

3 Dream Content as Revealed by Quantitative Content Analysis

Based on large samples of dream reports provided by college students and older adults, this chapter provides a detailed account of the main findings on dream content. For the most part these samples were collected in either exclusively laboratory or nonlaboratory settings, but six of the studies involved comparisons of samples collected from the same participants inside and outside the laboratory setting. Those six studies demonstrate that dream reports differ relatively little in content with regard to the context within which they were collected. (Aggression in dream reports is an exception.)

The chapter demonstrates that five categories of embodied simulations can be detected in the overall findings from a normative quantitative study of dream content. It also presents evidence that the dream reports in some of these categories differ in distinctive ways from an overall normative sample. Building on these classifications, the chapter then discusses the percentage of dream reports that include familiar settings and characters, and the frequencies of various thought processes and novel elements in dream reports. A section on age, cross-national, and cross-cultural studies of adult dream reports reveals age, nationality, and cross-cultural differences are relatively minor, with the exception of variations in aggressive elements. In addition, an analysis of four relatively large gender differences in dream content provides evidence there is continuity between the personal concerns that appear most frequently in dream reports and the degree to which those same personal concerns preoccupy the dreamers in waking life.

One important general conclusion drawn from these findings is that most dream reports are focused on personal and interpersonal issues. Perhaps for this reason, the dream reports of women, men, young adults, older adults, and people in different nation-states and indigenous societies are

more similar than they are different in several content categories. Finally, these various studies demonstrate dream reports are in most instances a reasonable simulation of the waking world.

Before focusing on what has been found in dream reports, however, it is first important to discuss the methodological and statistical strategies on which the findings are based. Just as studies of the neural substrate that supports dreaming were made possible by new neuroimaging technologies, so too, the advent of powerful desktop computers has made quantitative studies of large samples of dream reports far faster and easier to analyze with new search algorithms. It is also now possible to use approximate randomization strategies to examine or bypass the many assumptions that underlie established inferential statistical tests.

The benchmarks set by the large sample sizes, along with the methodological controls built into these replicated studies, provide baselines for assessing the usefulness of many smaller and unreplicated studies in later chapters.

Methodological and Statistical Issues in the Study of Dream Content

The findings presented in this and several of the following chapters are based on quantitative content analysis, a methodology that is widely used in the social sciences. It has made systematic studies possible for such widely differing texts as personal diaries, speeches, newspaper articles, novels, poetry, personal letters between correspondents, and psychotherapy sessions (e.g., Gerbner, 1969, for the classic compendium; Krippendorff, 2004; Charles Smith, 2000). Past experience demonstrates that no one general coding system is applicable to these many different kinds of texts. Novels are one thing, diaries are another, and dream reports are still another.

In fact, even though dream reports are similar to texts based on waking-state thinking in that they have a narrative-like structure, they are unique in several ways, starting with the fact that they are neither “instrumental” nor “representational.” In other words, they are not meant as communications to one or more individuals or as allegorical representations. Further, most of the dream reports used in research studies would not have been reported if dream researchers or anthropologists had not asked for them. Then, too, dream reports are unique in that they are verbal or written reports of a form of thinking that occurred in an atypical neurocognitive state. The

uniqueness of dream reports is also demonstrated by the repeated lack of success in finding anything new or useful by applying one or another coding system for waking texts to the study of dream reports. What is dreamed can only be known to others through such reports. Nor is there any independent way to assess the completeness and accuracy of dream reports. Dream content therefore has to be studied with systems of content analysis developed on the basis of detailed examinations of large samples of dream reports.

This conclusion is supported by an exhaustive compilation of the waking content methods used in the first 25 years of scientific dream research, most of which did not lead to replicable results and were never used again (Winget & Kramer, 1979). Nor did a comparison of 5,208 dream reports with many types of waking texts (from the Linguistic Inquiry and Word Count analytical system) yield any useful findings. It concluded that dream reports are somewhat similar to novels and expressive writing, and have higher frequencies for first-person singular terms, along with more terms for motion, space, and home (Bulkeley & Graves, 2018, pp. 43, 52–53). Similarly, a comparison of the Linguistic Inquiry and Word Count methodology with the system of quantitative analysis discussed in this chapter found that it can explain only 25.1% of the variance found with the system developed for studying dream reports (Zheng & Schweickert, 2021, p. 219).

The methodology of content analysis used in the study of dream content is best described as “the categorization of units of qualitative material in order to obtain frequencies, which can be subjected to statistical operations and tests of significance” (Hall, 1969a, p. 175). It includes four basic steps: (1) creating clearly defined categories that can be understood and applied in a reliable way by researchers who were not part of the effort to create them; (2) tabulating frequencies; (3) using percentages, ratios, or other statistics to transform raw frequencies into meaningful data; and (4) making comparisons with control groups or normative samples (Hall, 1969a, 1969b; Hall & Van de Castle, 1966; Van de Castle, 1969).

Ordinal-level rating scales for studying dream content, usually resembling 4- to 5-point Likert scales, have produced several useful findings, some of which are discussed in this and later chapters. However, they also have limitations in the study of dream content, as discussed in a summary fashion in chapter 8, and more fully elsewhere (Domhoff, 2003, pp. 58–60). Most of the findings in this and several subsequent chapters are therefore

based on a detailed and comprehensive coding system that rests on the categorical (nominal) level of measurement (Hall & Van de Castle, 1966, pp. 144–149). The 10 categories in the Hall/Van de Castle (HVdC) coding system are divided into two or more subcategories. They cover every type of element that appears in dream reports, including settings, objects, characters, activities, social interactions, good fortunes, misfortunes, successes, failures, and descriptive elements. There are also four categories for coding emotions, along with five categories for food and eating elements, and seven for elements from the past. The HVdC coding system has been used by investigators in several dozen studies in at least 11 countries, including Canada, Germany, Greece, India, Iran, Italy, Japan, Switzerland, Spain, the Netherlands, and the United States.

The most frequently used categories concern settings, characters, social interactions, and misfortunes. In the case of the social interaction categories, they include codings for who was the initiator and who was the recipient in the social interactions, along with codings for mutual interactions and reciprocated interactions. The codings of the dream reports are best analyzed using percentages and ratios (“content indicators”) to correct for differences in the length of dream reports. Percentages and ratios also correct for the varying densities of characters and social interactions in different samples of dream reports. Two different studies—one using the HVdC male norms, the other using the HVdC female norms—confirm that the content indicators are successful in eliminating any biases created by report lengths that vary from 50 to 300 words by comparing dream reports with 50 to 175 words to dream reports with 176 to 300 words. Similarly, a large sample of dream reports from one person, which ranged in length from two to 800 words, found that the content indicators are able to correct for the longer length of dream reports, which in general have more of everything. But dream reports with less than 50 words are not useful for quantitative studies (see Domhoff, 2003, pp. 80–84, for both of these studies). The corrections for length based on percentages and ratios are important because there is evidence that word frequencies may not be adequate to control for differences in report length (Foulkes & Schmidt, 1983, p. 274; Hall, 1969a, pp. 151–152). In addition, reports of findings based on a metric of “characters per 100 words” or “aggressions per line of text” are often difficult to understand and do not readily relate to information presented in more conventional ways.

To repeat a frequently used example of a content indicator, the “Animal Percent” is simply the total number of animals found in a sample of dream reports, divided by the total number of all types of characters. The use of the Animal Percent makes it possible to compare samples of dream reports from groups of all ages from all over the world. This is because the Animal Percent is independent of report length, character density, or sample size. In addition, findings presented as percentages are readily communicated and comprehended. People immediately understand what is meant if it is reported that the Animal Percent in dream reports declines from 10–20% in childhood to 4–6% in adulthood. It also “makes sense” to people if they are told the Animal Percent is higher in hunting and gathering societies than it is in industrialized nations (Domhoff, 1996, pp. 89–94, 117–126; Van de Castle, 1983).

In a parallel fashion, the total number of friendly interactions in a sample of dream reports, when divided by the total number of characters, provides a ratio called the “Friendliness per Character Index,” or “F/C Index.” This ratio controls for report length and the varying density of characters in dream samples. Furthermore, the F/C Index can be calculated for specific characters or types of characters in dream reports, leading to the possibilities of an F/C Index with, for example, parents, friends, children, or strangers. A list of the content indicators most frequently used in this book, and explanations for how they are calculated, is presented in table 3.1. The definitions of these indicators are also mentioned again the first time they appear in the text.

In addition, the categories can be used to make fine-grained analyses of one or another form of social interaction. For example, the HVdC categories for aggression (defined as hostile thoughts toward another character or deliberate, intentional acts by one character to annoy or harm some other character) demonstrate this point. Each aggression in a dream report is tabulated into one of eight categories: (1) covert feelings of hostility; (2) verbal criticism; (3) rejection or coercion; (4) verbal threat of harm; (5) theft or destruction of a person’s possessions; (6) chasing, capturing, or confining; (7) attempts to do physical harm; (8) murder. The frequencies for each category can be compared with normative findings with large samples. Categories 1 through 4, the nonphysical types of aggression, can be summed, as can categories 5 through 8, the physical aggressions. These two figures lead to a content indicator called the Physical Aggression Percent (all physical

Table 3.1

The formulas for calculating the Hall/Van de Castle content indicators

<i>Characters</i>	
Male/Female %	Males ÷ (Males + Females)
Familiarity %	Familiar ÷ (Familiar + Unfamiliar)
Friends %	Friends ÷ All humans
Family %	(Family + Relatives) ÷ All humans
Animal %	Animals ÷ All characters
<i>Social interactions</i>	
Aggression/Friendliness %	Dreamer-involved aggression ÷ (D-inv. aggression + D-inv. friendliness)
Befriender %	Dreamer as Befriender ÷ (D as Befriender + D as Befriended)
Aggressor %	Dreamer as Aggressor ÷ (D as Aggressor + D as Victim)
Physical Aggression %	Physical aggressions ÷ All aggressions
<i>Social interaction indexes</i>	
Aggression/Character	All aggressions ÷ All characters
Friendliness/Character	All friendliness ÷ All characters
<i>Percentage of dreams with at least one:</i>	
Aggression	Dreams with aggression ÷ Number of dreams
Friendliness	Dreams with friendliness ÷ Number of dreams
Sexuality	Dreams with sexuality ÷ Number of dreams
Misfortune	Dreams with misfortune ÷ Number of dreams

Adapted from Domhoff, 2003.

aggressions divided by all physical aggressions + all nonphysical aggressions). This indicator reveals age, gender, and cross-cultural similarities and differences, as discussed later in this chapter. Finally, all categories of aggressions can be totaled for an overall aggression score, which can be expressed by an Aggression/Character Index (A/C Index). It also can be expressed as the percentage of the dream reports in the sample with “at least one aggression,” or “at least one physical aggression.” No information is lost in this system, and there are no assumptions about how much “stronger” one aggression is compared to another, which is one of the problematic assumptions that underlie rating scales for dream content (see Van de Castle, 1969, for several examples). However, the “at least one” indicators do not control for dream

length for reports that contain over 300 words, so they need to be used with caution, or not used at all, with samples that contain numerous lengthy dream reports.

The coding system includes normative findings, based on 500 dream reports from 100 men and 500 dream reports from 100 women. These dream reports were collected from predominantly white middle-class students at Case Western Reserve University and Baldwin-Wallace College in Cleveland, Ohio, in the late 1940s and early 1950s (Hall & Van de Castle, 1966). The normative findings were subsequently replicated three times for selected coding categories (Dudley & Fungaroli, 1987; Dudley & Swank, 1990; Reichers, Kramer, & Trinder, 1970). They were also replicated for the major categories in studies of men and women's dream reports at the University of Richmond (Hall, Domhoff, Blick, & Weesner, 1982), women at the University of California, Berkeley (Tonay, 1990/1991), and women at the University of California, Santa Cruz, based on codings by Veronica Tonay, who also did the final codings on her Berkeley project (Domhoff, 1996, p. 67).

Determining Reliability in Studies of Dream Content

The percentage of perfect agreement method is a standard reliability measure for all types of content-analysis studies in the social sciences (Charles Smith, 2000). (This reliability measure is based on the number of agreements between two coders, divided by the total number of agreements and disagreements). It is the ideal method for determining reliability with the HVdC system. This conclusion was demonstrated empirically in a study that compared various methods of determining reliability (Hall & Van de Castle, 1966, chap. 13). In particular, this study demonstrated the risks of using a correlation coefficient with the HVdC coding system, because it does not answer the question of how often the two judges agreed exactly on their codings (Hall & Van de Castle, 1966, pp. 148–151, 154–155).

Within this empirically based context, using Cohen's kappa coefficient (κ) for reporting reliability is highly problematic. Cohen's kappa was created to correct for chance agreement by two judges making "yes" or "no" judgments of clinical protocols, who may be *guessing* at least some percentage of the time (J. Cohen, 1960). However, well-trained HVdC coders are making informed choices on the basis of explicit coding rules, in which two coders usually only disagree in terms of which subcategory to use, so a correction for chance makes no conceptual sense. Nor is kappa

actually chance-corrected because such a correction implies a model of how judges are making their decisions and can vary depending on whether few or many codings are made (see Uebersax, 1987, 2014, for a summary and a full bibliography relating to the weaknesses of kappa).

Determining Statistical Significance and the Magnitude of Effect Sizes

The percentage and ratio indicators used in the HVdC system are best analyzed for both statistical significance and the magnitude of effect sizes with the test for the significance of the difference between two independent proportions (hereafter simply called “the proportions test”). The issues involved in making this claim, and the claims in the next few paragraphs, may seem to be arcane or minor matters, but the use of statistical procedures premised on the ordinal, interval, or ratio levels of measurement, as found in readily available statistical packages, can lead to inaccurate outcomes.

The deceptively simple proportions test for nominal data is in fact a type of mean for which all the values in the distribution are either zero or one. A proportion only seems simpler than a mean because it is familiar to everyone from an early age in the form of a “percentage,” which is simply a proportion multiplied by 100. Since a proportion is a type of mean, the same inferential issues are involved with proportions as with means in general (J. Cohen, 1977, p. 179; Ferguson, 1981, p. 185). Another frequently used statistic, chi-square, provides the same results as the proportions test for 2×2 categorical tables, which are frequently used with the HVdC system (Ferguson, 1981, pp. 211–213).

Moreover, the proportional difference between two samples is exactly equal to the Pearson r between the two samples. For example, a difference of .13 between two samples can be understood as an r of .13 between two dichotomous variables (Rosenthal & Rubin, 1982). In the case of studies with the HVdC system that analyze three or more variables, it is possible to use other nonparametric statistical tests often deployed with categorical data. They include chi-square, the Wilcoxon signed-rank test, Kruskal-Wallis one-way analysis of variance, and Friedman two-way analysis of variance (Hall, 1966; Strauch, 2004, 2005; Strauch & Lederbogen, 1999).

The accuracy of proportions testing in determining p values has been demonstrated empirically for all but small differences between two small proportions at the extremes of a distribution (proportions below .10 to .15 or over .85 to .90). In those cases, the proportions test is sometimes wrong.

This point has been demonstrated by comparing estimates based on the proportions test with those based on the computationally intensive randomization strategy called *approximate randomization* (Domhoff, 2003, pp. 84–87; 2018b; Domhoff & Schneider, 2008a). The use of approximate randomization obviates the need for random samples, similar sample sizes, or a normal distribution of scores, through the use of random resampling. It is carried out by randomly drawing thousands of pairs of samples from a common pool made up of values from *both* samples (R. Franklin, Allison, & Gorman, 1997; Noreen, 1989). Approximate randomization thereby provides exact p values, not approximations. In a simulation study, randomization statistics were more powerful than either the nonparametric Wilcoxon signed-rank test or the parametric t test when distributions were skewed, which they usually are in studies of dream content (Keller, 2012).

The use of the proportions test with ratios, such as the A/C and F/C indexes, may at first glance seem inappropriate given that the relationship between a ratio and a proportion is seldom clearly articulated. However, ratios are the more general and encompassing category. They are defined as a comparison of any one quantity to any other quantity, and they can vary between zero and infinity. A proportion therefore is simply one type of ratio, by definition, but it is a ratio that only can vary between zero and one. It is thus possible to use the proportions test with a ratio as long as it varies between zero and one, as the HVdC social-interaction indicators invariably do. The fact that proportions testing is accurate with the A/C and F/C indexes has been demonstrated empirically through the use of approximate randomization testing, which returns the same results (Domhoff, 2018b).

The use of the statistic for the significance of the difference between two proportions segues smoothly to the use of an effect-size measure called h . It is similar in its logic to the better-known d statistic for determining effect sizes based on means. Both of these statistics were created by the same statistical psychologist (J. Cohen, 1977). Although h is calculated with a mathematical formula, as a rule the effect size is simply the difference between the two proportions, multiplied by two. For a more exact measure, there are easily used look-up tables, which make it possible to derive h from the two proportions (J. Cohen, 1977, p. 180; Domhoff, 1996, p. 315). However, the h statistic is best determined by the use of the DreamSAT spreadsheet, which is available on dreamresearch.net for doing all the statistical calculations

for a full HVdC analysis (SAT stands for “statistical analysis tool”). As simple as any of these avenues to determining h are in practice, they are in fact based on complex mathematical issues that have been resolved by Jacob Cohen (1977; see p. 180 for the statistical rationale) and summarized in other sources (Domhoff, 1996, p. 315; 2018b).

The h statistic has the added value that it is equal to ϕ and λ , the two statistics used to determine effect sizes with chi-square (Ferguson, 1981; Reynolds, 1984). Then too, the magnitude of the difference between two proportions is equal to the Pearson r for dichotomous variables, so nothing would be gained by using a correlational approach instead of percentages (Rosenthal & Rubin, 1982). More importantly, it is comparable to Cohen’s more widely known “ d ” statistic for determining effect sizes between two means. The relative sizes of h in various research areas in psychology can be readily compared with the findings with d . As shown in one study of the usual size of d in different fields within psychology, the h in HVdC studies of dream content, which are generally between .20 and .40, are higher than those for studies of laboratory interviews and reaction times (.14 and .18). They are lower than those for learning studies and person-perception studies (.52 and .54) (Domhoff, 2003, p. 89, table 3.6; Rosnow & Rosenthal, 1997).

Cohen (1977, p. 184) suggests that what is considered to be a “small,” “medium,” or “large” effect size is best determined by “theory or experience” in each research area. Based on numerous HVdC studies, effect sizes up to .20 should be considered small, effect sizes from .21 to .40 are best thought of as medium, and effect sizes above .40 are large. Effect sizes of .50 or above have been extremely rare in studies of dream content based on representative samples (Domhoff, 1996, chap. 8; 2003, chap. 5; Domhoff & Schneider, 2008a).

Necessary Sample Sizes in the Study of Dream Content

Sample sizes have to be large in most psychological studies to conclude anything with confidence. This point has been demonstrated empirically as part of the concern that many results in psychology, the neurosciences, and medicine cannot be replicated (Nosek, 2015). This point may be even more important in studies of dream content for two reasons. First, the fact that effect sizes are relatively small in dream research makes statistically significant differences more difficult to detect. Second, the units of analysis in

studies of dream content are not the individual dream reports. Instead, the units of analysis are specific categories of content within the dream report, such as characters or social interactions. These categories have varying frequencies; most of them appear in less than half of dream reports, although there are a few exceptions. Even in the case of characters, which appear in most dream reports, there may be far fewer *specific* characters, such as one or another of the members of the dreamer's family, or the dreamer's best friend (Hall, 1969a, 1969b). The traditional minimal sample size of 30 to 40 observations in psychological studies is therefore reduced to an effective sample size of 15 to 20 observations or less in a sample with only 30 to 40 dream reports.

According to Cohen's (1977, p. 205) detailed work on the sample sizes necessary for attaining statistical significance with varying magnitudes of differences in *proportions* between samples, it takes a large number of observations to detect small differences with any degree of accuracy. For example, with a real difference in proportions of .20, which is roughly equivalent to an *h* of .40, 125 observations are needed to have an 80% chance of attaining statistical significance at the .05 level. For proportional differences of .10, it takes a sample of 502 observations to have an 80% chance of attaining significance at the .05 level.

Three different empirical studies of this issue using the HVdC coding system led to the conclusion that Cohen's (1977) calculations have to be taken very seriously in dream research (Domhoff, 1996, pp. 64–67; 2003, pp. 92–94; Domhoff & Schneider, 2008a). For all but a few of the content indicators, it takes at least 125 dream reports to find statistically significant differences and accurate effect sizes. For example, examining the codings of 500 dream reports from women and 500 dream reports from men, which led to the HVdC normative findings, the results are replicated exactly for either gender with random samples of 250 and 125 dream reports, at the .05 level of significance. However, many of the significance levels and effect sizes in the two normative samples cannot be detected with any reliability with a subset of 100 dream reports, and the results become progressively weaker with 75 or 50 dream reports. The exceptions involve a few dream elements that appear frequently (Domhoff, 1996, pp. 64–67; Domhoff & Schneider, 2008a). It therefore is essential to use large sample sizes in building a sound scientific foundation for the understanding of dream content.

The Importance of Replication Studies

Although the evidence for the usefulness of the various statistical tests discussed in this section is very strong when sample sizes are adequate, virtually all statisticians agree there is no substitute for replication studies in psychology, no matter how large the sample size or how sophisticated the statistical analysis. It is now recommended that studies be replicated at least once (F. Schmidt, 1996; S. Schmidt, 2009). Replications are necessary because no statistical test is perfect (J. Cohen, 1990, 1994; Fife, 2020; S. Schmidt, 2009). Moreover, there are bound to be a few later studies based on small samples in which the random draw does not lead to the statistical significance that has been established in replicated studies. Although there are statisticians who suggest ignoring such small-sample studies, other statisticians suggest that any failure to replicate a finding that has been replicated several times should itself be replicated by the researchers and by independent investigators before it is taken seriously (Hedges & Schauer, 2019; S. Schmidt, 2009).

The Issue of Multiple Testing of the Same Sample

Multiple tests of the same pair of samples can greatly increase the probability of finding at least one or two statistically significant differences by chance (Fife, 2020, pp. 1056–1057). For example, if 10 comparisons are made, which is a realistic number when using the HVdC system, there is a 40% probability of at least one statistically significant difference ($p < .05$). To correct for multiple testing, the HVdC system has used the “false discovery rate” since 2015, which controls for false positives by focusing on the comparisons that yielded statistically significant differences (Benjamini & Hochberg, 1995). It does not suffer nearly as much from the large loss of statistical power experienced when the entire list of p values is used in making the correction, even when some comparisons are not significant, as in the case of the earlier Holm-Bonferroni correction (for further analyses, see Benjamini & Hochberg, 1995; Benjamini & Yekutieli, 2001; for a comparison of the two methods, see Domhoff & Schneider, 2015b; for the Holm-Bonferroni rationale, see Holm, 1979).

As a result of its low statistical power, the Holm-Bonferroni correction has been widely criticized by statisticians and by practitioners in epidemiology, ecology, and medicine on the grounds that it stifles the further exploration of unexpected findings, particularly in fields that are primarily at a

descriptive stage in the theory-building process (Ellis, 2010; Garcia, 2004; Moran, 2003; Perneger, 1998). Dream research, which has mostly remained at a descriptive level, can be placed in the same category as ecology, epidemiology, and medicine.

When the Benjamini-Hochberg correction for multiple testing was used in a comparison of the women's and men's normative samples for 22 HVdC content indicators, it did not result in any changes in the original p values that were calculated (Domhoff & Schneider, 2015b).

Do Dream Reports Collected in Laboratory and Nonlaboratory Settings Differ?

The most methodologically rigorous comparison of lab and nonlaboratory reports, based on 38 dream reports from 12 young male participants, revealed only two differences, both of which related to aggressive interactions (Weisz & Foulkes, 1970). The participants slept in the lab on two nonconsecutive nights over a two-week period and contributed nonlab reports from two morning awakenings at home, using voice-recorded reports in both conditions. There were no statistically significant differences between the lab and nonlab settings in the percentage of recall or the length of the reports, or on content indicators other than aggression (see Weisz & Foulkes, 1970, pp. 590–593, for details). Since the same participants were used in both conditions, a smaller sample size than is usually recommended could be used. Moreover, these findings were replicated in a study of 53 lab and 56 nonlab dream reports from five young male participants in a study at the University of Zurich, all of which were voice-recorded (Gross, 1988; Strauch & Meier, 1996, p. 107). Using the HVdC coding system and corrections for report length, there were no differences in settings, characters, activities, social interactions, or successful strivings (Gross, 1988).

The largest and most detailed comparison of lab and nonlab dream reports was carried out in the Miami sleep-dream lab, which had once been a suburban home. The study used voice-recorded reports in the laboratory and written reports in the nonlab condition. This was the least-controlled condition in the study, although the differences in the length of the reports from the two different conditions were not large and there were controls for length of the reports (see Domhoff & Schneider, 1999, for an accessible summary, and Hall, 1966). The original HVdC codings, which showed few or no differences in the initial analysis, were reanalyzed three decades later

using the new content indicators, which have excellent controls for word length with 50 to 500 words, as already mentioned above. This second analysis also included the effect size h .

Based on 120 nonlab dream reports and 272 lab dreams, which came from 8 of the 11 young male participants in the original study, there were only four statistically significant differences in the comparisons of 21 content indicators. The nonlab dream reports scored higher on three aggression indicators and the Animal Percent. However, the effect sizes were relatively small for two of the indicators but large in the case of two of the aggression indicators. Very importantly, this study also showed that the laboratory dream reports include only about half as many codable elements as do the nonlab dream reports in terms of the social interaction, striving, and misfortune categories (Domhoff & Schneider, 1999). It therefore seems there may be less of everything in at least some samples of lab dream reports, which has to be kept in mind for some type of studies. However, the basic results in terms of the content indicators remain the same.

Generally speaking, then, these three rigorous studies demonstrate there are few or no substantive differences between lab and nonlab dream reports, with the important exception of more frequent aggression in nonlab dream reports. There are also two studies that are less well controlled, which used the same participants in both conditions, and came to the same conclusions (Domhoff & Kamiya, 1964; Zepelin, 1972).

Although nonlab samples are useful when they are large and contain dream reports with 50 words or more, the differences on aggression have to be kept in mind when making major generalizations. Moreover, the differences between the two types of samples raise theoretical issues as to why nonlab dream reports would be similar to laboratory dream reports on some issues but not on others. More specifically, and as discussed in chapter 2, it may be that some of the well-known factors involved in the recall of dreams, such as recency and cued recall, may lead to reasonably representative samples of dream content, while saliency may introduce some biases into nonlab samples.

Five Categories of Embodied Simulations in Dreams

To provide a general picture of what people dream about, it is useful to begin with analyses of the codings for characters, social interactions, and

activities in the HVdC normative dream reports. These analyses reveal there are five main categories of embodied simulations in dreams. Three of these categories involve social interactions with, or thoughts about, other human beings. A fourth involves dream reports in which the only characters are the dreamer and one or more animals. The fifth concerns dream reports in which the dreamer is the only character. The results are derived from a spreadsheet containing the original codings for 991 dream reports, 491 of which are from 100 women and 500 from 100 men. Although nine of the original coding cards for women's dreams could not be located when these materials came into the author's possession, there were no differences on any content indicators when the original normative findings were compared with those from the extant normative samples. Within the context of the five categories extracted from the extant database, it is also possible to present the distinctive features that mark some of these categories and to mention any gender differences as well.

Aggression, Friendliness, Sexuality (A/F/S)

The first of the five categories includes three types of social interactions that occur in dream reports: *aggression*, *friendliness*, and *sexuality*. They have been analyzed in many dozens of investigations relating to age, gender, culture, and individual differences, some of which are summarized later in this chapter. These results are discussed in more detail in earlier books (Domhoff, 1996, chaps. 4–6; 2018a, chaps. 2–4). Aggressive, friendly, and sexual interactions can be combined to create a content indicator that expresses the percentage of dream reports with “at least one A/F/S” interaction involving humans. In the combined normative sample, 67.2% of dream reports have at least one aggression, friendliness, or sexuality interaction involving humans. There is a small gender difference (65.6% for women, 68.8% for men; $h = .07$, *ns*). Further, the dreamer is part of these social interactions about 80% of the time and an observer of them in the remaining 20%. These results demonstrate that most dreams are highly social in nature. The findings concerning the frequency with which aggression, friendliness, and sexuality occur in the combined normative sample, separately or together, are presented in figure 3.1.

Despite the large percentage of dream reports from both women and men involving aggressive, friendly, or sexual interactions, it is striking that only about 10% of the social interactions, whether initiated by the

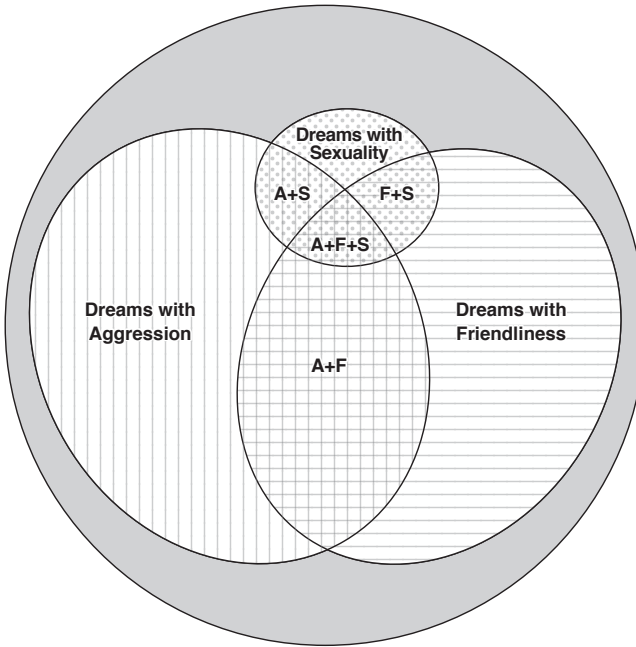


Figure 3.1

Euler diagram of social interactions (aggression, friendliness, and sexuality) between humans in the Hall/Van de Castle normative dreams.

Note: The enclosing gray circle represents the complete set of dreams.

dreamer or one of the other characters, are *reciprocated* by the other character involved. More specifically, a reciprocation concerns a response to a social interaction with a social interaction of the same type. Based on that index, the “social interactions” in dream reports do not involve much interaction. Omitting aggressive thoughts and murders, neither of which can be responded to, fewer than one in six aggressions is met with any type of aggressive response. After omitting friendly thoughts (which cannot be responded to), only 4.3% of the friendly acts in the remaining six categories lead to a response. These two results are the same whether the dreamer or another dream character initiates the aggression or friendliness. There are no significant gender differences on this issue. According to classic sociological understandings of what constitutes a “social interaction,” it is necessary for the two or more parties involved in the potential interaction to be

aware of the context and the likely thoughts of the other party or parties involved. Since so few friendly or aggressive acts in dream reports even involve a reciprocation, it may be that this lack is another example of a cognitive insufficiency during dreaming. The general results on reciprocation to aggression and friendliness are provided in table 3.2.

Directed and Joint Activities

In addition to A/F/S social interactions, social interactions often occur in the context of *activities* in dream reports, such as talking, walking, looking, listening, and thinking. There are eight subcategories of the overall activities category, all of which focus on “what characters *do* in dreams” (Hall & Van de Castle, 1966, p. 87; emphasis in the original). The activity subcategories include three that involve the body: *physical* (voluntary movements of the body or body parts while staying in about the same place); *movement* (self-propelled changes in location); and *location change* (changes in locale via a vehicle). The activities category also includes five sensory and cognitive categories, which are for the most part self-explanatory on the basis of their labels: *verbal*, *visual*, *auditory*, *expressive communication* (primarily laughing and crying), and *thinking/cognition*. Overall, activities are very

Table 3.2

Reciprocated aggression and friendliness in the Hall/Van de Castle norms

	Female norms (491 dreams)	Male norms (500 dreams)
<i>Aggression</i>		
Number of directed aggressions, subclasses 2–7	244	274
Percent that are reciprocated	13.1	17.9
Directed aggressions where the dreamer is the recipient	144	151
Percent that are reciprocated by the dreamer	11.1	17.9
<i>Friendliness</i>		
Number of directed friendly acts, subclasses 2–7	237	210
Percent that are reciprocated	5.5	2.9
Directed friendly acts where the dreamer is the recipient	112	101
Percent that are reciprocated by the dreamer	9.8	1.0

frequent in the HVdC normative dream reports, averaging 4.9 per dream report for women and 4.7 for men; 25% of women's dream reports and 22% of men's reports contain from 6 to 20 activities (Hall & Van de Castle, 1966, pp. 182–185, for the highly detailed findings on activities).

Although not all activities in dream reports are part of social interactions, many activities are indeed carried out in “interactions between characters” or in “conjunction with other characters” (Hall & Van de Castle, 1966, p. 87). The characters' interactions with each other (called “directed” activities) or in conjunction with each other (called “joint” activities) are used in defining the second of the five categories that can be found in dream reports. Directed and joint activities may or may not involve the dreamer. Sometimes they simply involve a group of unnamed people carrying out an activity together.

These directed and joint activities include characters talking with, or moving to another locale with, another character or characters, or two or more characters seeing or listening to someone together. They also can include such joint activities as lifting an object together or working to repair a vehicle together. There are even a few instances of characters laughing or crying together, or thinking together, as in “deciding” or “plotting” some activity together. This type of embodied simulation is analyzed by means of a content indicator expressed as the percentage of dream reports with “at least one directed/joint activity” involving another human character. In the normative sample, 77.1% of the dream reports have at least one directed or joint activity.

When the 77.1% of dream reports with at least one directed/joint activity are combined with the 67.2% of dream reports that have at least one A/F/S, then fully 86.9% of dream reports have at least one A/F/S interaction *or* at least one directed/joint activity. Women have a slightly higher percentage of dream reports with a directed or joint activity (79.2% for women, 75.0% for men). However, both women and men end up with approximately the same percentages when the A/F/S and directed/joint activity categories are combined (87.4% for women, 86.4% for men). The overall distribution, as displayed in table 3.3, demonstrates the overwhelmingly social nature of dreams even better than the two categories considered separately. Note that a majority of dream reports (57.4%) contain both a social interaction *and* a directed or joint activity. Note also that table 3.3 contains findings on three categories of embodied simulation discussed below.

Table 3.3

Categories of “social simulations” (or lack thereof) in the combined Hall/Van de Castle normative sample of dream reports

Type of social simulation	Percent of dream reports	Cumulative percent
Social interactions (aggression, friendliness, or sexuality)*	67.2	
Activities (joint/communal or directed)*	77.1	
Social interactions OR joint/directed activities	86.9	86.9
Human characters but no interactions	6.6	93.4
Only animal characters	2.2	95.7
Dreamer only	4.3	100.0

* 57.4% of dream reports had both social interactions and joint/directed activities.

Perception/Cognition of Other Characters

In addition to A/F/S interactions and directed/joint activities, there is a type of embodied simulation that includes *only* visual, auditory, or thinking activities by the dreamer but in which another character may be seen, heard, or thought about (e.g., “I saw/heard Joe across the room;” “There were hundreds of people along a fence and I thought of a woman I know”). This category also includes dream reports in which one or more human characters are reported to be in the same setting with the dreamer but are not interacting with the dreamer or with each other (e.g., “I was standing in a railroad station where there was a great crowd of people”). These dream reports are labeled “perception/cognition” simulations because they only include the dreamer’s perceptions and/or thoughts in relation to some other character or characters. By definition, perception/cognition dream reports do not include *any* type of social interaction or any directed or joint activities. Dream reports within the perception/cognition category are analyzed by means of a content indicator expressed as the percentage of dream reports with “at least one perception/cognition activity” involving another human character. The perception/cognition percent is 6.7, which means that 93.5% of dream reports include a social simulation of some type that involves other people.

Dreamer and Animals Only

A fourth type of embodied simulation in dreams is one in which only the dreamer and one or more animals or creatures are present. (“Creatures”—the

stuff of science fiction, fairy tales, and cartoons—appear only twice in the combined norms.) For all intents and purposes, then, this category involves only the dreamer and one or more animals, but it is by definition a “dreamer-plus-animals-or-creatures” category. This category allows for future studies in which there may be more creatures. In any case, only 2.1% of dream reports fall into this category. Although this percentage of all the dream reports is small, these dreams are distinctive because they are very high on aggressive interactions. The dreamers are often being chased or physically attacked by an animal or dangerous insect. The Physical Aggression Percent in animal-only dream reports is 72.2, compared to 42.4 in the rest of the dream reports. This difference leads to an unusually large effect size ($h = .62, p < .01$).

Dreamer Only

Fifth, and finally, there is a type of embodied simulation in dreams in which the dreamer has no social interactions, directed activities, joint activities, or social/perception activities. That is, there are no other characters, human or animal, in the dream report. Nor is there even any *thinking* of other characters in these “dreamer-only” dream reports. In these dream reports, the person is carrying out some activity alone, such as listening to music, shaving, driving, trying to fix an automobile, walking alone on a street or in a forest, or simply observing his or her surroundings. These “dreamer-only” dreams comprise the final 4.3% of the dream reports in the normative sample.

Dreamer-only dream reports are distinctive in that they are higher than the normative baselines for the presence of at least one of several types of “misfortune.” Misfortunes are defined as bad outcomes that happen to the dreamer, or any other dream character, but are not due to actions by any dream character. Misfortunes are analyzed in terms of five nominal subcategories. The categories range from annoying to difficult to very sad outcomes: a dream character is facing an obstacle, such as a locked door; is falling or in danger of falling; is threatened by something in the environment, such as a falling tree limb; is involved in a minor accident; is injured or ill; or dies or is already dead (Hall & Van de Castle, 1966, pp. 102–104). In dreamer-only dream reports, misfortunes are almost twice as likely to occur than in the remainder of the normative sample. In addition, the effect size is quite large (62.8% vs. 33.5%; $h = .59, p < .001$). For example, the dreamers are not only shaving, they also see blood from a cut. The dreamers are not

only walking in the forest, they are also becoming lost. They are not simply driving alone; they are also worried about experiencing car failure.

As this general analysis based on five separate categories documents, dreams are overwhelmingly social in nature. About two-thirds of dream reports contain at least one aggressive, friendly, or sexual interaction. A little over three-fourths of dream reports involve a shared activity with another human character. Another 6.7% involve thoughts or perceptions of other people. Finally, there are the 2.2% of dream reports that involve the dreamer and one or more animals, and the 4.3% that only involve the dreamer. As these percentages suggest, no one generalization captures the full range of dream content.

These findings can be used to examine various cultural stereotypes about dreams. This diversity and complexity are further supported by the findings in the rest of this chapter and in chapter 4. The wide individual differences in the content of the dream reports discussed in chapter 4 also add to this general portrait of dream content.

Age, Cross-National, and Cross-Cultural Differences in Dream Reports

Numerous studies of adults inside and outside of lab settings have examined the issue of age differences. Age is not only of interest in and of itself but also has implications concerning the degree to which normative findings based on young adults in university settings can be used with older adults. Similarly, there are both substantive and methodological reasons for determining if there are differences in dream content between dream reports collected in the United States and other industrialized countries (called “cross-national differences” in this book), as well as any differences between nation-states and small indigenous societies (called “cross-cultural” differences in this book).

Age Differences in Dream Reports in Three Different Countries

Although age is usually one of the first issues most people assess when they meet an individual, there are few age differences in dream reports. Nor is it very often obvious what the dreamer’s age is, based on the settings, characters, and social interactions in dream reports. However, phrases such as “my children” or “my aging father” sometimes provide some hints. In one of the first large-scale studies of age differences in nonlab dream

reports, which compared aggressive and friendly interactions in 281 dream reports from women ages 30 to 80, as well as aggression and friendliness in a similar number of dream reports from men in the same age range, the main differences concerned a possible decline in the frequency of aggression (Hall & Domhoff, 1963a, p. 260, table 2; 1964, p. 310, table 1). Similar age differences on aggression were reported in a study using a different coding system. It compared 148 dream reports from 38 college women, ages 18 to 26, with 185 reports from 43 women, ages 40 to 86, all but two of whom had attended college (Brenneis, 1975, p. 433). A study of age differences between 58 males ages 27 to 64, which compared laboratory and nonlab dream reports from the same participants, made use of several HVdC coding categories. One of the few differences involved the frequency of aggressions. Family-related content was most prominent from ages 35 to 55, which is consistent with the focus on raising children for many adults in that age range (Zepelin, 1980, 1981).

Perhaps the most convincing study on age changes in dream content involved a unique longitudinal design in which the researchers collected two-week, follow-up dream diaries from Canadian women. They had originally written down their dreams 10, 15, or 17 years earlier. At the time they were asked if they would keep a second dream diary, seven of the women were between ages 30 and 39, 10 were between 40 and 49, and four were between 50 and 55. Using a large number of HVdC content indicators, as well as other measures, the research team found no statistically significant differences (Lortie-Lussier, Cote, & Vachon, 2000, pp. 71–72, tables 1, 2, and 3).

Similarly, in a cross-sectional study of 47 French-Canadian women ages 25–35, 36–45, and 46–56, each of whom contributed two dream reports, the main difference, using various HVdC coding categories, concerned more pleasant outcomes in the oldest group. There was also a slight decline in the frequency of emotions for the older age group (Côté, Lortie-Lussier, Roy, & De Koninck, 1996). However, two other cross-sectional studies with heterogeneous samples found mixed evidence for age consistency for both women and men. The first study was based on 375 dream reports from each of 375 Canadian women, who varied in age from 12 to 17, 19 to 24, 15 to 39, 40 to 65, and 65 to 85. The second study used dream reports from 231 Canadian men, who were divided into roughly the same five age categories. Although several categories remained stable for the women, there was a slight decline in the Aggressor Percent and larger declines in familiar

characters, total number of activities, aggression, and the F/C Index. In the case of the men, the changes involved a decline in the rate of aggressions from the adolescent group to the young adults. It then remained relatively stable thereafter. On the other hand, the F/C Index and the number of activities in the dream reports gradually increased in the three older groups of men (Dale, Lortie-Lussier, & De Koninck, 2015, 2016).

Two large studies of the elderly at the University of Zurich made use of HVdC coding categories. In the first study, 253 dream reports from 15 women and 9 men between the ages of 66 and 78 were collected in a lab setting. Then dream reports were collected from the same women and men through the use of voice recorders in each individual's home setting for two weeks. The reports were coded for characters, settings, social interactions, and activities. The only two differences between the elderly and a control sample from younger Swiss adults involved a higher percentage of unfamiliar characters and unfamiliar settings in the dream reports of the elderly (Strauch, 2003). In a second study, a recent dream report was collected from each of the 106 women and 45 men, ranging in age from 65 to 89, who attended one of the two repeated lectures on dreams provided for senior citizens in Zurich. Once again, the dream reports were compared with dream reports from younger Swiss adults, and once again there was a higher percentage of unfamiliar characters and unfamiliar settings in the elderly sample. There was also less aggression in this sample of dream reports from the elderly (Strauch, 2014).

Substantively speaking, then, there are few age differences among dreamers in several samples from three different countries. However, there are one or two relatively consistent differences between the youngest and most elderly of adults, especially on indicators related to aggressive interactions. In terms of methodological issues, these findings suggest normative findings based on dream reports from young adults have to be used selectively with samples of elderly dreamers.

Cross-National Studies of Dream Content

The most detailed study of dream content in a European country compared the dream reports of young adult Swiss women and men, collected at a University of Zurich sleep-dream lab, to the HVdC normative findings. Based on HVdC codings, the Swiss and American men and women were very similar in terms of the mean number of settings, the mean number of

characters, the Male/Female Percent, Animal Percent, and the Familiarity Percent. However, the Swiss women had a higher percentage of strangers and the Swiss men had a higher percentage of outdoor settings (Domhoff, 1996, p. 202, table 6.3). The differences between the Swiss and American samples are greater in the categories of aggression and friendliness. The HVdC norms, based on nonlab samples, therefore are not ideal for a cross-national comparison (Domhoff & Schneider, 1999). Swiss dreamers of both genders were also much more likely than their American counterparts to initiate friendly interactions.

Similar findings emerge in two different studies of the same database of 246 dream reports from 106 German college women and 95 reports from 39 German college men (Domhoff, Meyer-Gomes, and Schredl, 2005–2006; Schredl, Petra, Bishop, Golitz, & Buschtons, 2003). In the second of the two studies, for example, the German women differed from the HVdC normative sample of American women on 5 of 17 comparisons based on HVdC indicators, and the German men differed from the HVdC normative sample of American men on 6 of 17 comparisons (Domhoff, Meyer-Gomes, and Schredl, 2005–2006, pp. 274–275, tables 1 and 2). The most unexpected large difference, on the Male/Female Percent in German men, is discussed later in the chapter.

A collection of 218 single dream reports from 115 men and 103 women at the University of Tehran found many similarities with the HVdC norms, along with lower levels of aggression and sexuality and a higher percentage of family members and other familiar characters (Mazandarani, Aguilar-Vafaie, & Domhoff, 2013, p. 167). The findings on family members and known characters are similar to findings in a study in India (Prasad, 1982). The results from a lab and nonlab comparison study at the University of Tokushima in Japan, which resulted in a total of 193 dream reports from women and 104 dream reports from men, provided findings that were almost identical to the HVdC norms for women and men for the objects and activities categories (Yamanaka, Morita, & Matsumoto, 1982, pp. 34–35, 38). However, there were more characters in Japanese reports than in the HVdC norms, and far more of the characters in Japanese reports were familiar to the dreamer. Both women and men in the Japanese study had very low percentages of dream reports with at least one aggression, compared to the American norms. The figure was 26% for women, as compared to 44% for American women, and 14% for men, compared to 47% for American men.

By and large, dream reports are more similar than they are different across a number of cases, although the United States is far higher than the others on content indicators related to aggression. In addition, there are differences on the degree to which the characters in dream reports are familiar to the dreamer. Although the available samples from a wide range of countries makes it possible to find commonalities, further studies in specific countries would be necessary to examine the differences from the HVdC normative samples in more detail.

Cross-Cultural Studies of Dream Content

Using dream reports brought together from a variety of anthropological studies, dream reports from 10 indigenous societies have been analyzed with HVdC categories. Two of the societies were based on hunting and gathering economies, and the rest of these indigenous societies largely relied on one or another type of agriculture. These dream reports were collected under many different conditions and many of the reports were relatively brief, so the most important conclusions are somewhat general (Domhoff, 1996, pp. 99, 115–120, for a more detailed discussion). Most impressively, the dream reports from these 10 societies are similar to dream reports collected in the United States and other countries in that there are always more single than plural characters, more humans than animals, and more familiar than unfamiliar characters. As in the United States, the A/C Index is higher than the F/C Index in these societies, with the exception of Hopi women. Dreamers in indigenous societies are also more often victims of aggression, with two exceptions. There is usually more physical than non-physical aggression. Finally, the Physical Aggression Percent is higher than it is in the United States in all but one of the indigenous societies, namely the Hopi, who had been forced to live on reservations almost 100 years before their dream reports were collected (Domhoff, 1996, pp. 119–120, tables 6.17 and 6.18, and p. 128). Once again, aggression emerges as a key variable between societies.

The Familiar and the Unfamiliar in Dream Reports

Most dream reports include familiar settings and familiar characters, but some dream reports include neither. In the HVdC women's normative sample, 33.6% of the dream reports include at least one family member, 59.1%

include at least one friend, and 39.7% have at least one familiar setting. More generally, either a family member, a friend, or a familiar setting are present in 82.7% of the women's normative dream reports. In contrast, only 18.2% of the dream reports in the men's normative sample include at least one family member, only 44.8% include at least one friend, and only 33.6% have at least one familiar setting. As a result, only 65.0% of the men's dream reports have at least one family member, friend, or familiar setting, so there is a large difference (82.7% vs. 65.0%, $h=.41$, $p<.001$). Gender differences on this issue aside, the dream reports with varying degrees of familiarity in terms of settings and characters also can be examined more closely using several of the HVdC coding categories.

When characterized in terms of degrees of familiarity and unfamiliarity, the dream reports differ on several content variables. In particular, dream reports that involve the dreamer interacting with unknown people, within unknown settings, have more physical aggression, less friendliness, more misfortune, and a higher Animal Percent. These dreams may be more "narrative-driven," which means they are more like sagas or adventures than enactments of personal concerns (Foulkes, 1999, p. 136). The results from the various analyses in this paragraph are displayed for women and men separately in table 3.4. The table also can be examined to show there is only one gender difference, which concerns the A/C Index.

The differences between familiar and unfamiliar dream reports also have been studied using four general ad hoc categories, which have some overlaps with HVdC categories. These categories concern "familiar characters," "familiar activities," "school/work/politics," and "nothing familiar." They were used to study six different sets of dream reports 50 to 300 words in length. The samples consisted of 246 dream reports from 106 German college women; 95 reports from 39 German men; random samples of 100 HVdC norm dream reports from 100 women and 100 men; and 100 dream reports collected at the University of Miami in a lab setting and 100 dream reports from the same male participants outside of the lab setting (Hall, 1966). The same bilingual research assistant who coded the German dream reports, Katrin Meyer-Gomes, also coded the other five sets of dream reports (Domhoff, Meyer-Gomes, & Schredl, 2005–2006). She did so on two separate occasions several months apart (a temporal measure of reliability). She then reconciled the few differences between her two sets of codings. In every sample, the percentage of dream reports that included one or more

Table 3.4

Differences in content in the familiar and unfamiliar dream reports of women and men

	Female norms			Male norms		
	Familiar (<i>n</i> =168)	Unfamiliar (<i>n</i> =80)	<i>h</i>	Familiar (<i>n</i> =127)	Unfamiliar (<i>n</i> =164)	<i>h</i>
Aggression/ Friendliness %	51	57	+0.12	57	65	+0.15
Physical Aggression %	32	66	+0.70**	33	63	+0.60**
A/C Index	.24	.24	+0.01	.29	.44	+0.33**
F/C Index	.22	.17	-0.13	.21	.20	-0.02
At least one misfortune %	35	46	+0.23	31	47	+0.32*
Animal %	3	13	+0.39**	3	11	+0.32**

Note: "familiar" dreams are those with both familiar characters and familiar settings. "Unfamiliar" dreams have neither familiar characters nor familiar settings.

* $p < .01$; ** $p < .001$.

of the "familiar" elements was 70% or higher. The results from the samples of women from Germany and the United States were very similar (87% and 82% familiar), as were all three samples from the American men (70–74% familiar). The German men had a Familiarity Percent of 80, which is more similar to the results for the two samples from women than it is to the results for American men.

These results with the six samples from Germany and the United States support the HVdC findings above, which are based on a comparison of familiar and unfamiliar dream reports with the normative dream reports for women and men. More generally, the results from the study using four ad hoc categories and the study using HVdC codings suggest there may be gender and nation-state differences on the degree to which samples of dream reports can be characterized in terms of the Familiarity Percent.

Cognition and Cognitive Appraisals in Dreams

Cognition, as defined in the HVdC system, involves a "deliberate continued mental effort," such as "concentrate," "deliberate," and "think about." But it does not include "brief, transient mental activities," such as "I forgot

my coat," "I remember the room," or "I think it was blue" (Hall & Van de Castle, 1966, p. 90). Defined in this way, 113 cognition codings appeared in 13.8% of the women's normative dream sample and 75 such codings appeared in 11.6% of the men's sample dream reports. On the other hand, a category for cognitive appraisals, which concerns the assessment of a puzzling or possibly concerning situation or event, appears more frequently (21.0% of dream reports for women, 13.4% for men). Since there is a small overlap in the two categories at the juncture between confusion and puzzlement, 29.3% of the women's dream reports contain at least one cognitive element and 23.0% of the men's reports include at least one cognitive element. Both categories are useful due to the concern with cognition in the neurocognitive theory of dreaming.

However, the focus in this book is on cognitive appraisals. They have important theoretical implications in terms of the development of an adequate theoretical understanding of emotions in dreams, as explained in chapter 8. Cognitive appraisals, which also can be defined as the "process of evaluating the affective significance of an event" (Dixon, Thiruchselvam, et al., 2017, p. 1034), often occur as part of a process that may or may not lead to the expression of one or another type of emotions. In the HVdC system, the concept of cognitive appraisals is indexed by terms such as "astonishment," "bewilderment," "confusion," "puzzlement," and "surprise." This point is captured in Hall and Van de Castle's (1966, p. 112) discussion of the category as one of "cognitive ambiguity," which is due to an "unexpected event," or to an "inability to choose among available alternatives." They further note this state is also expressed by terms such as "amazed, conflicted, mystified, perplexed, uncertain, and undecided" (Hall & Van de Castle, 1966, p. 112). However, the two researchers were uncertain as to whether to put this category under the general rubric of cognition or emotion. After noting "it may be debatable as to whether confusion is a condition possessing the same degree of autonomic involvement," they mention what came to be the key point concerning the later development of the concept of cognitive appraisals: "the feeling state accompanying uncertainty may begin to shade toward a type of free-floating anxiety, toward frustration, or toward depression" (Hall & Van de Castle, 1966, p. 112). They then concluded that confusion was "emotionlike."

Due to advances in cognitive psychology, it now makes more conceptual sense, especially within the context of a neurocognitive theory of dreaming,

to categorize confusion, surprise, and puzzlement as “cognitive appraisals.” Cognitive appraisals arise in the face of new situations or sudden events (I. Roseman & Evdokas, 2004; I. Roseman & Smith, 2001). To repeat, a cognitive appraisal is the first step in what may or may not lead to an emotion. It is for these reasons that confusion, surprise, and closely related cognitive states are now an important subcategory within the general category of cognition.

The Continuity between Dreaming and Waking Thought

The neurocognitive theory of dreaming puts a strong emphasis on the “continuity” between what people dream about and their waking personal concerns. This section provides good preliminary evidence for the validity of this hypothesis by means of studies based on three very different topics. The first compares the dream reports from a hunting and gathering society with the HVdC norms. The second study compares the degree to which the “negativity bias” detected in waking thought in numerous psychological studies also appears in dream reports. The third and most detailed analysis compares dream reports from women and men in the United States on the basis of a large and unexpected gender difference. This large difference in turn relates to other relatively large gender differences in dream reports and to gender differences in waking personal concerns.

The dream reports from the Yir Yoront, a hunting and gathering society in Australia, were collected in the 1930s by a cultural anthropologist (see D. Schneider, 1969, for details). Asking about dreams seemed useful to this field researcher, even though the Yir Yoront put no special emphasis on dreams and made no use of them in ceremonies. This is because he soon realized that talking about dreams provided a way to “establish and maintain rapport” on “a neutral subject that could be exploited without offending anyone” (D. Schneider, 1969, p. 15). The Yir Yoront sample consists of 140 dream reports from 43 men, one of whom contributed 14 dream reports. Another man contributed 11 and the rest contributed from one to five each.

There were relatively few differences between Yir Yoront men and American men, except that the Yir Yoront men dreamed far more about animals, had a higher proportion of aggression with animals, and had a very high percentage of physical aggressions with animals. They also had a higher frequency of friendly encounters with humans, particularly with familiar

female characters. These friendly interactions with women mostly involved the Yir Yoront men sharing meat from the animals they had killed. When compared with the men's normative samples and five indigenous agricultural societies, the findings suggest continuity between the dream lives and waking lives of Yir Yoront males (Domhoff, 1996, p. 120, table 6.18). They thought constantly about the animals they hunt and kill, and feared them. They looked forward to increasing their stature within the group by sharing the meat from the animals they killed with relatives and friends, including women relatives. And they had ceremonies to propitiate the spirits of the dead animals they feared and respected. In general, then, this comparison of animals in three extremely different samples of dream reports provides solid evidence for the concept of continuity.

Numerous waking studies over many decades have led to the conclusion that there is a negativity bias in people's thinking, which is a tendency to think more often of their fears, worries, failures, and bad experiences than of positive thoughts and events in their lives (see Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001, and Rozin & Royzman, 2001, for reviews and summaries of several decades of studies on this topic by research psychologists). This work has been supplemented and extended by research in social neuroscience (see Norris, 2021, for an analysis of neuroimaging and other types of neuroscience findings on the negativity bias from a social-neuroscience perspective). Based on an examination of the HVdC normative findings, the negativity bias is present in dream reports as well. When the total number of aggressions, misfortunes, and failures is compared to the total number of friendly acts, good fortunes, and successes, women have a negativity bias of 68.2%/48.7%, which can be expressed as a negativity ratio of 1.40, and men have a negativity bias of 73.6%/51.2%, which is a negativity ratio of 1.65.

Turning to the third study that is relevant to the issue of continuity between the concerns expressed in dream reports and waking thoughts, it began with one large gender difference in dream content in the HVdC normative sample. The analysis next used the findings in other HVdC categories to understand that initial difference. The results of these analyses were then related to gender differences found in a variety of waking studies. The gender difference that provided the starting point for the study is simply that women dream far more equally about both genders than do men. More exactly, 48% of the human characters in women's dream reports are men and 52% are women. Men, on the other hand, dream twice as often about other

men as they do about women, 67% vs. 33%. This difference on the “Male/Female Percent” is determined by dividing the total number of men by the total number of men plus women, which leads to an h of .38 and a p value of .0001. As noted above, but worth mentioning again, this is a fairly large effect size for studies of dream content. It is also one of the four largest differences between the normative dream reports of American women and men.

The gender difference on the Male/Female Percent has been found at all ages in many different countries and cultures, including Argentina, Switzerland, and many of the small traditional cultures studied in the past by cultural anthropologists (Domhoff, 1996, chap. 6; Hall, 1984). However, it is by no means a “universal” difference, in the sense that it is invariably found in every group. In fact, the dream reports of African American male college students at a community college in Chicago in the late 1960s had a Male/Female Percent of 53/47, which was very similar to the Male/Female Percent for the African American women in the study (Domhoff, 1996, p. 75). Nor was the usual difference found in studies of Mexican and Peruvian teenagers and young adults, where the men tended to dream equally of men and women and the women dreamed more frequently of men (Domhoff, 1996, p. 106). It also was absent in the study of the dream content in several hundred reports from German college students, in which the Male/Female Percent was 56/44 for women and 58/42 for men (Domhoff et al., 2005–2006; Schredl, Petra, Bishop, Golitz, & Buschtions, 2003). In the cross-cultural study of indigenous societies discussed above, there was no male group in which the Male/Female Percent was below 59/41. However, two of five female groups had a high Male/Female Percent—66/34 in one of them and 58/42 in the other. These two differences perhaps indicate they lived in extremely patriarchal societies (Domhoff, 1996, p. 119, table 6.17).

The unexpected general finding on the Male/Female Percent for white Americans, as well as people in several other societies, is a discovery that is the product of the coding system. There is no immediately obvious reason for this difference. However, it provides an opening for using other findings, based on the HVdC content indicators, to show how this finding led to further discoveries, which relate to gender differences in waking personal concerns. More specifically, if it is hypothesized that the quantitative analysis of dream reports reveals the same personal concerns people think about in waking life, then the findings on the Male/Female Percent suggest women are equally concerned about both men and women, and that men are more concerned about other men than they are about women.

As a starting point for examining this hypothesis, there is another gender difference that provides an initial clue. It is based on the frequency of appearances by familiar characters, who are defined as family members, friends, and acquaintances. Women dream more often of characters who are familiar to them than do men. They have a Familiarity Percent of 58, compared to 45 for men ($h = .26, p < .001$). A closer examination of this difference reveals that women dream more often about familiar females than men do (29% vs. 16%, $h = .31, p < .001$). On the other hand, men dream more often about unfamiliar men than do women (28% vs. 15%, $h = .32, p < .001$). Within this context, it is relevant that women and men dream equally about familiar men (23% vs. 25%) and also equally about unfamiliar women (11% vs. 10%). The gender difference on the Familiarity Percent is therefore created by the presence of more familiar women in women's dream reports and more unfamiliar men in men's dreams. This finding suggests that familiar women (such as mothers, sisters, and women friends) are of greater concern to women and that unfamiliar men are of greater concern to men.

These results take on further interest when the nature of the aggressions in dream reports, along with the patterns of aggressive and friendly interactions, are compared in the normative dream samples. At a very general level, the dream reports of American women and men are similar on aggression. About the same percentage of the reports have at least one aggressive interaction (44% for women, 47% for men), as well as a similar number of reports with at least one friendly interaction (42% for women, 38% for men). However, women have a lower A/C Index than men (.24 vs .34, $h = .26, p < .0001$). By way of contrast, women and men have the same rate of friendliness per character, .22 for women and .21 for men. If the aggressions are categorized as physical or nonphysical, then a very big difference appears. The Physical Aggression Percent for women is far lower than it is for men (34% vs. 50%, $h = .34, p < .0001$). Conversely, the aggression in women's dream reports is twice as likely to involve rejections and exclusions than in men's dream reports (36% vs. 18%, $h = .41, p < .0001$). This is the largest gender difference that has been found.

The findings on gender differences on physical aggression and relational aggression lead to studies of the patterns of aggressive and friendly interactions with specific categories of characters. This comparison is made by determining the Aggression/Friendliness Percent (A/F%), which is calculated by dividing the total number of aggressions with characters in any

given category by the total number of aggressions plus friendly interactions with characters in that category. A percentage under 50% means the dreamer has more friendly than aggressive interactions with that character. A percentage over 50% means the dreamer has more aggressive than friendly interactions with that character. To sharpen the analysis, “friends” in dream reports can be defined as characters with an A/F% of 40% or lower and “enemies” in dream reports can be defined as characters with an A/F% of 60% or greater. Characters in dream reports with an A/F% between 41 and 59 are neither friends nor enemies.

Based on this metric, known men are neutral for women dreamers, at 41%. Unknown men, though, are enemies, 62%. For men, unknown men are enemies to an even greater extent than for women, 73%, while known men are neutral at 50%. In women’s dreams, neither known women (49%) nor unknown women (48%) are friends or enemies. In men’s dreams, however, both known women (37%) and unknown women (36%) are friends. These findings are displayed in table 3.5.

In a nutshell, then, women find both their friends and their enemies among male characters. Men are friends in women’s eyes if they are known and enemies if they are not known. Further, women have mixed relationships with both known and unknown women characters. On the other hand, men have a very different pattern. They have clear friends (all women,

Table 3.5

Aggression/Friendliness percent for known and unknown male and female characters in the Hall/Van de Castle normative sample of the dream reports of women and men

	Unknown A/F %	Known A/F %	<i>h</i>
<i>Female norms</i>			
Male characters	62	41	-.43*
Female characters	48	49	+.03
	Unknown A/F %	Known A/F %	<i>H</i>
<i>Male norms</i>			
Male characters	73	50	-.47*
Female characters	36	37	+.02

* $p < 0.01$.

whether known or unknown) and clear enemies (unknown men) in their dream reports. Known men are neither friends nor enemies in men's dreams.

Waking studies of American women and men support the hypothesis that the largest gender differences in dream content are continuous with waking thoughts and concerns. In a study of short stories by well-known authors of the late 1950s and early 1960s, 18 written by women and nine written by men, the Male/Female Percent in the stories by women authors was 54%/46% and the Male/Female Percent in the men's stories was 80%/20% (Hall & Domhoff, 1963b, p. 280). This finding is similar to what is found in dream reports using the Male/Female Percent. A second study asked 40 college women and 35 college men to write down the initials of people they liked for one minute and to write down the initials of people they did not like for another minute. Half the participants started with the initials of those they liked, half began with the initials of those they disliked. The Male/Female Percent, based on the total number of initials for women and men that were written down, was 41%/59% for women and 61%/39% for men ($h = .44$, $p = .08$) (Hall & Domhoff, 1963b, p. 280). This difference is very similar to the difference found in dream reports.

Studies of waking gender differences by research psychologists, many of whom have a focus on developmental psychology, provide further support for the hypothesis that the concerns expressed in dreams are continuous with waking concerns. Men's inclination to be involved in physical aggression is perhaps the largest of the few gender differences in studies of women and men in the United States, with an effect size of .55 (Hyde, 2014, p. 385). Moreover, just as in dreaming, women make greater use of relational aggression in waking life, such as exclusion, rejection, and criticism. On this issue, the difference is not as large in waking studies as it is in dreams (Bussey, 2013, pp. 87–88; Leaper & Farkas, 2015, p. 830). Then, too, it seems likely from varying types of evidence that men react differently to threatening male bodily postures and faces, even while focusing more often on women's faces in nonthreatening situations (Kret & de Gelder, 2012; Kret, Pichon, Grèzes, & de Gelder, 2011). Men also commit 85–90% of homicides, and mostly kill other men. To the degree that women kill anyone, it is usually an abusive male partner (e.g., Kellerman & Mercy, 1992). In a classic anthropological study, which compared highly male-dominant societies with those in which the women had considerably more power, it was nonetheless the case that men in the latter societies would organize to kill

women. They did so if they thought it was necessary to change the social system in the face of challenges from other cultural groups. On the other hand, women were unwilling to band together to kill men (Sanday, 1981, pp. 210–211).

Overall, this third analysis of continuity between the concerns expressed in dream reports and waking life demonstrates how an unanticipated gender difference on the Male/Female Percent leads to further findings in dream reports. Those differences involve more unfamiliar men in men's dream reports, along with a higher Physical Aggression Percent for men. There are also differences in the patterns of friends and enemies in women and men's dream reports. These various differences between women and men in dreams in turn lead to continuities with differences in the waking personal concerns of women and men.

More generally, this section has used three different avenues—one based on dream reports collected in a hunting and gathering society over 80 years ago, one based on the normative findings on the negativity bias in the contents of white American women and men's dream reports, and one based on the small handful of medium and large gender differences in dream content—to provide solid evidence for an important tenet in the neurocognitive theory of dreaming. The conceptions and personal concerns discovered in dream reports are similar to those in waking life. The evidence for this claim is expanded in chapters 4 and 7.

Conclusions and Implications

This chapter has placed considerable emphasis on sample sizes, methods of analysis, and statistical tests. These issues are emphasized because numerous studies show there are no substitutes for well-designed studies with large sample sizes, which can be and have been replicated. Most of the content-oriented studies of dreams used in this book therefore have very large sample sizes and only are used with confidence when the p value is .01 or less in both the original and replication studies. Moreover, most of the basic studies used in developing the neurocognitive theory of dreaming have been replicated twice or more.

Based on the importance that should be attached to sample sizes, statistical procedures, and replication studies, it seems likely that many past studies are not useful in developing a neurocognitive theory of dreaming or

any other type of dream theory. Some of these studies have been critiqued in earlier analyses (e.g., Domhoff, 1999, pp. 120–124, 129–134; 2003, chap. 2; 2005; 2017, pp. 25–33). Still others are discussed in terms of their specific shortcomings in relevant contexts in chapters 8, 9, and 10. Such studies are often mentioned in review essays because they put forth possible implications. These implications generate endless speculations that are never tested. If small and unreplicated studies are given the same weight as large-scale replicated studies, it hinders the process of altering or abandoning theories that have no other evidentiary basis.

In terms of substantive findings, this chapter shows dream content differs relatively little by age, nation-state, or culture. The most important of the few exceptions concerns the frequency and nature of aggressive actions. These studies of dream reports from widely varying societies further show there is nothing in dream reports that cannot be encompassed by the comprehensive HVdC coding system. The differences are in degree and in clusters of indicators (such as those concerning aggression) but not in kind. However, there are just enough differences from society to society, especially in the case of non-Anglophone nation-states, and even more so with indigenous societies, to conclude it would not be methodologically sound to use the HVdC norms for women or men to study groups within those societies. Although culture is not a prominent variable in dream reports, culture does matter in shaping societies and relationships between societies. It would not be helpful to overlook culture in studies of dream content before many more results are available.

The chapter also demonstrates that there is a pattern of relatively small gender differences, but the differences are larger on aggression, and especially on physical aggression. Then too, there are differences among dreams in terms of their content. About 70–75% of the dream reports of Americans include personal concerns, with the remaining 25–30% in the realm of adventure dreams. The great majority of dream reports include aggression, friendliness, or sexuality, and also directed or joint activities. A small minority include only the dreamer (4.3%) or only the dreamer and one or more animals (2.2%). In addition, there are differences in the degree to which dream reports contain familiar or unfamiliar settings and characters. Dream reports with only unfamiliar settings and characters also contain more aggressions and misfortunes.

When all of the dream reports in the HVdC normative samples are analyzed, in women's dream reports there are 1.40 times as many "negative" elements (aggressions, misfortunes, and failures) as there are "positive" elements (friendly acts, good fortunes, and successes), and in men's dream reports there are 1.65 times as many negative elements as there are positive elements. These findings are consistent with the negativity bias found in waking thought and therefore provide good evidence for the continuity between the concerns that are expressed in both dream reports and waking thought.

These and other findings discussed in this chapter are important in and of themselves, especially in narrowing the theoretical focus of attention to what actually appears in dreams. Then, too, the findings also are important for laying the foundations for many of the analyses presented in later chapters. Those analyses begin with the large individual differences in what people dream about, which are discussed in chapters 4 and 7. The numerous findings on dream content overviewed in this chapter also provide a good basis for examining the adequacy of a variety of theories in terms of their ability to incorporate and explain replicated descriptive empirical findings, as shown in chapters 9–11.

This is a section of [doi:10.7551/mitpress/14679.001.0001](https://doi.org/10.7551/mitpress/14679.001.0001)

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By: G. William Domhoff

Citation:

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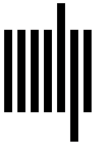
DOI: 10.7551/mitpress/14679.001.0001

ISBN (electronic): 9780262370882

Publisher: The MIT Press

Published: 2022

The open access edition of this book was made possible by generous funding and support from MIT Press Direct to Open



The MIT Press

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The MIT Press would like to thank the anonymous peer reviewers who provided comments on drafts of this book. The generous work of academic experts is essential for establishing the authority and quality of our publications. We acknowledge with gratitude the contributions of these otherwise uncredited readers.

This book was set in Stone by Westchester Publishing Services, Danbury, CT.

Library of Congress Cataloging-in-Publication Data

Names: Domhoff, G. William, author.

Title: The neurocognitive theory of dreaming : the where, how, when, what, and why of dreams / G. William Domhoff.

Description: Cambridge, Massachusetts : The MIT Press, 2022. | Includes bibliographical references and index.

Identifiers: LCCN 2021051383 | ISBN 9780262544214 (paperback)

Subjects: LCSH: Dreams. | Cognitive neuroscience. | Neural networks (Neurobiology)

Classification: LCC BF1078 .D583 2022 | DDC 154.6/3—dc23/eng/20211122

LC record available at <https://lcn.loc.gov/2021051383>