement, Hobson and McCarley's (1977) theory says that physiological events (including muscle twitches) can elicit dream images. (More on Hobson and McCarley's theory in the next chapter.)

⁸*DSM-III*, the diagnostic manual of the American Psychiatric Association (APA 1980) lists several personality disorders that involve longstanding, maladaptive traits, but that are not considered to be major clinical syndromes. The *schizotypal* person is eccentric and experiences oddities of thought and perception (such as magical thinking and derealization), and odd behaviors such as speaking digressively and with overelaborations, and is usually socially isolated. The *borderline* person is impulsive and unpredictable, and has an uncertain self-image, intense and unstable social relationships, and extreme mood swings. Both types may appear psychotic under stress (Davison & Neale 1986).

⁹Besides emotionally significant personal concerns, dreams can be affected by people's personal interests or hobbies that occupy their daytime thoughts. An avid birdwatcher in Maine told me that besides keeping lists of birds seen on field trips he also keeps a list of birds seen in his dreams. Over a five-year period he has seen 189 different bird species in his dreams, including some that are not shown in any bird identification books! (For example, the "blue-breasted woodpecker.")