# A Jungian Foundation for Quantitative Analysis of Dreams and Other Psychical Phenomenon

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**Abstract**

If Jung had a dream database composed of dream journals from across cultures and time, how would he use it? What would he look for and what would he find meaningful? Could he find expressions of archetypes, individuation, or the collective unconscious? This paper summarizes the academic method for quantitative analysis of dream content, then speculates on possible paths of its development. This paper then outlines a Jungian foundation for the quantitative analysis of dreams and other psychical experiences. The Jungian concepts of the collective unconscious, synchronicity, individuation, and archetypes serve as the basis for expectations or hypotheses regarding the quantitative analysis of large collections of first person accounts of subjective experiences such as dreams and visions. These concepts lead to the expectation of the discovery of synchronicity, archetypal motifs, and other meaningful patterns through which causality of psychical phenomenon may be scientifically explored.

The crisis of modern life is that we have cut ourselves off from the unconscious. Psychologist Carl Jung knew this, as described by Robert Johnson, “The disaster that has overtaken the modern world is the complete splitting off of the conscious mind from its roots in the unconscious... Jung observed that most of the neurosis, the feeling of fragmentation, the vacuum of meaning, in modern live, results from this isolation of the ego-mind from the unconscious.” (1986, p. 9).

It can be seen in the scientific treatment of first person accounts of subjective experiences like dreams, visions, and shamanic or psychedelic journeys. They are often ignored by the academy or else dismissed as fantasy or unexplained side effect to brain processes. Science rarely looks at the content of dreams on its own. As we will see, Jung put forth a view a dreams and psychical phenomenon that considers them not only on their own terms, but also as a field of science. Jung (1938, p. 185) views psychic phenomenon as real, “Just as material objects are the constituent element of this world, so psychic factors constitute the objects of that other [psycho-spiritual] world.” Looking at these factors is meaningful, “The unconscious processes are constantly supplying us with contents which, if consciously recognized, would extend the range of consciousness. Looked at in this way, the unconscious appears as a field of experience of unlimited extent.” (Jung, 1938, p. 184).

I experience that the academy and popular culture perceive dreams as fantasy contrary to Jung's views. When they are scientifically studied, it is often only in their relation to neural activity and to therapy. However, there is a wealth of scientific data that is undervalued and is ready to be used. It is a fields of dreams, visions, and unseen messages from the inner world of

the psyche. Thousands of people tell the story of their dreams, visions, and spiritual experiences on the internet. People record and report these experiences because they find meaning in them. Additionally, there are academic databases of first person accounts of dream, psychedelic, near death, out of body, and imaginal experiences that have been used in peer reviewed studies.

By my estimate, there are roughly 100 series of dreams for academic study. A series may be an individual's dream journal or a collection of responses to surveys for academic studies. These represent nearly 50,000. In contrast, the public internet has at least 100,000 dreams available to be indexed, representing over 20,000 individuals.

## Quantitative Analysis of Dreams

The technology to collect and analyze all these reports has matured in the last decade, allowing complex machine learning and natural language processing algorithms to find patterns hidden within data extracted from the text of the report. This data could allow us to discover, measure, and track images and dynamics expressed from the collective unconscious. I entertain the notion that such a system may lead to the scientific study of the inner subjective world of the psyche through the quantitative measurement of the objective event of storytelling.

I have a vision for a system of tools and processes to transform the raw data of naturally reported experiences into meaningful insight or understanding. I envision a public web application composed:

1. a search index of all the dreams, visions, and psycho-spiritual experiences reported on the internet

2. an analysis engine that derives measures from the raw text using natural language processing algorithms
3. pattern finding through machine-learning driven processes with connections to outside data sources (like news, weather, and demographics)
4. a query, visualization, and export data framework

**Application for Dream Analysis**

I do not propose to make technology to analyze dreams as a Jungian therapist or analyst might. Dreams are seen as communication from the unconscious. By considering the symbolic language of the dream, the dreamer can come into conscious relationship with the underlying psychic material within the dream symbol. Dream analysis begins with telling or writing the dream story. Dreams speak in a language composed of images, action, and drama. Analysis often considering each dream image, one at a time. Dream analysis progresses through amplifying dream images by association. The analysis culminates when the dreamer comes to a meaningful and new understanding of his or her inner world.

Humbert summarizes the process of Jungian dream analysis:

Dreams generally appear in a dramatic form... Jung suggested that dreams be interpreted in much the same way as a play... an analysis of the dramatic structure of the dream allows the interpreter to discern the permutations of the dream elements and to perceive the connection between those elements that appear within the scene and those that disappear from it. (1988, p. 17).

Technology can never replace the work of analysis. However, technology can support

both the telling of the dream story and the identification of images and patterns within the dream story or series of dreams. The system can track images throughout a series of dreams, identify significant images, and, given enough data, make probabilistic inferences about the dreamer's waking and inner lives. It may be a useful starting point for deeper analysis.

**Study of Archetypes**

The scope of the technology is broader than individual dream analysis. It will identify patterns across hundreds of dreams within a dream journal, providing a new way to look at dream images. Once there is a representative sample of data, it will enable the study of dreams as an expression of the aspects of the unconscious that are deeper than the personal unconscious, such as the cultural and collective unconscious.

In addition to dream analysis, Jung's activities offer another use case. Jung discovered that images from dreams, visions, and myths are often based on universal pattern he called archetypes. He first had to saturate himself with myths and dreams through study and work. When he found the same pattern in myths of two or more cultures, he understood that these patterns are archetypal.

When Jung was investigating the processes of the collective unconscious, he found that they extended far beyond academic psychology. He found incomplete analogies of the collective unconscious processes within ancient Gnostic texts. When he found similar processes within a Chinese alchemy text, he felt confident to publish his work. Jung writes (1929, p. 6), “I would only like to emphasize that it was the text of the *Golden Flower* that first put me on the right track. For in medieval alchemy we have the long-sought connecting link between Gnosis

and the processes of the collective unconscious that can be observed in modern man."

Further, he maintained that the connection between similar myths of different cultures, which is the same connection between similar dreams from different dreamers, is acausal and synchronistic insofar there is no physical or waking life reason for the connection. He stated that these synchronistic connections are meaningful in their own right. Jung defines synchronicity (1958, p. 522), "Instead of simultaneity we could also use the concept of *meaningful coincidence* of two or more events, where something other than the probability of chance is involved." Therefore, I expect the underlying patterns within the database to be an expression of our deeper unconscious to the degree that they are meaningful. This expands the criteria for validity from only making inferences about the dreamer's life, to being meaningful insofar that the observation of the patterns brings consciousness to deeper aspects of our inner worlds.

My vision responds to difficulties in current dream databases. The data is difficult to access, therefore my database will be public and accessible via API for collaborations. The current databases are designed for academics and require technical knowledge, therefore my web application will be designed for the interested lay person to observe patterns in their own dream reports or aggregations of the entire database. The current analysis processes are limited in meaning by their assumptions that a) dreams are only a nocturnal fantasy that are limited to the individual and their waking life and b) their analytic knowledge is valid only when verified through predictions about the dreamer or their waking life. Therefore, I take the opportunity of this paper to establish assumptions in line with Jungian psychology and spirituality.

**Process of Quantitative Analysis**

The quantitative analysis of dreams has two main activities. First, the raw text is transformed into machine-readable numbers. Second, those numbers are analyzed to make inferences about the world. The numbers and inferences are in part determined by the analyst's initial assumptions.

The process of transforming text into numbers is called content analysis. The academic standard for the content analysis of dreams is the Hall/Van de Castle (HVdC) system. The central element of content analysis is a code manual. A code manual is a set of categorized words. The HVdC code manual has categories for characters, places, actions, emotions, and so on. Each of these categories break down into sub-categories, for example, characters breaks down into family, friends, enemies, and so on. (Domhoff, 2003, p. 4).

The main activity of content analysis is counting the occurrence of each word in the category. For example, “I dreamed I was on a boat, fishing in the ocean,” would have 1 character (dreamer), 1 nature place (ocean), 1 action (fishing), and so on. In multi-dimensional data analysis, data is represented as a set of measures (numbers) in a multi-dimensional space. The numbers generated from content analysis serve as numerical measures of the dream report.

The space itself is a convention of formatting data to be used in machine-learning algorithms, statistical analysis, or visualization. A common dimension is time, for example, you could plot the number times a parent occurred in a dream over time versus all characters, perhaps to infer the history of the dreamer's psychological involvement with family.

A dimension could be any aspect of the dream or dreamer. For example, the gender or age of the dreamer could be a dimension. Thus, you could compare the dream content of males

and females or different generations.

Once the dreams are mapped into this space, machine-learning and statistical algorithms can identify patterns. The significant correlations between measures and dimensions can be inferred. Thus, when we see patterns in dream content, we can infer the dream and dreamer's situation within the various dimensions. I plan to test its clinical application in the prediction of mental illness onset. It could be used to discover and track patterns in the collective unconscious, which could be expected to mirror images within popular media or news events. Finally, it could be used to identify synchronicity between dreams and events in the waking world. There is some speculation that data from a large enough sample could be used to predict future events based on many reports of precognitive dreams of 9/11.

I have so far described the basic strategy and outcomes of my proposed system, which I am currently implementing. The HVdC system also involves a set of statistical processes that assume human intervention during the analysis. It technically counts occurrences of dream images and not the words themselves, therefore it requires human interpretation because a computer cannot yet distinguish between literal and figurative meanings of words.

Kelley Bulkeley (2009), along with William Domhoff, brought the essence of the HVdC code manual into the digital age by simply counting words and not interpreted images. This is known as the “word search” method. Bulkeley's strategy involves simply counting occurrences of categorized word and therefore is a task that a computer can perform.

**Outcomes of Quantitative Analysis**

Once the numbers, or measures as I call them, are generated, they are interpreted by the

analyst who make inferences. The process of interference in these systems has so far been performed by a trained analyst. Generally, a series of dreams are compared with another set. For example, Bulkeley (2010) compared measures from an unknown dream journal to measures taken from a known set of dreams, to make interference about the unknown dreamer's life. For example, the analyst may notice more words related to schooling in the unknown journal when compared with norms, thus deduce school plays a higher than average role in the dreamer's life.

I propose to take this a step further by incorporating machine learning and statistical algorithms. These will discover patterns within the dream and between dream content and known dimensional data such as gender, age, ethnicity, etc. of the dreamer. I propose closing the loop between quantitative analysis and interference by removing human interpretation. Once the dreams are plotted in the multi-dimensional space, clustering algorithms can automatically categorize dream images, series, or dreamers. These clusters can be correlated with known dimensional data such as gender, age, or state of the dreamer. Regression analysis will show which clusters of dreams, thus patterns of numbers, correlate with which dimensions. Thus, when a dream of unknown origin is encountered, inferences may be made about its origin based on the underlying pattern of word use.

The necessary intervention of human interpretation may be a limitation to quantitative analysis of dreams. All code manuals used in content analysis have tended to look for words and images that convey direct meaning to a human, for example, looking at nouns that could signify dream characters. A human can hold in mind only so many measures, while a computer can hold an infinitude.

My work will involve the assessment and iteration of a code manual to generate measures of the dream. Bulkeley's word search lists are small and focus on imagery, not linguistic data. I propose building a new set of word lists based on Jungian psychology, involving myth and archetypes. I suspect archetypal patterns will appear in basic linguistic data. For example, the proportion of first person pronouns to third person may be related to the Self and Other archetypes, therefore may be related to sets of other words through constellation of archetypes in a complex. Perhaps a narcissistic complex manifests a high first to third person pronoun ratio, along with similar words from the mythological motif.

I will test these new measures by algorithmically determining patterns within the measures. I will expect that these patterns will have personal and cultural meaning, much like an archetype, in addition to serving as a means of interfering unknown data about dreams, the dreamer, and collective psyche.

## Jungian Understanding of Dreams

Jung outlines the scientific basis for the analysis of dreams in his essay, *The Practical Use of Dream-Analysis:*

> According to our hypothesis, the unconscious possess an aetiological significance, and since dreams are the direct expression of unconscious psychic activity, the attempt to analyze and interpret dreams is theoretically justified from a scientific standpoint. If successful, we may expect this attempt to give us scientific insight into the structure of psychic causality, quite apart from any therapeutic results that may be gained. (1974, p. 89).

The work of content analysis, then, is to give scientific insight into the structure of the psyche, in addition to providing inferences about the dreamer and waking world. It, however, can not extend to therapeutic analysis, as this requires doing personal work of association with the dream images.

Jung describes the work of association:

When we take up an obscure dream, our first task is not to understand and interpret, but to establish the context with minute care. By this I do not mean 'free association', starting from any and every image in the dream, but a careful and conscious illumination of the interconnected associations objectively grouped round particular images. Many patients have first to be educated to this. (Jung, 1974, p. 96).

At best, content analysis can help identify quantitatively significant images within a dream for the purpose of therapeutic association.

**Dreams as Dramatic Messages**

We can look at dreams as messages from the unconscious for the purpose of bringing unconscious material into consciousness. The message has a grammar composed of symbols and dynamics. The cultural and psychological state of the dreamer may be seen as the dialect in which the message is written. The theme of the message is greater wholeness and individuation of the dreamer.

Jung writes, “The dream is specifically the utterance of the unconscious. Just as the psyche has a diurnal side which we call consciousness, so also it has a nocturnal side: the unconscious psychic activity which we apprehend as dreamlike fantasy.” (Jung, 1974, p. 95).

Robert Johnson, in his book outlining Jungian dreamwork and active imagination, *Inner Work,* writes, “Dreams are dynamic mosaics, composed of symbols, that express the movements, conflicts, interactions, and developments of the great energy systems within the unconscious.” (1986, p. 19).

Humbert summarizes Jung's view, “Jung suggested that dreams be interpreted in much the same way as a play... an analysis of the dramatic structure of the dream allows the interpreter to discern the permutations of the dream elements and to perceive the connection between those elements.” (1988, p. 17).

The goal of dream work is to assimilate unconscious material into consciousness, as Jung writes:

Since dreams provide information about the hidden inner life and reveal to the patient those components of his personality which, in his daily behavior, appear merely as neurotic symptoms, it follows that we cannot effectively treat him from the side of consciousness alone, but must bring about a change in and through the unconscious. In the light of our present knowledge this can be achieved only by the thorough and conscious assimilation of unconscious contents. (Jung, 1974, p. 100).

Therefore, we can not only expect to see patterns in what images or words are present in a dream, but also patterns in their sequence. Taking an archetype as an example, the “hungry mother” might be seen as a pattern of words related to hunger, mother, and negative affect. Further, we may expect to see certain correlations with other images in the sequence of dream action or across time through the dream series.

**The Unconscious**

Jung developed a model of the psyche, based on the relation of the consciousness and the unconscious. He fully accepts the reality of psychical experiences. In Jung's essay on *Individuation*, he writes (1938, p. 185), "Because the unconscious is not just a reactive mirror-reflection, but an independent, productive, activity, its realm of experience is a self-contained world, having its own reality, of which we can only say that it affects us as we affect it- precisely what we say about our experience of the outer world."

Jacobi (1973, p. 5) outlines this model: "By 'psyche' Jung means not only what we generally call 'soul' but the totality of all psychic processes... the psyche consists of two complementary but antithetical spheres: CONSCIOUSNESS and the UNCONSIOUS. Our ego has a share in both." Jung defines the ego as "a complex of representations which constitutes the centre of my field of consciousness and appears to possess a very high degree of continuity and identity." (1973, p. 7).

The unconscious is divided into several spheres, Jacobi describes the contents of the personal unconscious, "forgotten, repressed, subliminally perceived, thought, and felt matter of every kind." (1973, p. 8). The collective unconscious is then described, "the collective part of the unconscious does not include personal acquisitions specific to our individual ego, but only contents resulting 'from the inherited possibility of psychical functioning in general, namely from the inherited brain structure'." (1973, p. 8).

Jacobi divides the unconscious further, "the collective unconscious may also be broken down into zones which, figuratively speaking, may be considered as one above the other." (1973,

p. 32). These zones may be envisioned as resting on top of a deep central psychical energy source that flows through them up into consciousness. The zones are listed as: animal ancestors, primitive human ancestors, ethnic groups, nation, tribe, family, and individual (Jacobi, 1973, p. 34).

Therefore, we can not only expect content analysis to yield inferences about the individual, but also the various zones of the collective unconscious. One could expect to see universal patterns vary in expression according to cultural group.

Jacobi describes how these patterns will appear in dream:

It is not difficult to tell from the material provided by dreams, fantasies, and visions to what degree they transcend the personal sphere and involve the contents of the collective unconscious. Mythological themes, symbols rooted in the universal history of mankind, or reactions of extreme intensity always indicate the participation of the deepest strata. These motifs and symbols exert a determining influence on psychic life as a whole... he [Jung] called them archetypes. (1973, p. 39).

This presents are two tools for identifying archetypes within dream content. First, the dream has a high energy unlike dreams limited to the personal unconscious. It is reasonable to assume that dreams of high energy would be reported with different language than low energy, therefore is is reasonable to expect that a pattern would arise in content analysis.

Second, archetypal dreams have universal symbols and mythological themes. We could expect that a similar pattern of words would be used in retellings of myths as archetypal dream reports. This suggest one potential avenue to develop a new code manual for content analysis

based on occurrence of archetypal motif.

**Implications for Content Analysis**

Adopting Jungian assumptions about dreams, thus, makes available new methods and application of the content analysis of dreams. The domain of inference expands beyond the individual dreamer's waking life to include both the waking and dreaming life of the individual, their culture, and humanity in general. These assumptions point out that the validity of content analysis does not solely lie in its power to make inferences. Rather, it holds that the patterns within dream content are in themselves meaningful as expressions of real experiences. Thus, an additional test of validity for content analysis would be the power of the analysis to illuminate universal patterns within the psyche itself.

Recalling the metaphor of a dream as a message, I have so far described what the underlying language might be. It is a language of archetypes, which could be observed as a pattern or sequences of patterns of numbers derived from the dream journal text. However, it must be remembered that dreams speak in the specific dialect of the dreamer. A horse means different things to different people, especially across cultures. Likewise, the presence of an archetypal figure in a dream may be contaminated by the personal shadow. The universal pattern would be clothed in individual and idiosyncratic language.

I am unable to speculate how the personal expression of archetype through dream will impact the study of universal patterns until I run actual analyses. It is conceivable that the signal of the archetypes maybe seen through the noise of personal imagery. It is also conceivable that personal imagery will overwhelm the direct quantitative analysis. A first step to understanding

would be to consider the typology of the dreamer using a Meyers-Brigg assessment, which is based in Jungian typology. I would expect that dreams of an introvert would differ from those of an extravert.

**Dream Processes and Temporal Patterns**

Thus far, the proposed system of content analysis only addresses one aspect of the Jungian view of dreams, namely, that dream images are connected with archetypes, which are real elements within our psychic structure. It has so far ignored the dramatic and temporal aspect of dreaming. Archetypes are not just images represented in language by nouns, but are also patterns of transformation, represented by verbs.

A dramatic play is the model for the HVdC system. It looks for characters, settings, props, and so on. While it has no notation for overall plot, it tracks transformation of dream image, for example, a beautiful girl into old witch. However, this observation requires human interpretation and is therefore lost in the computerized word search methods.

I expect the sequence of images within a dream to be as meaningful as the proportion of content. It is possible to plot every occurrence of a dream image on a time axis relative to a) the dream report itself using sentences as units of time, b) the dream series using dream reports as the unit, or c) chronological time. I expect that a statistical algorithm will detect and model patterns in the sequence of dream images. These patterns and the associated dreams may then be measurable expressions of an archetype.

There is one main movement in the psyche, which Jung calls individuation. It is a process through which the individual comes into conscious relationship with unconscious

elements and dynamics. The journey of life is one's relationship to the self. Every dream is an invitation and path to relationship with the unconscious. Consequently, knowledge about dreams is thus only meaningful insofar that as it contributes to the knower's own conscious relationship with their unconscious.

I expect that dream experience is a function of the individual's relationship to the unconscious. A pattern may emerge through content analysis, especially if background data on the dreamer is available. For example, Jung observed that dreams tend to become more opaque after an initially clear beginning as therapy progresses. Jung (1974, p. 93) writes, "initial dreams are often amazingly lucid and clear-cut. But as the work of analysis progresses, the dreams tend to lose their clarity."

**Implications of Patterns within Dream Content**

Once meaningful patterns are discovered in the numbers derived through content analysis, it becomes possible to track similarity between dreams and correlation between dreams and the waking world. These connections could indicate synchronicity, defined as the meaningful connection of acausally related events. Content analysis and subsequent statistics can reveal several types of sychroncities:

1. similarity of dreams through a process called vector analysis, which views each dream as a vector in a multi-dimensional space and performs trigonometry functions to compare dreams
2. correlation of dream content with waking world events, through regression analysis incorporating time series data about the world

3. precognitive dreams perhaps through training a classifying algorithm on data from documented precognitive dream events like 9/11.

The validity criteria for synchronicity is not simply correlation. Additionally, the connections must be meaningful. Jaffe describes Jung's concept, “An *a priori* meaning seems to manifest itself chiefly in phenomena that Jung described as 'synchronistic'.” (1983, p. 150). This enforces my conviction that any quantitative analysis of dreams should provide insight that is not only valid insofar that it may produce inferences, but also because it provides meaningful insight into the psyche.

## Summary and Expectations

Jungian psychology provides a meaningful framework for the content analysis of dream journals. Holding its assumptions yields several expectations about the data that can be investigated in a systematic and scientific way. Dreams are communications from the unconscious for the purpose of unfolding the dreamer's conscious relationship with the unconscious. The unconscious is composed of nesting layers from the personal to the collective unconscious, which holds universal patterns of psychic transformation called archetypes.

These patterns are expected to emerge through the transformation of raw text into numbers through content analysis, cluster and regression analysis, and comparisons of dream content between various demographics such culture, language, age, and so on. I also expect that a code manual based on the archetypes, perhaps through the analysis of several mythology summaries, may prove meaningful.

Dream experiences are more than fantasy because they are expressions of the reality of psyche. Meaningful correlations and similarity is expected within dream content and waking world events, as the synchronistic expression of psychic reality. Therefore, observation of patterns within dream content for the purpose of understanding dream experience is as scientifically meaningful as making inferences based on dream content about the waking world.

Insight about dream experience itself maybe be validated through correlation with patterns in waking world events, like correlation with cultural media such news or movies. More importantly, it may support the unfolding of a conscious relationship with the unconscious. It is my hope that identifying, tracking, and comparing dream images and patterns will make meaning through supporting the deeper work of dreams. I hope that it will contribute in whatever way possible to the resolution of crises of modern life stemming from disconnection with the unconscious.

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