

## 4 Findings on Dream Content in Individual Dream Series

Dream journals, which usually consist of hundreds to thousands of dream reports, are kept by a very small but diverse set of individuals in many parts of the world. These individuals keep a record of their dreams for their own separate reasons, which only rarely have anything to do with psychotherapy or an interest in any dream theory (A. Bell & Hall, 1971; Domhoff, 2003, chap. 5; 2015; Hall & Lind, 1970; M. Smith & Hall, 1964). The dream series contained in dream journals are a form of unobtrusive, nonreactive archival data. They are uninfluenced by demand characteristics, expectancy effects, and social desirability factors, which can arise as subtle confounds in experimental settings, whether using human participants or other animals (Kihlstrom, 2002; Orne, 1962; Rosenthal, 1976; Rosenthal & Ambady, 1995; Webb, Campbell, Schwartz, Sechrest, & Grove, 1981).

Unobtrusive measures have enjoyed a respected methodological pedigree in psychology and related fields since the early 1940s. They have led to new insights in the study of personality, social psychology, and community psychology (Allport, 1942; Webb et al., 1981; Whitley & Kite, 2013). Nonetheless, they are not frequently used because most researchers prefer to do experimental and observational studies whenever it is possible. In addition, there are relatively few sources of good nonreactive data for most substantive issues. Perhaps the biggest exception to the lack of good nonreactive archival data is in the field of dream research. It is also the area of study that is most limited in terms of the possibilities of experimentation and in which it is impossible to obtain dream content until after the fact. When the difficulties of obtaining even four or five dream reports from volunteers over a one-week or two-week time span are added to the picture, the possibility that dream series might provide useful data becomes of greater interest.

Most analyses of individual dream series are based on Hall/Van de Castle (HVdC) content categories, which make it possible to compare the results with the replicated group norms for American men and women (Hall et al., 1982; Hall & Van de Castle, 1966; Tonay, 1990/1991). These comparisons with the HVdC normative findings also lead to inferences about the dreamers' waking thoughts, which are based on statistically significant deviations in any given dream series from the norms. In that regard, the analysis of multiple content indicators in a dream series can be placed in the same realm as standardized personality tests, which are based on numerous questions and also rely on group norms. Thus, studies of dream series are not similar to "case studies." Case studies usually do not include the same detailed, systematic quantitative information from individual to individual and therefore cannot be compared with quantitative, group-based norms.

Quantitative studies of about two dozen dream series, using a variety of HVdC coding categories, have shown that the main characters, avocations, and personal preoccupations in them are consistent over months, years, or decades (Domhoff, 1996, chap. 7; 2003, chap. 5; Lortie-Lussier et al., 2000). This past research reveals three types of consistency are possible: absolute, relative, and developmental. Absolute consistency, which also can be called constancy, means the frequency of a dream element varies very little over time periods of several months or years. Relative consistency is defined in terms of one or another dream element always exceeding the frequency of a related element, although one or both of them may increase or decrease in frequency. Developmental consistency is defined as a continuous increase or decrease in any dream element.

Moreover, dream series provide a good opportunity for studies that examine the degree to which the conceptions and concerns found in dream reports also might be present in waking thought. This search for continuities between dreaming and waking thought can be carried out by asking participants to confirm or reject a series of inferences that are based on blind quantitative analyses of a dream series. In these studies, the researcher knows little or nothing about the dreamer at the outset. Studies of roughly a dozen dream series based on this strategy have shown that there is usually considerable continuity between the frequency with which specific people and avocations appear in a dream series and the intensity of waking personal concerns about those people and avocations. These studies thereby establish a general rule: frequencies in dream series reveal the

intensity of concerns in waking life (Bulkeley, 2012, 2014; Domhoff, 1996, chap. 8; 2003, chap. 5; 2015).

Finally, studies of ongoing dream series provide an excellent way to test claims based on questionnaire studies or two-week dream diaries. This is particularly the case when researchers allude to some recent event as part of their questionnaire studies. By asking people if they have had a dream about a recent dramatic event, such as an earthquake, researchers may inadvertently introduce implied demand characteristics. This may be especially the case for participants who follow the media closely or have a strong desire to tell researchers what they think the researchers want to hear. This possibility is examined in this chapter in a study of six ongoing dream series in regard to the concern about the coronavirus pandemic and COVID-19. All of these participants had been keeping a record of their dream reports for their own personal reasons, well before the investigator thought about doing such a study.

Most of the findings in this chapter have been presented in detail in published sources, so they can be presented in a more summary form here. The emphasis in this chapter is therefore on the theoretical implications of the various studies. In addition, most of the dream series discussed in this chapter can be examined by readers on DreamBank.net, an online resource, which is discussed early in the chapter. Before turning to the results of these varied studies, however, it is essential to provide the methodological and statistical rationales that underlie these studies. If these rationales make sense to readers, then the study of dream series can contribute to the creation of a plausible neurocognitive theory of dreaming and dream content.

### **Safeguards, Methodological Strategies, and Statistical Rationales**

The consideration of a dream series for possible use begins with efforts to determine its authenticity and accuracy. Dream reports posted on the Internet are never used. The veracity of such reports and the motives for posting them cannot be known with any certainty. Dream reports written down from memory months or years after they were thought to have occurred are not useful. They are not part of any dream series that has been studied. It is also necessary to ask the person why they began to write down or voice-record their dreams to begin with, and also to ask why they decided to offer their dream reports to dream researchers at the time they did so. People

are usually very candid in response to these questions. Their answers often lead researchers to write tactful expressions of regret that it is not possible to study their dream journal. It is also necessary to ask for photocopies of pages from handwritten dream series or to examine Word files for information on the dates on which the first entries were made. It is useful to search the Internet for possible information on the actual origins of dream series that seem to be questionable as to their authenticity.

If a decision is made to examine the dream series, it is essential to read through it before deciding to study it. There is no certain way to know that any given dream report collected in any setting, whether a sleep-dream laboratory or otherwise, is fabricated, slightly altered, or authentic. Two past studies found some content differences in the two types of reports, but one did not. Using rating scales, one found that it was possible for independent judges to distinguish made-up and authentic dream reports, but the other did not (see Domhoff, 1996, pp. 47–48, for a summary). In the Berkeley normative study of women, a later post-collection information questionnaire found that 3.8% of the participants said they made up one or more of the reports. Fully 43% of the students in the class, many of whom did not participate in the study, reported they probably would have made up dream reports if participation had been required (Tonay, 1990/1991).

### **Methodological and Statistical Issues**

As noted and demonstrated in chapter 3, the first crucial methodological issue confronting dream research concerns the length of dream reports, which can vary greatly from sample to sample. If there is no control for dream length, results often cannot be replicated. To examine this issue in detail, a random sample of 250 dream reports from the first 3,116 dream reports in a lengthy dream series were studied. This series carries the pseudonym Barb Sanders. These dream reports, which ranged in length from 50 to 300 words, as in the HVdC normative samples, first were coded for the most important and length-sensitive coding categories—characters, social interactions, and misfortunes. The analysis showed the HVdC content indicators control for length within this range, including for the at-least-one indicators. In addition, random samples of 200 shorter and 200 longer dream reports from this series were coded for the same content categories. This analysis revealed that the content indicators, whether they involve

percentages or ratios, cannot adequately correct for length in dream reports with less than 50 words. However, they controlled for length perfectly for dream reports with more than 300 words. These results support the decision by Hall and Van de Castle (1966) to exclude dream reports shorter than 50 words, which was based on their unpublished results.

However, the various at-least-one indicators cannot control for dream length above 300 words because they do not include controls for length. Since dream reports with more than 300 words have increasingly more of several types of dream content in them as they grow longer, at-least-one indicators should not be used with the relative handful of very long dream reports in a dream series (Domhoff, 2018b, for details).

### Sample Sizes

As also noted and demonstrated in chapter 3, sample size is another major methodological issue that faces all dream researchers. A study was therefore carried out using the HVdC codings for the same random sample of 250 dream reports from the Barb Sanders series, using approximate randomization. Based on 10,000 resamplings, *any* sample of 125 of the 250 dream reports replicates the overall results almost exactly. However, as was the case with the studies of the HVdC normative sample discussed in chapter 3, there are many deviations from the overall results with subsamples of 100 dream reports. The drop-off is large at 75 and 50 dream reports, demonstrating once again how risky it is to accept or reject hypotheses based on inadequate samples sizes (J. Cohen, 1977, 1990, 1994; Domhoff, 1996, pp. 65–66; Domhoff & Schneider, 2008a).

### The Issue of Autocorrelation

The issue of autocorrelation is a concern in any psychology study that includes repeated responses from the same participant. In dream research, the possible lack of independence among a series of responses is unlikely in terms of finding a false consistency. This is because autocorrelation is thought to be increasingly unlikely as the time between responses increases, from a few seconds to a minute to several minutes, and so on. Since dreams usually are recalled only three to five times a week by many of those who keep dream series, autocorrelation is less of a possibility. However, the issue nonetheless needs to be addressed statistically.

The Wald and Wolfowitz (1940) runs test, a statistical technique designed to test for randomness in categorical time-series data, can detect the presence of any form of dependency within a dataset. This generalization includes monthly or seasonal cyclical patterns. It is the best-suited test for categorical data because the frequently used Durbin-Watson test assumes at least an interval level of measurement (Klingenberg, 2008). The Wald-Wolfowitz test determines whether there is any pattern in the “runs” that appear. (A run is defined as a series of similar responses, followed by a dissimilar observation, which in turn may or may not become the first instance in another run.) The application of the runs test begins by counting the observed number of runs and comparing them with the expected number of runs. The expected number of runs is determined by a formula that accounts for the number of runs and the overall frequency of occurrence for each type of observation. Using a formula based on the difference between observed and expected proportions, a  $Z$  score and  $p$  value are calculated.

In a study of five different dream series, 125 runs tests were carried out on several hundred dream reports. These dream reports had been previously coded for various HVdC categories as part of substantive studies (Domhoff & Schneider, 2015a). The analysis of these 125 different sets of codings, all of which are longer than most of the sets of repeated responses analyzed in other types of psychological studies, ranged from 86 to 171 dream reports. The analysis resulted in only six statistically significant results, five at the .05 level and one at the .01 level. The percentage of statistically significant  $p$  values, 4.8% at the .05 level and 0.8% at the .01 level, is very close to what would be expected by chance for each significance level (Domhoff & Schneider, 2015a, pp. 73–74, table 1). Since the failure to reject the null hypothesis of randomness also can be due to very weak autocorrelations, a one-period lagged phi coefficient also was computed for each dream series in order to examine the results more rigorously. These first-order phi coefficients were extremely small, which suggests the results of the Wald-Wolfowitz test are accurate (Domhoff & Schneider, 2015a, p. 73).

Based on these results, it is very unlikely autocorrelation will be found in any dream series that has been carefully checked for the authenticity of the dream reports to avoid hoaxers. However, if there are any doubts about any given dream series, it can be checked for autocorrelation with the aforementioned utility, which can be used for studies of HVdC categories.

### The Issue of Multiple Tests on the Same Sample

The problem of generating false positives by carrying out numerous tests on the same sample is as potentially serious for the study of a dream series as it is for studying representative samples of dream content, as discussed in the previous chapter and in more detail elsewhere (Domhoff & Schneider, 2015b). For purposes of examining this issue in dream series, the codings for the Barb Sanders sample of 250 random dream reports was studied, using the Benjamini-Hochberg statistic for ascertaining the false discovery rate (Benjamini & Hochberg, 1995; Benjamini & Yekutieli, 2001). Nineteen content indicators were calculated and compared with the HVdC female norms. Twelve of the 19 indicators were originally statistically significant at the .05 level; 5 of those 12 were also significant at the .01 level. After applying the Benjamini-Hochberg correction, 10 of the 12 previously significant  $p$  values remained significant at below .05, with four of five remaining significant below .01. The two measures that crossed over from significant ( $p < .05$ ) to nonsignificant ( $p \geq .05$ ) had small effect sizes ( $h = .11$ ,  $h = .16$ ) (Domhoff & Schneider, 2015b). The similarity of these results to those for the HVdC normative samples for both men and women strengthens the case for the findings with dream series.

In addition, there are good reasons to assume approximate randomization works well with a dream series from one individual, mainly because there is no assumption of independence built into this approach (R. Franklin et al., 1997). Further, there is evidence that the  $h$  statistic for determining effect sizes can be used with a dream series. This evidence is based on a simulation study, which made use of approximate randomization with 10,000 resamples. The simulation study demonstrated that Cohen's  $d$  statistic for determining the effect size between two independent means is as accurate with repeated measures from one individual as it is with representative samples based on numerous individuals (Dunlap, Cortina, Vaslow, & Burke, 1996). Since proportions are a special case of the mean, this result holds for  $h$  as well.

### DreamBank.net: An Online Resource for Carrying Out Content Analyses

The online and publicly accessible website, DreamBank.net, provides a way to carry out all four steps of a content analysis in a matter of seconds or minutes. It does so through an algorithm that makes the use of word strings possible. (Simple examples of word strings might include father|mother|

sister|brother in the case of characters or living\_room|dining\_room|kitchen|bathroom|bedroom in the case of indoor settings.) The word strings entered into the search program are also the definition of the category's breadth and limits. Since the same results are guaranteed each time the sample is searched, the categories have perfect reliability. The search engine also provides instant frequency counts. It also creates analyses in the form of percentages, which are "at-least-one" indicators in the parlance of the HVdC coding system. The fourth step of a content analysis, a comparison with a normative or control group, can be carried out by using any given word string to analyze the extant 491 normative dream reports from women and the 500 normative dream reports from men. Then, too, relevant dream series available on DreamBank.net can be used as control groups. DreamBank.net contains roughly 34,000 dream reports, 26,000 in English and 8,000 in German. Most of these dream reports are part of several lengthy dream series.

Two types of word strings, generic and individually tailored, can be created for use on DreamBank.net. They are constructed with a slightly modified version of the Perl language for "regular expressions," which are codes used for pattern matching in computer programming (Domhoff & Schneider, 2008b; A. Schneider, 1999). Generic word strings concern topics likely to be relevant in the lives of most individuals. In principle, they can be used on a wide range of representative sets of dream reports as well as on individual dream series. Individually tailored word strings are separately created for each new dream series.

Generic word strings have to be based on a relatively circumscribed number of words commonly used by most people. Even though generic word strings rely on commonly understood words, they are susceptible to both false positives and false negatives, mostly because many words have multiple uses. They also have to be assessed for statements that deny the presence of an element (e.g., there were no trees in the backyard, there were no books on the shelf). This is especially the case if the word strings are not constructed using the language of regular expressions, which can eliminate some problems. Then the results with generic word strings usually have to be searched for false positives and false negatives, using the "show dreams" utility on DreamBank.net. Such searches can be carried out in a reasonable amount of time. The search terms appear in boldface when the relevant dream reports are displayed.



There are several simple generic word strings, including one for sensory terms, which was very useful in studying dream reports from people who were blind from birth or became blind later in their lives (Hurovitz, Dunn, Domhoff, & Fiss, 1999). (The results from this study are utilized in chapter 6 as part of an analysis of the development of visual mental imagery in children.) The others were primarily developed for demonstration purposes (Domhoff, 2003, chap. 4; Domhoff & Schneider, 2008b). However, there also is a useful word string for finding the degree to which religious elements are present in a series of dream reports.

### **Religious Elements in Dream Series and in the HVdC Normative Dream Reports**

The religion word strings are built on coding categories created by other dream researchers on the basis of the same breakdown of dream content into settings, characters, objects, and activities used in the HVdC coding system (Krippner, Jaeger, & Faith, 2001). Such an adaptation was possible because the terms used in relation to religious and spiritual concerns are limited in number. Religious settings, such as churches, synagogues, temples, and mosques, are relatively few in number, and the characters in religions, such as gods, angels, and spiritual leaders, are also few in number. Religious activities involve such matters as praying and worshipping. Religions usually have only a relatively few sacred objects, such as crosses, rosaries, and altars. Nor do any of various terms in this word string usually have additional, nonreligious meanings, except when used figuratively or in analogies (e.g., it was a “church-like” situation). It is therefore necessary to use the “show dreams” utility on DreamBank.net to search for false positives.

The religion keyword searches initially focused on the two normative samples, which found there were few religious terms once false positives were eliminated. After eliminating false positives, only 3.6% of the dream reports had at least one of these terms. Specifically, 2.5% of the dream reports mentioned places of worship. Only 0.8% of the dream reports mentioned specific religions or religious denominations. Only 0.7% mentioned religious objects. The percentages were even smaller for religious concepts, such as “worship,” “divine,” and “nirvana” (0.5%), and for religious leaders, such as deities, ministers, and priests (0.4%). The most prominent religious object in the dream reports was the altar, which sometimes appeared in dreams about weddings. When 10 dream series from adult men and 10 dream series

from adult women were searched, similar results emerged. However, there were some individual differences, and the dream series with the highest frequencies for each of these categories, as well as overall, were significantly different from both the HVdC normative dream reports for women, as well as from the cumulative results for the other nine dream series from women.

In addition to the generic word strings for sensory terms and religious elements, word strings have been created for other topics including perception, cognition, culture, natural elements, and emotions, along with numerous subcategories. They have been used to study consistency and continuity in several dream series (see Bulkeley, 2014 and 2018, for findings and references). These word strings are part of the Sleep and Dream database at <http://sleepanddreamdatabase.org/>.

### **Individually Tailored Word Strings**

As stated above, individually tailored word strings have to be created for each new dream series. They are therefore less likely to have defects. The process of creating them begins with a reading of several dozen dream reports in a new series. During this reading, as many repeated personal names for people and places as possible are entered into a Word file, along with repeated words and phrases. Separate word strings for characters, activities, places, avocations, and other common and well-understood topics, which are designed to parallel the HVdC coding categories, are then created from the initial compilation of words. The initial word strings are next extended and refined into revised word strings. This step includes reading through the dream reports found with the original string. At this point the revised word strings are again refined and some new word strings may be created as well. Through repeated iterations of this simple but sometimes tedious process, many different word strings can be developed for the study of any dream series. The updated strings and any new word strings added on the basis of the later iterations are then used in searches of the entire series or subsets of it. Individually tailored word strings can consist of a few simple separate words (e.g., ^my\_mother^ ^my\_father^ ^my\_older\_sister^ ^my\_younger\_brother^) or slightly more complex formulations (e.g., my\_mother|my\_father|my\_brother|my\_sister).

With these methodological and statistical considerations serving as a backdrop, the chapter turns to the substantive issues of consistency and continuity in dream series.

### Consistency in Two Very Different Dream Series

The dream series discussed in this section come from different eras and the opposite ends of the adult age spectrum. The first one was kept by Jason, out of his own personal curiosity. He wrote down his dreams from age 37 until the time of his death in his 70s. He was born early in the twentieth century, earned a Ph.D. at a major university, and was employed as a professor at several different universities for the rest of his working life. Since Calvin S. Hall came to know him slightly as a colleague at one point in their careers when they taught at the same university for several years, there is every reason to accept its authenticity. The two professors then stayed in touch about the dream series as they both moved on to several different universities. This dream series is not available on DreamBank.net. Jason, who was a very private and strait-laced person, stipulated before he shared the dream series that his dream reports could not be published (Domhoff, 1996, pp. 133–143).

Kenneth, on the other hand, wrote down every dream he remembered during his first three years of college in the late 1990s, which adds up to 2,222 dream reports. He sometimes documented two or more dream reports from the same night, which led to a mean of almost two dream reports a night. After he finished his undergraduate years, he went to graduate school in a physiological field. After a long conversation with this author about the quantitative content analysis of dream reports when he happened to be attending a meeting of sleep researchers, Kenneth unexpectedly said he had a dream journal. He then offered it for quantitative studies, which was well after he had stopped documenting his dreams. He earned a Ph.D. in physiology and later worked in the private sector. Kenneth's dream reports are available on DreamBank.net.

#### **Jason's Dream Reports at Ages 37–54, 55–59, and 70–73**

Jason was not a frequent recaller, and he made no special effort to improve his recall. During one four-year period, which began eight years after he started keeping a record of his dreams, he wrote down only 15 of his dreams. His yearly recall totals for the eight years before the four-year lull ranged from 11 to 103, for a mean of 49.5. For the five years after the years of low recall, his recall ranged from 13 to 70, with a mean of 37.8. The fact that the dream series is sparse necessitated the use of only six subsets of 100 dream reports to analyze it for the age period 37 to 54.

To begin with, there was excellent absolute consistency on the Male/Female Percent, as has been found with most later dream series, with a few exceptions (Hall, 1984). There was good absolute consistency on several other general character categories, such as known adult men and women strangers. There was good absolute consistency for his Friendliness per Character Index (F/C Index) with all characters. His Aggression/Character Index (A/C Index) showed adequate absolute consistency but was slightly higher in the last two subsets. His A/C Index was always higher with women than with men, which is the opposite of the case with his F/C Index (Domhoff, 1996, p. 139). This is an example of relative consistency.

There was one developmental regularity. In each of the six subsets there is an increasing A/C Index with his wife and daughter, and the increase is very large in the last two subsets. This development regularity is displayed in table 4.1 as part of a larger table, which also provides instances of absolute constancy and relative consistency in the Jason dream series. Unfortunately, it was not possible to determine the degree to which these changes were continuous with changes in his waking thoughts about his wife and daughter. This was because he did not want to divulge any information about his waking life.

**Table 4.1**

Types of consistency in the Jason dream series, ages 37–54

	Set (100 dreams each)					
	I	II	III	IV	V	VI
<i>Absolute constancy</i>						
Male/Female %	63/37	61/39	57/43	63/37	62/38	60/40
<i>Relative consistency</i>						
F/C with male characters	.35	.37	.39	.47	.31	.35
F/C with female characters	.22	.15	.10	.27	.19	.28
<i>Developmental regularity with female family members</i>						
A/C with wife and daughter	.17	.19	.21	.25	.33	.68

### **Consistency and Change between Ages 37–42 and 48–53**

The general consistency in Jason's dream content, despite major life changes, was examined more closely by comparing his dream reports from ages 37 to 42 to those when he was between 48 and 53. Jason was married and a parent of a child while recording the first subset, but by the time of the second subset he was legally separated from his wife and retired. He traveled often. He lived in two foreign countries for several months each, and eventually settled far from the area in the United States in which he spent his career. In addition, his daughter was a college graduate and lived in a state distant from where he lived.

Jason's A/C Index and F/C Index indicated absolute consistency between the two subsets. There was a relatively new cast of characters, with the exception of his immediate family members, a high-school friend, and a favorite professor from his college years. All those holdover characters appeared less frequently than they did in the first five-year subset. The known men in the second subset were mostly his friends, as in the first subset analyzed in this subsection. They were not the same friends that appeared in the first subset, who had almost entirely disappeared from his waking life as well as his dream life by age 53. However, despite this turnover in specific individuals, his percentage of known characters remained consistent. This finding shows that absolute consistency can occur within general character categories.

### **Consistency in the Jason Series at Ages 40+ and 70+**

Finally, consistency in the Jason series was analyzed by comparing the first 100 dream reports from his early 40s with the first 100 from his early 70s. There were few or no changes on the main content indicators. For example, there were three acts of physical aggression in the first subset, two in the second subset. Nor were there any differences in mentions of injury, illness, or death. Based on the elements from the past scale in the HVdC coding system, the present-mindedness of his dream life is shown by the fact that he dreamed of the past in 10% of the dream reports in both subsets.

The present-mindedness of Jason's dream reports in both subsets is further demonstrated by the finding that he once again dreamed most frequently of his friends at the time, just as he did in the comparison of two subsets in the previous subsection. There was very little carryover of friends from his early 40s to his 70s, a 30-year gap. The few characters who

overlapped in the two subsets were once again his former wife, his daughter, his father, a male friend from the past who he still saw on occasion, and the same favorite professor from his college years. By then, these five important people from his youth and young adulthood had appeared as characters in his dream reports over a 33-year time span (Domhoff, 1996, pp. 142–143).

### **An Extensive Three-Year Dream Series from a College Student**

Kenneth, as already mentioned above, recalled dreams frequently, at least during his first three years of college. He claimed he wrote down every dream he remembered. The issue of consistency is therefore packed into a much shorter time span in this dream series, and it involves nearly four times as many dream reports. For a HVdC study of consistency, the Aggression/Friendliness Percent and the percentages for at least one aggression, friendliness, and sexuality were utilized. This study focused on his first 100 dream reports from 1996, the first 100 for 1997, the first 100 for 1998, and the last 100 dream reports he recorded, which were written down in the fall of 1998. There was absolute consistency on all four indicators in the first three sets. In the fourth set, the A/F%, at least one aggression, and at least one friendliness declined slightly, and there was a slight increase in sexuality. There was relative consistency among the four indicators as well. These results are shown in table 4.2.

For purposes of word string studies, the full series of 2,022 dream reports was divided into four subsets of 506 dream reports per subset (or 504 in the case of the last subset, to be exact). Kenneth's consistency on words relating to religion and sexuality was examined using the search engine

**Table 4.2**

Consistency in social interactions among four sets of 100 dream reports from Kenneth

	Set (100 dreams each)			
	I	II	III	IV
Aggression/Friendliness Percent	66	68	67	64
At least one aggression (%)	57	53	55	42
At least one friendliness (%)	37	39	37	33
At least one sexuality (%)	9	9	8	11

on DreamBank.net. There was considerable consistency in sexual content, but the findings with the religious word string were markedly higher in the third subset than in the other three subsets.

Kenneth's series was also studied for consistency using several individually tailored word strings that were created using the procedure discussed above. Since Kenneth appeared upon inspection to dream frequently of his family, his friends, food and eating, cars and trucks, taking part in outdoor activities, and playing sports, six search patterns were created. His parents appeared consistently across the four sets, ranging from 17.0% to 21.1% of dream reports. His friends appeared 47% of the time overall, with a slightly wider range of 42.9% to 51.4% for the four subsets. When combined into a single search term, either a parent or a friend appeared in 56.3% of Kenneth's dream reports. The other four categories (food-eating, cars-trucks, the outdoors, and sports) showed varying levels of consistency, which is shown in table 4.3. Overall, food-related terms appeared in 17.2% of the dream reports; cars and trucks were mentioned in 25.3%; outdoor activities (hunting, fishing, and boats) appeared in 16.0%; and sports showed up in 12.0%. When all six of the individually tailored word strings are combined, 75.7% of the dream reports mentioned at least one of these terms. The specific figures and trends for both the generic and individually tailored word strings over four subsets are presented in table 4.3.

As the following section shows, there are other examples of consistency in adult dream series, using either HVdC codings or word strings. More

**Table 4.3**

Frequency of search terms in four subsets of the Kenneth dream series

	I ( <i>n</i> = 506)	II ( <i>n</i> = 506)	III ( <i>n</i> = 506)	IV ( <i>n</i> = 504)	total ( <i>n</i> = 2,022)
Religion (%)	3.8	3.6	7.1	4.8	4.8
Sex (%)	18.2	15.2	19.4	16.1	17.2
Parents (%)	21.1	20.2	17.0	18.1	19.1
Friends (%)	49.4	51.4	44.3	42.9	47.0
Food & eating (%)	17.8	17.4	19.0	14.7	17.2
Cars & trucks (%)	27.1	26.9	24.7	22.6	25.3
Hunting/fishing/ boats (%)	8.5	20.0	19.6	16.1	16.0
Sports (%)	14.4	12.5	11.7	9.3	12.0

examples could be added (Domhoff, 1996, chap. 7; M. Smith & Hall, 1964). However, the two very different series from two very different people analyzed in this section, with one series covering adulthood and old age and the other documented in the first three years of young adulthood, provide strong replicated evidence for consistency in dream series. This unanticipated finding was first discovered in the Jason series many decades ago but remained unpublished until consistency was documented in other dream series (Domhoff, 1996, chap. 7).

### **Consistency and Continuity in Three Unusual Dream Series of Varying Lengths**

This section discusses three different dream series of varying length from different eras, one from a woman and two from men. These three dream series not only differ in length and era but also have unique features that present potential challenges to the concept of consistency and, to some extent, to the concept of continuity. The lengthy dream series contributed by the adult woman (Barb Sanders) began when she was in her late 20s. It contains over 4,000 dream reports overall, which were documented in the last quarter of the twentieth century. It provided the opportunity for the most detailed study that has been done of any dream series using HVdC codings.

The 173 dream reports written down by an entomologist in a summer in the 1930s is an unusual document from an unexpected source. The section concludes with an analysis of the 143 dream reports a bereaved widower documented about his deceased wife over a 22-year period. It is highly atypical in its own poignant way. The three series are analyzed with slightly differing subsets of the HVdC coding categories and also with two individually tailored word strings in the case of Barb Sanders.

#### **The Dream Reports of Barb Sanders**

Barb Sanders grew up in a small town in the West. She is the oldest of four children. She has a brother about three years younger, a second brother about five years younger, and a sister about six years younger. Her parents both had college degrees from a small denominational college. They worked all their lives in education and social work. Both of her parents played musical instruments, as did Barb Sanders and her three siblings, which led to frequent household music and singing sessions.



Barb Sanders married after one year of college, had three daughters in about a five-year period, and completed a B.A. degree at a nearby state college when she was in her mid-20s. She left her husband, a technical employee for a natural resources corporation, when she was 30. She then returned to her home state, where she earned an M.A. in a helping profession and worked in a community college as a counselor for several years. Her three daughters, ages 7, 4+, and 2+ at the time of the divorce, were raised by her ex-husband, although her middle daughter came to live with her about 10 years after the divorce. Barb Sanders had a long-standing personal interest in dreams. However, she did not write any dreams down until a few years after her divorce, at a time when she was having disturbing dreams, including some relating to the divorce and its aftermath. She hoped to gain insight about herself by keeping a dream journal and perhaps use that insight to enhance her efforts at creative writing. She became involved in local theater productions as an actress, writer, and director, and participated in dream groups. She had several boyfriends after her divorce and never remarried.

Twenty years after she started documenting her dreams, she unexpectedly offered them to the author, who had not met her before. She was attending, out of her own curiosity, a meeting that included a panel of dream researchers. Her dream series originally consisted of 3,116 dream reports. It was first analyzed by drawing the earlier-mentioned random sample of 250 dream reports. This sample, which was in effect a “normative” sample of the 3,116 dream reports, was coded for five major HVdC categories (characters, social interactions, misfortunes, and successes and failures). The codings were carried out by three research assistants, who knew nothing about the dreamer. In addition, all 3,116 dream reports were coded by another research assistant for social interactions with family members, along with a few of her friends, her high-school sweetheart, and a younger man she developed a crush on two decades after her divorce. After all of the codings were completed, the author interviewed the dreamer and also did separate individual interviews with four of her close women friends, during a two-day visit to her hometown.

Barb Sanders later provided another 1,138 dream reports that were documented, again for her own reasons, while the initial study was carried out. Subsequent analyses of this second subset showed no appearances by the author or his research assistants, or any evidence that her dream reports

were influenced because she provided the first subset for study. This second subset was therefore used in later studies using word strings. All 4,254 dream reports and the HVdC codings for the baseline-250 sample can be found on DreamBank.net, along with partial codings of several hundred other dream reports, and transcripts of the interviews with Barb Sanders and her four friends.

**Consistency in the Barb Sanders series** Consistency in the Barb Sanders series was initially studied by comparing the first 125 dream reports in the baseline-250 sample with the second 125. It showed the two subsets are consistent within five or six percentage points on 12 content indicators, ranging from the Familiarity Percent, Aggression/Friendliness Percent, Befriender Percent, and Aggressor Percent, to the A/C and F/C indexes and the “at-least-one” percentages for aggression, friendliness, and sexuality. Her Male/Female Percent fell from 58/42 to 49/51, placing her very close to the female norms of 48/52. In the second half of the baseline-250 sample, she dreamed less of friends and more of family members (see Domhoff, 2003, pp. 114–115, table 5.3).

These findings were supplemented by making word and phrase searches using DreamBank.net In this analysis, the first and second subsets within the full series were compared on the frequency of appearances by at least one of the 13 main people in her life—parents, ex-husband, three siblings, three children, granddaughter, and three best women friends. They appeared in 33.6% of the dream reports in the first set and 35.1% of the second set. Her interest in theatrical productions, as a writer, actor, and producer, is reflected in the fact that 4.9% of the dream reports in the first set contained one of several terms related to this activity, as compared to 5.2% for the second set. This strong evidence for consistency over a period of 35+ years in the Barb Sanders series replicates the findings with the Jason and Kenneth series.

Further evidence for consistency for all the characters in the full Barb Sanders series was provided in a network analysis by mathematical psychologists (Han, 2014; Han & Schweickert, 2016). This analysis is discussed later in the chapter.

**Continuity in the Barb Sanders series** The codings for the baseline 250 made it possible to determine how she did and did not differ from the HVdC norms. At the same time, it established an overall self-norm, which

could be used for comparisons with the findings with individual characters. Although she is normatively typical on her Aggression/Friendliness Percent and her Befriender Percent, she is above the norms on the A/C Index (.33 vs. .24,  $h = .21$ ,  $p = .000$ ), the F/C Index (.32 vs. .22,  $h = .24$ ,  $p = .000$ ), and the Aggressor Percent (50 vs. .33,  $h = .36$ ,  $p = .000$ ). These results establish that she is very socially active in her dream reports. This is especially the case for aggressive interactions, which in her case usually involve angry thoughts toward a person, critical comments, or rejections. Moreover, the additional codings for her interactions with several important people in her life made it possible to study continuity in more detail than was possible in past or subsequent studies of any dream series.

Barb Sanders's mother was the most frequent character and also the central figure in her overall network of characters, even though her waking circumstances and her relative lack of contact with her mother would not have predicted it (Domhoff, 2003, chap. 5; Han, 2014). Her mother appears in more dream reports than any other character. Barb Sanders's A/C Index with her is .70, which is above her normative figure in the baseline 250 for all characters (.33). Her F/C Index is a much lower .27, although it is well within her normative range. The A/F%, which is consistent through the first subset, is 72%, well above the dreamer's normative figure of 49%. Barb Sanders reported in the interview that she conceived of her mother as a cold and rejecting person. She said her relationship with her mother remained the number one concern in her life and a constant preoccupation for her. Her friends made similar observations about Sanders's relationship with her mother in the individual interviews with them (Domhoff, 2003, chap. 5).

Sanders's relationship with her middle daughter is almost as problematic for her as her relationship with her mother. As noted above, this daughter was 4+ years old at the time of the divorce. She was also the daughter most upset by the divorce. At age 14, she ran away from her father's home and came to live with Barb Sanders. She did poorly in school, could not hold a job, and suffers from severe psychological problems. She had a daughter when she was in high school and often left her to Barb Sanders to raise. She returned to live with Barb Sanders from time to time. There is a high level of tension between them, and Barb Sanders constantly worried about her. Barb Sanders's A/C Index with this daughter, .92, is far higher than it is with her mother or any other character. The F/C Index is also relatively high

at .52, because Barb Sanders is always helping this daughter. Barb Sanders initiates 79% of the aggressive interactions and 70% of the friendly interactions, which are both above her normative figure. By contrast, Barb Sanders dreams only half as often of her oldest and youngest daughters and has more friendly than aggressive interactions with both of them. Sanders is once again more likely to initiate both aggressive and friendly interactions with them.

The fact that Barb Sanders had a primary role in raising her granddaughter, who lived with her, provides an opportunity to examine the way in which changing conceptions and concerns lead to changes in content in the 205 reports with her in them. When the granddaughter was a cute and charming baby, there was a predominance of friendly interactions in the 14 dream reports about her, with an A/F% of 29%. Barb Sanders took the initiative in all the interactions. The predominance of friendly interactions when the granddaughter was a young child is even greater in the 33 dream reports from this period, with an A/F% of 20%, and Barb Sanders initiates 88% of these interactions. However, this friendly conception of her relationship with her granddaughter declined greatly thereafter. The A/F% rose to 69% in the 93 dream reports during her late childhood and to 75% in the 65 dream reports during her adolescent years. Barb Sanders told the author she became increasingly frustrated and annoyed by her granddaughter's many deficiencies as a person and student. Barb Sanders was often highly critical of her in waking thoughts and in social interactions with her (Domhoff, 2018a, p. 103, table 3.4).

Barb Sanders's 164 dream reports involving her ex-husband enact the same negative interactions with him for the first 15 years after they were divorced. This finding is best reflected in the A/F percentages of 57%, 59%, and 61%, in the first three segments of this subseries. All of these figures are above her baseline with all characters, which is 49%. However, her conception of him began to change at the beginning of the fourth segment. Then he unexpectedly died of a heart attack in his early 50s, without any history of serious illness. At this point the dream reports that include him become more reflective and sometimes include the awareness that he is dead, even though she is interacting with him in the dream. The changes in this fourth segment are captured in the dramatic decline of the A/F% from 61% in the third segment to 34% ( $h = -.53, p < 0.005$ ).

Still another dimension of Barb Sanders's dream life is demonstrated in the first 43 dream reports she documented about a man she became infatuated with well after she was divorced. These dreams are in the realm of pure fantasy, but they are continuous with waking personal concerns expressed in daydreams. She also talked about him all the time with her friends, they said in the interviews with them. These dream reports portray an arc of passionate initial involvement and her eventual angry rejection of him, even though they knew each other only slightly through occasional involvement in the same social occasions. Nor did he know of her infatuation with him. Thirteen of the first 16 dream reports about him contain sexual or intimate physical interactions, but they also express a fear he does not care about her. A few months later, the dream reports rarely include sexual interactions. Then she documents dreams in which she is angry with him or jealous because he is having sex with someone else. At that point, she broke off her real-life acquaintanceship with him, because he brought a woman with him to a small social gathering she also attended. After appearing in 43 of the 334 dream reports she recorded after her first dream about him, he appeared in only four of the next 461 and then disappeared from her dream life. In complete contrast with her dream reports about her ex-husband, which continued off and on for decades, the dream reports about her infatuation declined greatly in frequency as the infatuation turned to disappointment. They then turned to angry thoughts of rejecting him, and then he disappeared from her dream life (see Domhoff, 2003, pp. 122–126, for a detailed account).

The dream reports relating to the man with whom she became infatuated share some similarities with the 53 dream reports concerning the boy she fell deeply in love with in her senior year in high school. However, these dream reports appeared sporadically throughout the dream series, and they were consistently more positive in terms of the A/F% and the F/C indexes. They often included sexual interactions as well. Her dreams of him primarily express the love she felt for him, along with their intense sexual interactions when they were a couple, which stopped just short of sexual intercourse. In the interview with her, she said the high school sweetheart was similar to the man she developed a crush on decades later in that they were the two men she had loved the most. They were also the two men in her love life with whom she never had sexual intercourse.

However, several of the dream reports about this first love also dramatize her bitter memories of a relationship he had while he was in naval training. This intimate relationship deeply angered her, even though they had agreed they would see other people while they were separated. As she explained in the interview in March of 2000: "I was so angry and felt so betrayed that at that point." "I said, 'That's it, we're done. . . . I was out, and very, very angry and was not willing to trust him again'" (Domhoff, 2018a, pp. 105–106).

Despite all the negative notes in her relationships with the characters discussed up to this point, the dream series also captures her positive relationships with the favorite people in her life. She paints a more positive picture of her relationship with her father, who is the second-most frequent character in the dream series. She said in the interview she had a more positive attitude toward him in waking life than she did with her mother, as also stated by her friends. In addition, she has great affection for the brother closest to her in age. He appears in 97 dream reports, which is one more than the total for her other two siblings combined. The A/F% with him is 25, which is nearly the mirror opposite of her interaction pattern with her mother.

Even more, she has an extremely positive relationship with her closest friend of long standing, whom she met when she returned to college for her M.A., even after this friend later moved to a city 100 miles away and raised a family. She appears in 96 dream reports and has an A/F% of 23, the most positive balance with any known character, along with a high F/C Index of .89 and a low A/C Index of .26. The comradely nature of their relationship is seen in the fact that they are equally likely to initiate friendly or aggressive interactions.

Barb Sanders's dream reports about another close friend reveal a very different pattern. She takes an initiatory role with this friend, who is many years younger. This younger friend had been a student at the community college where Barb Sanders once worked, giving her instructions, helping her, and becoming annoyed when she was late or resisting direction. This pattern is reflected in the fact that Sanders initiates 78% of the many friendly interactions between them, as well as 78% of the relatively few aggressive interactions. Her A/C Index with this friend is a low .39, and her F/C Index is a high .63.

The findings included in these thumbnail sketches of how Barb Sanders's dream reports enact her differing waking conceptions of the significant people in her life, were found in analyses of several other dream series as well. However, those analyses were sometimes limited in scope by the sample size or the lack of full information on the dreamers' waking-life concerns. The analyses of the Barb Sanders series, on the other hand, do not suffer in the slightest from either of these defects. It is highly likely that similar detailed analyses of any large sample of dream reports from an individual would provide similar detailed portraits. Still, the dream series discussed next demonstrate this point well for a more limited set of characters. In conjunction with past analyses and with the two analyses that follow, the studies of dream series overviewed in this chapter fully establish continuity between the nature of dream enactments in a dream series and the dreamer's thoughts about those people in waking life.

### **The Dream Reports of an Entomologist in 1939**

The person given the pseudonym "Natural Scientist" kept a dream journal in the summer of 1939, at age 46 He did so in part because he remembered dreaming "copiously" and having nightmares as a youngster. He also wanted "to learn whether the nature, course, and speed of a dream can be controlled; and I wish to test Freud's belief that the subconscious mind is largely a cess-pool." He was also careful to state his method: "My method is to place a notebook at my bedside every night and, on waking in the morning, or during the night, to jot down the 'high spots' and 'a rough outline' of each dream remembered." He would then write a more complete account.

The Natural Scientist was born in 1893 in a small farming town in the Midwest. He graduated from a state university in Iowa in 1916. Except for nine months in the US Army in 1918–1919, he worked as an entomologist in an agency of the Department of Agriculture in Washington from the time of his college graduation until the late 1940s, when he took an early retirement due to declining health. His work over a period of 30 years focused on trying to construct an accurate taxonomy of the 400,000 species of beetles. He was a lifelong bachelor and did not have any direct descendants. Nor does he have any other traceable descendants. His dream journal eventually was sold to an antiquarian book dealer. It was purchased in the early 1980s by a dream researcher, who generously shared it (see Hobson,

1988, chaps. 11–14). (The Natural Scientist's dream reports, along with his introduction to the dream journal, are available on DreamBank.net.)

Even in the space of just three months, the 234 dream reports provide a large enough sample size to determine there was a very great degree of consistency. Using a range of HVdC coding categories, the first 93 reports with 50 or more words were compared with the second 93 reports with 50 or more words. The details do not need to be repeated by this point in the chapter, because the empirical fact of consistency has been replicated many times (Domhoff, 1996, p. 148, table 7.9). A blind analysis of the characters, social interactions, settings, and emotions in the dream reports provides a revealing picture of the dreamer's waking concerns and interests. This analysis was made possible by a four-page obituary in an entomology journal, which contains personal information supplied by one of his sisters (Domhoff, 2003, pp. 154–157). The dreamer is low on aggressiveness and even lower on dreamer-involved aggression and dreamer-involved friendliness. He is in good part an observer of social interactions and of other people's activities, which is atypical. These findings are continuous with his quiet personality and his focus on observation in waking life, including in his work. There are no sexual interactions in his dream reports, which fits with his bachelor status.

On the other hand, he is above the norms on Animal Percent, which fits with the fact that he liked to fish and hunt and became an entomologist. The animals in his dream reports are primarily birds, barnyard animals, and the insects he studied in his professional life. They often appear when he dreams that he is on the farm on which he was raised and to which he returned occasionally in summers. They also appear in dream reports in which he is working with beetle specimens in his office. He is also somewhat above the norms on familiar settings, which are most often his home, his office, or the family homestead (Domhoff, 1996, pp. 147–150). There is great attention to detail, which parallels the large taxonomic task he had undertaken with beetles. There are also 13 dream reports concerning golf, which he enjoyed in waking life as part of a lifelong involvement in competitive sports.

This quantitative content analysis is also supported by what the Natural Scientist wrote in the introduction to his dream journal: "At the time this is being written, in my 46th year, the majority of my dreams are of the neutral sort (emotionless), neither particularly pleasant nor unpleasant, like the



prosaic episodes of everyday life." He further explained he had reached this point as his activities gradually changed over the previous 20 years:

One by one I have eliminated a good many of my earlier activities, for one reason or another; partly from the ever-strengthening conviction that it is only a simple life that holds for me any chance for a reasonable degree of contentment. The gradual simplification (which of course goes in the face of the much advertised and praised "more abundant life") of my mode of existence is beginning to give me a certain amount of leisure, much of which has been spent in reading miscellaneous literature, and in reflection.

This dream journal, coming as it does from an unlikely source and kept over one summer in the late 1930s, out of his own curiosity as a careful scientific observer and thinker, is an ideal example of an unobtrusive, non-reactive dream series. It strengthens the case that there is both consistency and continuity on most issues in most people's dream lives.

#### **A Widower's Dreams of His Deceased Wife**

For 22 years after his wife's death, a bereaved husband ("Ed") wrote down 143 dream reports that included his deceased wife. He did so because it gave him solace and comfort to see her in his dreams. He sometimes included the memories and thoughts the dream had occasioned for him after he documented the dream. Because Ed only recorded dreams that included his deceased wife, Mary, the full range of his dream life cannot be known. Comparisons between dream reports including his deceased wife and his other dream reports cannot be made. Nevertheless, his dream series provides a unique opportunity to study the memories dramatized in relation to his love for her and a marriage of 32 years, during which Ed and Mary raised three children.

After he had been writing down dreams about Mary for 14 years, Ed, by then retired for several years, wrote a reminiscence of his life with Mary. It was part of a tentative plan to publish a pamphlet or book for other grieving spouses. This project was in keeping with the help-oriented occupation he had been involved in for decades after his service in World War II. (However, to quell some likely speculations about his profession, he was neither a clinical psychologist nor a psychiatrist.) The draft manuscript included a commentary on how his dreams about Mary had impacted his life after she died. Although his plan never materialized, his commentary on how his dreams affected his life, along with his reflections on some of

his dream reports shortly after writing them down, provides a very useful waking-life perspective for dream researchers. He later offered a copy of his dream series to a psychologist and her colleagues at a nearby university for research purposes (Belicki, Gulko, Ruzycki, & Aristotle, 2003). The dream reports and the HVdC codings of them, along with his reminiscences, are available on DreamBank.net. The full results of the detailed study of this series are reported elsewhere (Domhoff, 2015).

When Mary was 45, she began to suffer bloating and stomach pain, which turned out to be ovarian cancer. Following a radical hysterectomy, she was assured she was cured. She was indeed symptom-free for six years, but the cancer returned during the seventh year after the operation. Medication suppressed the tumors, and there seemed to be a chance she would live normally for some time—or so Ed and Mary thought. The cancer came back a third time during the next year. She had a long and painful terminal illness that ended with her death one year later. Ed was 57, and their children were 27, 24, and 19 when she died at age 54.

The bereaved widower reports that he suffered great agony, loneliness, and confusion during her final illness and after her death. He met another woman, Bonnie, about four months after Mary died, and married her about a year later. However, this marriage did not work out at all well. He and Bonnie often argued, and they separated five years after they married. He remained single for the final decades of his long life. He lived alone in an apartment until he had to move into a home for the elderly. In his reflections, he wrote that his second marriage was a great mistake, which caused shock to his children. He wondered in retrospect how he had ever gotten involved with someone so different from Mary. Mary had been his first and only girlfriend, he wrote. He added that he was a shy person who did not find it easy to take the initiative in relations with women (Domhoff, 2015, pp. 7, 20).

**Consistency and continuity in Ed's dream series** Ed's dreams about Mary were relatively infrequent, between four and eight in most years, although he recalled 14 in the 16th year after she died. There was a 14-month hiatus in recall about nine years after she died, which provided a natural dividing point for comparing the content of the early and later parts of the series. There are 62 dream reports in the first part and 81 in the second.

A comparison of these two subsets showed there was considerable consistency over the 22 years of documenting his dreams. There was no change

in the Befriender Percent or the Aggressor Percent, nor in the indicators for at least one aggression, at least one friendliness, or at least one sexuality (Domhoff, 2015, p. 243, table 4). There was a decline in the number of dream reports in which Mary is ill or dead, from 39% of the dream reports in the first half of the series, to 23% in the second half. The percentage of dream reports with at least one misfortune also declined, primarily because Mary is less often portrayed as ill or dying in the second subset. On the other hand, the A/F% rises from 17% in the first subset to 28% in the second subset, which suggests the social interactions between Ed and Mary become somewhat more aggressive. However, these trends, which had medium effect sizes, did not reach statistical significance at the .01 level, nor were they statistically significant even at the .05 level after the false discovery rate correction for multiple testing was applied.

All of the 10 dream reports in which Ed was surprised to see Mary was alive again, which are coded as a “good fortune” in the HVdC coding system, are in the first subset. (A good fortune is defined as something good that happens out of the blue.) However, the percentage of dream reports with at least one good fortune was the same overall in both subsets. Ed did have one dream report toward the end of the second subset, nearly 20 years after her death, in which she returns home unexpectedly due to the success of a last-minute surgery. But there is no implication in this dream report that she has been dead, and he is not surprised to see her alive.

In addition to good consistency, there is very strong continuity with his waking thoughts and concerns. This conclusion is based on a comparison of the findings from his dream series with his written comments after documenting some dreams and with his later commentary on his dream reports. It is also based on his response to a question the author sent him via email, when he was in the home for the elderly. First, the Bodily Misfortunes Percent in Ed’s dream reports is far higher than in the HVdC normative sample for men (100% vs. 30%,  $h = +1.99$ ,  $p < .001$ ). (The Bodily Misfortunes Percent is defined as the misfortunes to a human body, divided by the total number of misfortunes.) These dream reports embody Ed’s upsetting memories about Mary’s illness. For the most part, they are realistic portrayals of Ed’s thoughts concerning Mary’s illness, hospitalization, or impending death during various stages of her illness. In many of these dream reports Mary looks very good or they are embracing, but he is aware that she is dying.

She still looks very beautiful in other dream reports, but there is one or another telltale sign of her illness, such as paleness. Sometimes she is overweight or bloated, but in another dream report she is thin and gaunt, and in two others she is bald. These illness dream reports also portray his concerns about her treatment, as reported in his waking reflections. However, there is no sequence or progression in the dream reports with bodily misfortunes in terms of the increasing severity of her illness and her imminent death. Once again, dreams seem to emerge through a random draw from the dreamer's cognitive rolodex of semantic memories.

In addition, Ed's dreams about Mary are characterized by a large number of friendly interactions (208 in 101 dreams) and a small number of aggressive interactions (64 in 41 dreams). This finding is most clearly demonstrated by the Aggression/Friendliness Percent. The A/F% is 36.4% with women characters in the norms for men, but it is only 22.1% for Ed's interactions with Mary ( $h = .32$ , adjusted  $p = .004$ ). There is also more friendliness than would be expected in terms of the percentage of dream reports with at least one friendly interaction, and less aggression in terms of dream reports with at least one aggressive interaction. This pattern of findings suggests Ed's dreams act out his predominantly friendly feelings toward Mary, which are evident in his reflections. There are also 25 sexual interactions in 15 of the dream reports, which is close to what would be expected based on the men's norms.

The findings on social interactions become more revealing when they are analyzed in terms of who initiates the three types of social interactions. Ed initiates most of the friendly interactions, 81.2% vs. 18.8%, which is higher than the 67% vs. 33% difference in the men's normative sample ( $h = .32$ , adjusted  $p = .034$ ). Similarly, Ed initiates 76% of the 21 sexual interactions that do not begin with mutual overtures. In striking contrast, Ed is the aggressor in only 25% of their relatively few aggressive interactions, whereas men initiate 50% of the aggressive interactions with women in the men's normative sample ( $h = .52$ , adjusted  $p = .034$ ). Put another way, Ed is the victim of Mary's aggressions in 75% of their aggressive interactions. As demonstrated in the following paragraphs, the interaction patterns concerning aggression simulate Ed's conceptions of his relationship with Mary. They are therefore excellent evidence for continuity between dream portrayals and waking thoughts.

There are 64 aggressive interactions between Ed and Mary in the dream series. They are primarily nonphysical in nature, which include hostile thoughts, critical remarks, rejections, and accusations or threats. There are four physical aggressions, in all of which Mary is the aggressor. In one dream, she throws “a ham or a roast” at him. In two, she pushes him away. In another, she takes something away from him. Several other aggression dreams seem to embody the annoyances, tensions, and rejections that often typify married life, such as arguments and criticisms. The most dramatic of the dream reports with aggression in them involve arguments about their sexual life.

In the first of these dream reports, Mary angrily criticizes Ed for not understanding her. In two of these dream reports Mary is critical of Ed about an affair she says that he had with another woman. These accusations, which first appear 16 years after her death, give the impression that Ed is simulating an actual event. In the second dream about an affair, which occurred roughly eight months after the previous one, Ed is in a play or a business venture (he is not sure which). In this dream he must have an association with a woman, and perhaps even kiss her. Friends warn him that people will gossip, and that Mary will hear about it. When this author asked him via email if there was a waking behavioral basis for this accusation, he said that such a relationship did occur. He then recounted a brief encounter, a few years before Mary’s final illness began. He said he had thought about this affair quite often over the decades and had deeply regretted it ever after.

In perhaps the most cerebral and revealing of the dream reports in which they argue about sexuality, Mary blames him for their lack of sexual relations. This accusation leaves Ed unable to reply, even though a litany of answers is running through his mind as she is talking. In the long comments Ed writes after documenting this dream, he says he was “very conscious of the argument put forth” by Mary. He felt she was “unfair in equating infrequent sex with my not loving her.” He “went over in my mind,” while lying in bed after waking up, “what our sex life had been during the years preceding her death.” He adds that even though “this dream prompted me, now, to think about this aspect of our relationship,” he had “thought about it frequently when Mary was alive” (Domhoff, 2015, p. 20).

Ed then recalls a discussion they once had about her often falling asleep on the sofa at night. At that time, Mary told him that she felt he didn’t want sex with her because he didn’t urge her to leave the sofa and join him

in bed. He then recalls replying he did not come out of the bedroom to the sofa in the living room because he thought she wanted to avoid having sex with him. He then characterizes himself as a person who does not assert himself when he feels he has been rejected: “I bowed out of the act and did not try to get this straightened out.” He also comments “This dream had a strong impact on me in reviewing, yet again, our sexual relationship” (Domhoff, 2015, p. 20).

Very clearly, the overall findings from Ed’s dream series support the idea that dreams are embodied simulations, which express waking concerns. The main concerns in these dream reports—his wife’s health and his relationship with her—enact concerns his written reflections attest to in waking life. In his dreams, he seeks Mary’s help or assurance, on occasion enacts fond memories of the good times they had together, often puzzles over the sexual tensions in their marriage, and relives the horrible events of the terminal illness that ended her life. The dream reports express and embody the conflicted thoughts and feelings on the dreamer’s mind and in his semantic memory bank during the 22 years after she died. His answer to the author’s email query about a possible affair in the distant past suggests that he continued to think about his brief affair and its impact on his marriage long after he no longer recalled any dreams about Mary.

### **Character Networks in Dream Series Are Small-World Networks**

A mathematical psychologist and his graduate students, who turned to the study of dream series as part of their work on memory, made a major discovery. They determined that the network of characters in a dream series has the same small-world properties as waking-memory networks. Building on earlier studies by the leader of this research team, Richard Schweickert (2007a, 2007b, 2007c), their studies of five different dream series extended his earlier work. They did so by assuming that the characters appearing in the same dream report are linked in the dreamer’s cognitive social network. The series range in length from 208 to 423 dream reports, three from women and two from men (Han, Schweickert, Xi, & Viau-Quesnela, 2015). Both the waking and dreaming social networks differ from random networks, which are discussed in chapter 2 in relation to brain networks. They include short paths to other people, a tendency for the people who appear frequently to appear together, and a strong tendency for a large number of

characters to be connected in a large general component (Han et al., 2015). Based on this work, it was further demonstrated that the distribution of characters in a dream series can be understood, by means of the power law (Zipf's law), as a lawful draw from a dreamer's semantic memory network (Schweickert, Zhuangzhuang, Viau-Quesnel, & Zheng, 2020).

The findings with the first five dream series were replicated and extended through a unique comparison, the first and only of its kind. It focused on both the character network in the 4,254 dream reports from Barb Sanders and on the people in her social network in waking life. Her waking-life social network was constructed on the basis of a questionnaire in which Barb Sanders rated how well each possible pair of individuals in her dream reports actually knew each other in waking life. She also rated how emotionally close they were to each other on a 1 (low) to 5 (high) scale. She also rated her own emotional closeness to each person on the same 5-point scale (Han, 2014, p. 36; Han & Schweickert, 2016). In all, 120 characters known personally by the dreamer appeared in her dream reports. They included nine immediate family members, 55 other relatives, 28 friends, 14 coworkers, nine boyfriends, and five miscellaneous characters who appeared once or twice. The number of dream reports including at least one of these 120 characters was 2,048, which is 48.1% of all the dream reports.

The first finding of interest in terms of social networks is that the 120 characters in the dream reports are close to the estimate of the number of relationships among people (150), which can be cognitively managed in waking life (Han, 2014, p. 38). Then, too, the more a pair of people appeared together in various dream reports, the more likely they were to be connected in waking life (Han, 2014, p. 50). The two networks were also similar in several other important ways. The "density" of the networks, defined as the proportion of all possible connections that actually appeared, was .16 in the waking network and .14 in the dreaming network (Han, 2014, p. 47). A centrality measure, based on how connected a person is to other well-connected people, revealed that all nine of her immediate family members, including the granddaughter she helped to raise, were among the 10 most central characters in both networks. Her mother and father had the highest centrality scores in both networks. When the character networks in the dream reports were separated into four chronological subsets, they were found to be very consistent over time (Han, 2014, p. 68). However, her granddaughter

was the most central figure in the fourth subset, and Barb Sanders's mother became the second-highest in centrality (Han, 2014, p. 83).

Unexpectedly, the dreaming and waking networks differed somewhat. The people in Barb Sanders's waking-life network were sorted into separate "communities" of family, friends, and coworkers, with the boyfriends usually not connected to any other character. However, her network of dream characters more often brought together immediate family members, other relatives, and friends into a common network, even though they were not necessarily in the same social networks in waking life (see Han, 2014, pp. 48–49, figs. 5 and 6, for graphics of this difference). This tendency increased for the people she rated as extremely close to her in waking life (Han, 2014, pp. 50, 67). The coappearances of pairs of characters in dream reports who are closest to Barb Sanders in her waking life reinforce a key concept in the neurocognitive theory of dreaming: the frequency of appearances in dream reports reveals the intensity of personal concerns in waking life.

### **Dream Reports from 2020 Relating to COVID-19**

The potential for a worldwide coronavirus pandemic became apparent to many experts and to journalists in the mass media in the United States in late February 2020. The rapid spread of the virus soon led dream researchers in the United States and Italy to do online questionnaire studies (e.g., D. Barrett, 2020; Iorio, Sommantico, & Parrello, 2020; S. Scarpelli et al., 2021; Schredl & Bulkeley, 2020). The pandemic also led to articles in the popular press concerning COVID-19's influence on dreams. In early October, for example, an article on the science pages of the *New York Times* appeared under the headline "Pandemic Escape? Maybe Not in Your Dreams." It began with the claim that people were dreaming of swarms "of insects—sometimes gnats, sometimes wasps or flying ants; being caught in a crowd, naked and mask-less; of meeting men in white coats who declared, 'We dispose of the elders'" (Carey, 2020, p. 7).

However, there are several difficulties with questionnaire studies. Since very few people recall their dreams and soon forget the few that they do recall, they rarely have any detailed knowledge of the content of their dreams (Beaulieu-Prevost & Zadra, 2005a, 2005b, 2007, 2015; Bernstein & Belicki, 1995–1996; Bernstein & Roberts, 1995; Domhoff, 2017, pp. 25–33). Even if people feel certain they can remember at least one dream of the



type asked about, they usually are not able to provide any reliable information concerning content or frequency. The findings from such studies therefore may be based on a combination of people's beliefs about dreams and their general waking thoughts, not the actual recall of dream content. People may feel an implicit pressure to be helpful to researchers by answering questions about a widely discussed and frightening event, such as the COVID-19 pandemic. In that type of situation, they may provide answers on the basis of what they hear and read about other people's dreams. Such studies may have demand characteristics in them, and people also might answer on the basis of the wake-state bias (Windt, 2015). These factors add up to the fact that the retrospective recall of dreams in response to a questionnaire is not likely to be accurate in regard to the frequency or content of what people dream about, perhaps especially in the midst of a pandemic.

In the specific instance of the COVID-19 pandemic, these inadequacies in questionnaire studies can be examined by studying ongoing dream series. Six dream series from American women, which began long before the first year of the pandemic, provide an unobtrusive baseline for studying these issues. Four of the six series were volunteered in 2020 or 2021, so they have not been analyzed for other dimensions in their dream content. However, they have been authenticated, primarily through their use of voice recordings that document their dreams, through voice recordings on a smart-phone app, or through the timestamps other participants use in digitally entering each report soon after it is recalled. Two of the series were already known to the author on the basis of earlier studies of them. The analysis begins with the dream series provided by the youngest participants.

### **Rebecca, Penelope, and Zelda: Ages 18–23**

Rebecca was 18 years old and in her first year of college in a southwestern state when she volunteered her dream journal in early 2021. She has been documenting her dreams since her mid-teens. She entered 53 dream reports into her computer from March through December. Two of them related to the pandemic, which is 3.8% of the dream reports. On March 26, after the campus had been closed for three weeks due to the pandemic, she dreamed that the students were asked to return for just one day. She was sitting with her best friend and an acquaintance at their usual lunch table. On March 29, she dreamed that she and her friends were wearing masks, which was

the day after her mother had dropped off a large pack of disposable masks for her and her close friends.

Penelope, who volunteered her dream series in early 2021, is in her early 20s. She lives in a southern state, which has an ongoing high incidence of COVID-19 infections. She was raised in a highly religious family, which belongs to a mainstream Protestant nomination. She has been writing down her dream reports since she was in her mid-teens. Penelope documented 93 dream reports between March 1 and the end of 2020. Four of them clearly relate to the pandemic and another could conceivably relate to it. On March 30, she dreamed that “some parasite was infecting everyone else around me.” She did not think the parasite related to the coronavirus, but when she sent the dream reports, she “thought it worth mentioning.” On May 22, she dreamed she was working again in a store she had left in 2019. In her dream “The place had changed because of COVID-19 and the new policies implemented.”

On June 13, she dreamed that her sister, who “has a compromised immune system in real life, died of a car crash, when I expected it to be the coronavirus.” On June 20, she was on a “horrible movie date, so I bring up COVID-19 violation to get out of sitting next to him.” On September 29, she walked up to the house she and her parents once lived in and gave her “mother a hug.” But the young person she was walking with, who did not know her very well, “seemed shocked I would hug a random lady possibly giving her COVID-19 or vice-versa.” Depending on how the first dream is counted, 4.3% or 5.4% of her documented dream reports related to the pandemic.

Zelda is also a recent college graduate, only a little older than Penelope. She was born and raised in a large city in Western Europe and went to college in the United States. She works as an assistant in a scientific laboratory in a large city in the United States. The city is located in a region that has tried to control the spread of the coronavirus. Due to her scientific training and the type of cell-oriented basic research lab she worked in, she clearly understood the potential for a pandemic from the outset. She volunteered her dream reports in late 2019 and sent what she had up to that time, well before the author thought of studying pandemic-related dream reports. She documented 99 dreams between March 1 and November 13, 2020, which is the day the author first contacted her for a second (unexpected) time. To avoid the risk of demand characteristics, he did not want any dream reports from after he contacted her that second time.

Nine of Zelda's dream reports mention COVID-19, which is 9.1% of the dream reports. Seven of them are notable for the passing way in which the virus is mentioned. On July 14, 4.5 months after fears of the virus were widespread, "a woman yells at her for walking past the row of homes she lives in," and the dreamer yells back, "there was a sign that allowed me to pass on this road because of COVID-19." On July 23, she is walking in a recreational area at "a respectful distance from the families who have paid to fish here (also perhaps in a COVID-19 distanced way)." On July 26, she is in a museum, but it is "emptier than usual: it must be shortly after COVID-19 has ended." On August 7, "the subway is crowded despite COVID-19" and people are wearing colorful leather jackets because they think "leather protects from COVID-19."

On August 8, she dreams that she has lost her job, which is very likely a personal concern to her at a time when layoffs were in the news, and she wonders if it is "because of COVID-19?" On August 23, she asks a store manager how things are going and the woman replies, "some things have had to change somewhat because of COVID-19, not too much." On August 29, in a dream in which she seems to portray a personal concern, she dreams she is in another recreational area: "we're all packed into these boats with the kids with a high risk of transmitting COVID-19, despite the masks." On September 18, she goes into a place that is closed, "either for COVID-19 or for construction," but she goes in anyway. On September 24, she wants to see an exhibit, but it is not clear if the exhibit is open, "due to COVID-19."

### **Allison and Jasmine: In Their 30s**

Allison is in her mid-30s. She volunteered her dream series in the early spring of 2020. She has documented her dream reports for two different periods in her life, separated by a four-year gap, during which she married and had children. The author later asked her to update what she had provided earlier, a request that neither he nor Allison knew would occur. Allison lives in a northern state, which eventually had high infection rates. Her 79 dream reports between March 1 and October 31, 2020, which is the day the author contacted her after a hiatus of several months, revealed only one instance of a pandemic-related dream report (1.3%). On March 11, she had gone shopping for a school snack for one of her young sons. The first two cases of COVID-19 in her small town had been announced that day

and “everyone was in a panic,” and “all of the toilet paper and anything disinfectant was already gone.” In the dream she had that night and documented the next morning, she “went shopping and everyone was in a hysteria. Everybody was out buying stuff. It was just crazy busy.” Compared with many of her other dream reports, this is a very matter-of-fact dream.

Jasmine, also in her mid-30s, documented 58 dreams between February 29 and December 10, which is the date the author contacted her for the first time in a year or more. She lives in a warm southern state that had high levels of infection and did little to prevent them. She has been keeping a voice-recorded journal of her dreams on and off since her early adolescence. Only two of her 58 dream reports within the relevant time period, which is 3.4% of the total, had a mention of COVID-19. On May 31, three months after the pandemic began, she was trying to delete something she had just posted. She had decided she didn’t want a certain person to see it. However, it was “slowly transforming into something more benign or something more COVID-19 and I’m realizing she probably won’t know what it is anyway.” On September 10, she was taking a Scantron test, which was supposed to determine if she had COVID-19. In a dream report from October 10, she mentions that she is afraid to fly because of “all the crazy crap in the world.” If that dream is also counted, then 5.2% of her dream reports are pandemic related. (A detailed analysis of Jasmine’s earlier dreams, from her early adolescence to her mid-20s, is presented in chapter 7.)

Overall, these five young women contributed 382 dream reports. Eighteen included a mentioned of COVID-19, which is 4.7% of the total. If the two dream reports that perhaps include an indirect mention of COVID-19 are added, then 5.2% have a mention of COVID-19. Few of the pandemic-related dream reports from these five participants expressed strong personal concerns. For 18-year-old Rebecca, neither of her two dream reports expressed a personal concern about COVID-19, although she was glad to be back sitting with her classmates in one of the dreams. For Penelope, her long-standing concerns about her sister’s compromised immune system very likely led to her concern that her sister might succumb to the virus. For Zelda, there was concern about losing her job in one dream and of being on a crowded boat with “kids,” ages unspecified, in another. For Allison, her one dream about the pandemic related to a personal concern she experienced that day: a buying panic while venturing out to purchase a snack for one of her school-aged sons. One of the two directly pandemic-related

dream reports voice-recorded by Jasmine showed personal concern, in that she was being tested for COVID-19 by means of a Scantron test.

### **Beverly: A Frequent Pandemic Dreamer**

Beverly, who is in her mid-60s, is a whole different story. She has been keeping a written record of her dreams for over 35 years. She showed high levels of consistency in an earlier analysis of three different time periods, based on generic word strings (Bulkeley, 2018). She has a lifelong interest in politics and current events. She dreamed frequently of former president Donald Trump from 2015 to 2020, whom she feared and disliked. She defines herself as a liberal Democrat and always has been regularly involved in helping others. She has an M.S. degree in clinical youth counseling. She documented 250 dreams in eight months between March 1 and the first few days of November. The reports are relatively brief, but they are more than adequate for the narrow purposes of this analysis. She also keeps a daytime journal of her thoughts and activities, which adds a further dimension to a study of her pandemic-related dream reports.

Beverly lives in a southwestern state, which had high rates of infection early in the pandemic. She first mentions COVID-19 in her daytime journal on February 22 and then discusses it at more length in an entry on February 28. She calls the virus a “threat,” says its main impact so far has been on the stock market, and then adds: “So I worry. If things get worse, lots of people could die.” On March 1, she documents her concerns about flu-like symptoms and a temperature of 99.9. On March 3, she awakened “with her head spinning,” and says she blew her nose most of the day. She made further daytime comments on her symptoms on March 8.

On March 10, after digitally entering 11 dream reports between March 1 and March 9, she had her first pandemic-related dream. She was “wearing big mittens for picking weeds,” and also dreams that the mittens “help stop the spread” of the coronavirus. On March 11, she writes in her daytime journal about COVID-19 being “really scary,” and thinks the president “acts insane.” She worries that she might “get the bad virus if I don’t already have it.” While continuing to enter daytime comments into her journal, she digitizes 11 more dream reports before she has another pandemic-related dream on March 18. In her dream she is helping the police at a “crime scene,” which is very empty, but “we worry they [the many boxes strewn about] ‘might be infected.’” They have to send the boxes to a lab “to be tested.”

The dream about helping the police exemplifies what proved to be an ongoing pattern in her dream reports related to the pandemic, which less often express her concerns about herself. Instead she is helping gather data, helping scientists to analyze data, or finding new ways to provide scientific information to the general public. In a dream on March 31, she is helping to rewrite the script for a soap opera so that more people can be reached about the need to wear masks and take other precautions. In a dream in April, she is making a website for updating pandemic-related information. On May 2, she is “involved in a scientific investigation into the virus—we want to find out what it is and how it spread.” She is also helping other people in other dream reports, such as people in a hospital. This emphasis on helping others, rather than enacting her worries and fears for herself, is revealed by the percentage of her pandemic-related dream reports in which she is in some way helping others. From March through August, when her concerns about the coronavirus were highest, 79.8% of her 47 dreams mentioning COVID-19 involved helping others in some way.

By April, Beverly’s most frequent way of helping others became the sewing of masks for free distribution. She makes no mentions of masks in either her daytime journal or her dream journal during March, but this new personal interest—indeed, quest—is mentioned in both her daytime journal and her dream journal after her new sewing machine arrived in early April. Over the next six months she frequently mentions in her daytime journal that she is sewing masks, giving masks to family and friends, giving masks to nonprofits to distribute to the homeless, and mailing packets of masks to places as far away as Hawaii. She mentions this general topic four times in April, 13 times in May, nine times in June, and 16 times between July 1 and September 30.

However, she mentions masks only once in early October and then again on October 30, when she thinks back on the past several months. She noted how her “priorities had changed.” In the early summer she had worked on another project related to a museum exhibit, but now she “hardly ever works on it.” She further says, “I was making 100 masks a week or more.” But in the past month, she “had only made 100.” On election day, November 3, she wrote that it had been a busy day, including sewing masks, but she had “thought about when to quit. I have two boxes of sheets and a lot of elastic plastic bags, and thread.” Then she writes, “maybe it’s time to hit pause. Everyone has a mask.”

Beverly's dreams dramatize this waking personal concern. They are not nearly as frequent as her daytime journal entries, but their rise and fall in frequency parallels the rise and fall of this personal concern in waking life. For example, one of her 32 dream entries in April is about sewing masks and six other dream reports are pandemic related, but the remaining 25 focus on other personal concerns, which is 78.0% of the dream reports for that month. Thirty-six of her 159 dream reports from May through September involve COVID-19 in one way or another, which is 22.6% of the total. Fourteen of those 36 (39.9%) relate to her concern about making and distributing masks. In October and early November, when the series ends for purposes of this research, she documented 27 dreams, only four of which (14.8%) related to the pandemic in any way, and even fewer, two, related to making and distributing masks.

When asked to comment on these findings, she said that "making masks helped ameliorate my fears about the pandemic," and added that "at times I was very concerned and frightened." Due to her passionate concern with helping others and for doing all she could to promote progressive social change, masks became a strong personal concern for her. This personal concern was enacted in her dreams. Her dreams about the pandemic thereby provide excellent evidence for the concept of continuity, which is a key-stone of the neurocognitive theory of dreaming.

Overall, 21.2% of Beverly's dream reports between March 1 and November 7 concern the COVID-19 pandemic. When her 250 dream reports are added to the overall sample, they account for 39.6% of the 632 dream reports and 74.6% of the 71 dream reports mentioning the pandemic in any way. She is 3.2 times more likely to dream about pandemic-related topics than the other five dreamers combined. This comparison demonstrates she has a far greater personal concern with the general impact of COVID-19 than they do. Her frequent inclusion of events related to the pandemic is consistent with her early symptoms, and perhaps even more so with her ongoing interest in current events, including politics, as well as with her lifelong focus on helping others. Even with this very high level of concern, though, 73.2% of the 250 dreams she documented during this frightful time period were about her usual concerns with family, friends, and two or three long-standing personal avocations.

These overall results demonstrate that current events, even those as potentially life-changing as the COVID-19 pandemic, do not readily become

personal concerns for most people. As revealed by the first five dream series, the pandemic had only a small impact on the dreams of people who were not suffering from COVID-19 or did not become highly concerned or traumatized by events related to the pandemic, or develop a sleep disorder due to it.

Methodologically, the results of this study demonstrate once again the importance of establishing a normative baseline for studying dream content under any circumstances. The results further show that questionnaires, including online questionnaires, are of limited value in dream research and of no value in developing a neurocognitive theory of dreaming.

### Conclusions and Implications

The findings in this chapter support and extend the conclusions in chapter 3 with regard to the everyday nature of most dream content. More importantly, the results from the studies of these widely differing dream series demonstrate there is consistency over time in what people dream about. This discovery, and many others reported in this chapter, might not have been made with representative samples of dream reports. These findings also reinforce the findings in chapter 3, based on cross-sectional group data, which showed that dream reports change very little over the decades from young adulthood to old age. The very different dream series provided by Jason and Kenneth provide excellent evidence for this point. However, many other dream series make this point as well, sometimes in unique ways, such as in the case of the widower.

The findings also substantiate a conclusion drawn in chapter 3. There is continuity between what people dream about and their waking personal concerns. This continuity is perhaps most striking for the entomologist, due to his atypical activities and interests in waking life. Then, too, the Beverly series, in the space of eight pandemic-filled months, provided unexpected new evidence on continuity from a different angle, due to her daytime documentation of the rise and fall of her personal concern with contributing free masks to the efforts to control the spread of COVID-19.

However, the Barb Sanders series supports this point in the greatest detail by showing how her relationships with different characters in her dream reports provide an accurate picture of her conceptions and concerns about them in waking life. In addition, the rigorous quantitative network analyses



of both her dreaming and waking social networks provide new and original evidence for continuity. There are also some understandable changes in *continuity* for some individuals, which leads to a further generalization about *consistency* in dream reports. There is consistency in people's dream lives to the extent there is continuity in their conceptions of people and activities in their waking personal concerns. In this regard, the consistency and continuity in the 4,254 dream reports from Barb Sanders are impressive, and perhaps definitive. In addition, the changes in some of Beverly's waking personal concerns at the height of the pandemic, which were followed by increases and decreases in her enactment of these concerns during dreaming, adds close-in evidence of this relationship.

Although it can be predicted that Barb Sanders will dream about one or more of the 13 most important people in her life in 30 to 35 of every 100 dreams, it cannot be predicted what she or anyone else will dream about on any one night. In that sense, dreams are based on a random spin of each person's cognitive rolodex, located in their semantic memory banks. Nor is it possible to know the full range of topics stored in a person's memory bank. Six individually tailored word strings relating to Kenneth's primary personal concerns, ranging from family and friends to driving trucks and playing sports, can account for at least some aspects of three-fourths of his 2,022 dream reports, but that still leaves out one-fourth of his dream reports. This figure is similar to an estimate in chapter 3, based on a study of "familiar" and "unfamiliar" activities in six different sets of dream reports, four from the United States and two from Germany: 70–75% of the dream reports contained "familiar" content. These and other findings make clear that consistency and continuity are very important, but they do not encompass all dreams.

The individual differences revealed in this chapter can be combined with the findings on the many cross-national and cross-cultural similarities in the large samples of dream reports overviewed in chapter 3. Based on these two different types of evidence, it seems plausible to suggest that dreams are first of all characterized by pan-human dimensions on the one side and by large individual differences on the other. The few gender, cross-national, and cross-cultural differences, although real, and often replicated in the case of gender, pale in importance to the pan-human similarities and the wide individual differences in dream content. Then, too, the character networks in dream series, which were discovered by mathematical

psychologists with expertise on waking memory, provide indications that dreaming in general may be rooted in the same principles governing waking memory to a greater extent than is usually recognized.

In terms of assessing the theories of dreaming discussed in this book, the most relevant issue that emerges from this chapter concerns the extent to which readers find the methods and results in it to be convincing. If these methods and results are judged to be soundly based and useful in understanding dream content, then the conclusions in this chapter could be helpful to them in assessing the two comprehensive theories of dreaming examined in chapter 9, and the adaptive theories of dreaming discussed in chapter 10, as well as the neurocognitive theory of dreaming.

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# The Neurocognitive Theory of Dreaming

## The Where, How, When, What, and Why of Dreams

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