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## **Pre-writing rhetorical strategies which activate both hemispheres of the brain**

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PRE-WRITING RHETORICAL STRATEGIES WHICH ACTIVATE  
BOTH HEMISPHERES OF THE BRAIN

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A Thesis  
Presented to the  
Faculty of  
California State University,  
San Bernardino

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts  
in  
English Composition

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by  
Edith M. Sonnenburg

March 1985

✓

“PRE-WRITING RHETORICAL STRATEGIES WHICH ACTIVATE  
BOTH HEMISPHERES OF THE BRAIN”

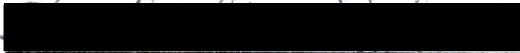
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Edith M. Sonnenburg  
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Approved by:

  
Chairman

March 18, 1985  
Date


## ABSTRACT

The purpose of this study is to present rhetorical strategies for pre-writing which will activate more of the brain's capacities by using the processing modes associated with both hemispheres of the brain. Brain research shows that the right and left hemispheres of the brain process information in different ways. The left hemisphere processes predominately analytically while the right hemisphere processes predominately holistically. Yet the teaching of writing traditionally considers the processing modes of the left hemisphere without considering the processing modes of the right hemisphere. This study has organized these rhetorical strategies into two categories: brainstorming and heuristics. Each strategy will include a description and an explanation of how the strategy encourages the cooperation of the processing modes of both the right and left hemispheres of the brain.

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## INTRODUCTION

William F. Irscher, author of The Holt Guide to English, confessed to those assembled at the Opening General Session of the 1979 CCCC Convention in Minneapolis that in junior high he was a 'non-writer.' How could this have been? Irscher explained that he didn't know "what to write" in response to the assignments given (Irscher, p. 243). He did not suffer from a lack of knowing how to write, but rather from a lack of knowing what to write.

Numbers of writers have commented on the same problem. David Harrington, author of "Encouraging Honest Inquiry in Student Writing," states that the major cause of anxiety and inadequate content in student writing is the student's inability to find "something of substance and value to say" (Harrington, p. 182). Likewise, Mina Shaughnessy tells us that students' writing often shows a lack of thought arising from the fact that many students begin writing before they even begin thinking about what they will say. This is what Shaughnessy calls "premature formulation"--when students begin to write before their ideas have undergone a period of incubation (Shaughnessy, p. 235).

This problem of discovering content faced orators, the counterpart to today's writers, over two thousand years ago.

To prevent rambling, boring, unconvincing speeches, orators employed rhetorical strategies to focus their speeches and strengthen their cause. To discover what to say, that is what arguments to use, Aristotle led his fellow orators through a series of topics, or topoi--places in the mind from which various lines of argument could be drawn upon at will according to need. Cicero went one step further by devising a mnemonic to keep all of these strategies organized in the orator's mind. He employed the spatial metaphor of a house to depict places where images are stored. By walking through the house, the orator could recall each argument as he travelled from room to room of this familiar structure.

Today's student writers also need rhetorical strategies to help them discover what to say and how to say it. I will use the term "rhetorical strategies" specifically to mean strategies of invention--or inventio in the classical view of rhetoric--which stress the Isocratic view of rhetoric as a means of discovering, framing, and expressing what is in one's mind. Such rhetorical strategies could help students to probe their subjects, to uncover what they already know about a subject and to discover what they can still learn about that subject. Further, these strategies could help students form relationships among the details of the information and even draw hypotheses concerning those details.

According to current brain research, which I will discuss in the following section of this work, the thinking

skills of recalling details and formulating relationships among those details involve cooperation of the right and left hemispheres of the brain. What has happened in the teaching of writing, particularly in the area of pre-writing activities, however, is that most strategies taught deal primarily with only one hemisphere of the brain.

For example, a typical California state-adopted English text, Building English Skills, McDougal, Littell, 1981, contains two pre-writing activities. Both of these activities--listing of topics and listing of details to support those topics--involve processing information in a logical, sequential manner. Sequential processing, according to the research discussed in this work under a section entitled "A Review of Brain Research," is believed to be centered in the left hemisphere. I contend that without the combined efforts of the right hemisphere's talent for synthetic processing, many student writers will not form patterns with that information, will not formulate hypotheses about that information, and will instead write a logical but boring account of the information. Since good writing uses both processing modes, teachers and students need to be aware of strategies that will encourage hemispheric cooperation.

I will present rhetorical strategies for the pre-writing stage which will activate more of the brain's capacities by using the processing modes associated with both hemispheres of the brain. I will divide these strategies



into two categories: those involving brainstorming and those involving heuristics. My format for each strategy will include first a description of the strategy and second an explanation of how the strategy encourages the cooperation of the processing modes of both the right and left hemispheres of the brain.

It is my hope that teachers of all disciplines will expose their students to many, if not all, of these rhetorical strategies, thus increasing the possibility that their students will discover that they do, indeed, have something of value to say and the strategies with which to say it.

## A REVIEW OF BRAIN RESEARCH

Although there are inherent problems, research into brain functioning has delivered important information. Clinical observations of patients suffering from damage to one or the other hemispheres of the brain have been accumulating since the mid-19th century. Patients observed usually suffered from massive brain damage or inoperable lesions to the brain. The numbers of such patients increased after each war as more people suffered from war-related wounds. Generalizations were being made about the functioning of the normal brain by noting the observable activities of these brain-damaged patients. Serious methodological problems, inherent in trying to determine the functions of each hemisphere merely by observing patients who have suffered hemispheric damage, plagued this type of research. For example, it was difficult to assess the location and size of the damage and even more difficult to find two patients with exactly the same type and extent of damage on the same hemisphere of the brain. Furthermore, researchers realized the inadequacy of inferring hemispheric functions by dealing with only the deficiencies of the damaged parts of the brain. Thus, any conclusions arrived at were considered suspect and unreliable.

It was not until the 1950's when the historic split-brain operation was performed to prevent the spread of uncontrollable epilepsy from one hemisphere to the other (called a commissurotomy in which the corpus callosum between the cortical hemispheres is severed) that clinical research could be done which could compare the positive competence of one hemisphere to the other. Such research, performed on sixteen commissurotomy patients of neurosurgeons Phillip J. Vogel and Joseph E. Bogen in Roger Sperry's lab at the California Institute of Technology, Pasadena, yielded interesting findings. The main technique used for studying these patients was developed and used by Dr. Sperry and his associates over an eighteen year period. An examiner, using a tachistoscope, an apparatus which rapidly displays an object or groups of letters, would flash a picture to the left half of the visual field, which is processed in the right half--or hemisphere--of the brain. The examiner would also flash pictures to the right half of the visual field which would be processed in like manner in the left hemisphere.

The results of this research showed the left hemisphere to be linguistic, analytic, logical, sequential and constructive. It controlled speech, writing, and calculation, and it processed information analytically. The right hemisphere was shown to be visual-spatial, holistic, synthetic, and perceptual. Predominantly mute and generally inferior in all performances involving language or linguistics or

mathematical reasoning, the right hemisphere processed information holistically. Furthermore, although language was found to be processed in both hemispheres, the left hemisphere showed a strong dominance over the right hemisphere (Sperry, p. 5-18).

In 1970, Dr. Eran Zaidel, a former student of Sperry's and a researcher at California Institute of Technology, Pasadena, California, performed further tests on three split-brain patients using a specialized contact lens which he developed. By blocking out sections of the visual field, this contact lens enabled researchers to get complex and prolonged information to one hemisphere at a time. Along with substantiating the belief that language is processed in both hemispheres, he concluded that the importance is not where information is processed in the brain but how it is processed.

The right hemisphere, according to Zaidel's research, processes information in a holistic manner. That is, it can perceive an apparently disorganized or unrelated group of parts as a meaningful whole. It further possesses the capacity to predict or construct a whole picture from incomplete or limited material. The left hemisphere processes information in a more part-specific manner. This processing mode allows the subject to see the parts of a configuration but does not allow him or her to project how those parts could fit together (Zaidel, p. 31).

Zaidel's interest in connecting language functions and cognitive functions of the hemispheres led him to form the analogy that the right hemisphere, then, recognizes units--spoken or printed words--as whole patterns or gestalts without being able to divide and analyze them into their components. The left hemisphere, on the other hand, decodes words and sentences by feature analysis (Zaidel, p. 31). An understanding of these two processing modes could prove crucial to the teaching of language, especially writing, if we are to create pre-writing rhetorical strategies which involve both information processing modes of the two hemispheres.

The concept of cerebral hemisphericity according to information processing modes was further tested by Dr. Gillian Cohen of the Department of Experimental Psychology at the University of Oxford, Oxford, England, in the early 1970's. Well aware of the findings of Sperry, Zaidel and their colleagues from their research with commissurotomy patients, Cohen wanted to test "normal" subjects who had no history of epilepsy or any brain traumas. His aim was to supply the missing link connecting hemispheric functions directly to the mode of information processing.

Cohen first experimented with six students between the ages of 17 and 25. Using a tachistoscope and charting the reaction rate of his subjects to various stimuli for both the right and left field of vision, he performed 288 experimental trials on each subject in three separate sessions.

He concluded that the left hemisphere, which was superior in the recognition of verbal material, processes information analytically in what he called a "serial" or sequential processing mode. The right hemisphere, which was superior in the recognition of non-verbal or visual material, processes information holistically in what he called a "parallel" or simultaneous processing mode (Cohen, p. 349).

Cohen replicated this study three times using six new students each time for a total of 640 experimental trials. These replications confirmed that each hemisphere processes information in a different manner--the left hemisphere in a "serial" processing mode and the right hemisphere in a "parallel" processing mode (Cohen, p. 349-55).

Research done by Jerre Levy of the Department of Behavioral Sciences at the University of Chicago (and a former student under Roger Sperry) further supports the belief that the two hemispheres of the brain serve different functions through different information processing modes. In the late 1970's, Levy tested 73 "normal" subjects with a series of visual field stimuli. Using the tachistoscopic method of flashing syllables and dots to each visual field, Levy tested their ability to perform language functions (in theory, a left hemisphere activity). She calculated the superiority of the left hemisphere to perform the language functions and the right hemisphere to perform the visuo-spatial functions and, in addition, confirmed that the right hemisphere

processes information in a holistic manner while the left hemisphere processes in a sequential manner (Levy, p. 285-96).

Recent research connects cerebral hemisphericity to composing. Benjamin Glassner and Janet Emig tested the hypothesis that extensive writing, Emig's term for writing which is intended to convey information already familiar and formulated by the writer to another, and reflexive writing, Emig's term for writing which is intended to explore meanings and feelings, are processed in different hemispheres of the brain. Placing electrodes symmetrically over the right and left temporal areas of thirty students between the ages of 18 and 22, Glassner and Emig recorded and analyzed hemispheric activity measured by an electroencephalograph (EEG) during the composing process. They combined this information with extensive observations of the students while they were composing.

Their findings suggest that these two modes of composing are, indeed, processed in separate hemispheres of the brain. When the writing was focused on information already familiar to the writer (extensive writing), the writing showed more concern with surface features and left hemisphere activity was noted. When the writing was focused more on discovering and translating feeling into language (reflexive writing), the writing required more pausing time for conscious thought and right hemisphere activity was noted (Glassner, p. 79,83).

Evidence from these separate sources indicates that each hemisphere of the brain does, indeed, perform different functions through different processing modes. However, research also reveals that hemispheric interplay or crossover of hemispheric functions allows for cooperation of the hemispheres. Although each hemisphere has specialized functions and processing modes, each hemisphere can assume some of the functions of the other.

Research done by Jerre Levy and colleague Colwyn Trevarthen on split-brain patients shows cooperation of the hemispheres. Levy and Trevarthen constructed chimeric figures from drawings of common objects and asked subjects to match similar pictures on the basis of their function or their appearance. Their hypothesis was that the left hemisphere would perform the functional matches and the right hemisphere would perform the appearance matches. Although responses to the left-hemisphere stimuli were most often made according to function while responses to right-hemisphere stimuli were most often made according to the appearance of the objects, a large number of the responses deviated from the expected pattern. In some cases, the instructions to match by appearance resulted in a response to the right hemisphere stimulus, but the subject made a functional match. Similarly, the instructions to match by appearance sometimes resulted in a response to the left hemisphere stimulus that was based on appearance. In such cases, the appropriate



hemisphere responded but in an inappropriate way. Other subjects displayed the reverse behavior, using the inappropriate hemisphere for the instructions given but doing so with an appropriate processing strategy. For example, the right hemisphere would respond under function instructions and the left hemisphere would respond under appearance instructions. Although Levy and Trevarthen drew no formal conclusions as to why this hemispheric interchange occurs, they did speculate that "hemispheric activation does not depend on a hemisphere's real aptitude or even on its actual processing strategy on a given occasion, but rather on what it thinks it can do" (Springer, p. 52). These results indicate that in a given situation each hemisphere is capable of performing certain tasks generally associated with the opposite hemisphere and can sometimes do so with the processing mode associated with that opposite hemisphere.

Cross-cueing, the giving of hints by one hemisphere to the other concerning information only transmitted to the former, provides further indication of hemispheric interplay (Segalowitz, p. 240). The term cross-cueing was coined by Michael Gazzaniga and Steven Hillyard, pioneers in split-brain research, to refer to the attempts of their commissurotomy patients to use whatever cues were available to make information accessible to both hemispheres. The corpus callosum of these patients had been severed, eliminating the network of nerve fibers which normally serves as transmitters

between the hemispheres. Yet, information given to one hemisphere was correctly identified by the other hemisphere.

While testing the language skills of the right hemisphere, Gazzaniga and Hillyard found that the supposedly mute right hemisphere could reliably identify digits from two through nine. Whether the numbers were flashed to the left or right visual field, the subject could read them out. However, the verbal left hemisphere could identify the digits in under one second for all digits while the right hemisphere required over two seconds and, in some cases, eight seconds to verbally complete the task. The cross-cueing process added time to the completion of the tasks.

A simpler example of cross-cueing involves patients who were given an object to hold and identify with their left hand out of their line of vision and thus disconnected from the verbal left hemisphere. By the process of cross-cueing, the left hemisphere was able to identify the object. For example, when patients were given a comb or a toothbrush to hold, they would stroke the brush or surface of the comb. The left hemisphere could hear and interpret the sounds made--the "cues"--and then immediately identify the object (Springer, p. 33). Cross-cueing provides a way for one hemisphere to pass on to the other hemisphere information about what it is experiencing. This process is generally not a conscious attempt by the patient but rather a natural

tendency by an organism to use whatever information it has to make sense of what is going on.

Research done by Lillian Leiber of the State University of New York on fourteen right-handed male undergraduates also shows hemispheric interplay or what Leiber terms "inter-hemispheric cooperation" (Malatesha, p. 241). In one of her experiments, subjects were each shown sixty-four sets of faces and names and then told to decide if the name and the face were both male or both female. These sets were presented unilaterally, where the name appeared above the face and both occurred in the same visual field, and bilaterally, where the name appeared in one visual field and the face in the other. Previous experiments done by Leiber had resulted in the conclusion that the name or word was processed by the left hemisphere and the face or visual image was processed by the right hemisphere (Malatesha, p. 243).

This experiment, however, showed that although the left hemisphere was superior in recognizing the name and the right hemisphere was superior in recognizing the face, hemispheric cooperation aided each hemisphere in performing the tasks involved. Although performance improved when the name went to the left hemisphere and the face to the right hemisphere, when both face and name were presented to the same hemisphere, performance was markedly higher than had been predicted (Malatesha, p. 248).

Leiber's study supports the findings of the major research discussed here concerning cerebral hemisphericity. All of the sources cited indicate that the brain's two hemispheres each possess superiority in certain functions and processing modes and that each hemisphere cooperates with the other through a form of hemispheric interplay or crossover of hemispheric functions. The findings of the brain research discussed here can be summarized as follows.

The left hemisphere of the brain appears to be predominately linguistic, analytic, logical, sequential, and constructive. It shows a dominance for speech, writing, and calculation, and it processes information analytically (Sperry, 1974). The left hemisphere processes information in a part-specific manner distinguishing details but not projecting how those details could fit together (Zaidel, 1978). The left hemisphere is superior in the recognition of verbal matter and processes information in a "serial" or sequential mode (Cohen, 1973). The left hemisphere is superior in the performance of language functions and processes information in a sequential manner (Levy, 1978). The left hemisphere processes extensive writing--writing which is intended to convey information already familiar and formulated by the writer to another (Glassner, 1980).

The right hemisphere appears to be visual-spatial, holistic, synthetic, and perceptual. It is non-verbal and processes information holistically (Sperry, 1974). The right

hemisphere processes information in a holistic manner and possesses the capacity to construct or predict a whole picture from incomplete or limited material (Zaidel, 1978). The right hemisphere is superior in the recognition of non-verbal or visual material and processes information in a "parallel" or simultaneous mode (Cohen, 1973). The right hemisphere is superior in the performance of visuo-spatial functions and processes information in a holistic manner (Levy, 1978). The right hemisphere processes reflexive writing--writing which is intended to explore meanings and feelings (Glassner, 1978).

The hemispheres cooperate with one another through hemispheric interplay and crossover of hemispheric functions. In given situations, each hemisphere is capable of performing certain tasks generally associated with the opposite hemisphere and can sometimes do so with the processing mode associated with that opposite hemisphere (Springer, 1981). Cross-cueing creates an interplay between the hemispheres which allows one hemisphere to "cue" the other so that it may perform tasks generally performed by the other hemisphere (Segalowitz, 1983). Hemispheric cooperation accounts for the ability of one hemisphere to perform a task with the aid of its hemispheric counterpart (Malateska, 1981).

These findings from brain research and the study of cerebral hemisphericity have direct implications to the teaching of writing. Teachers of writing need to be aware of

the functions and processing modes of the hemispheres and of the interplay and crossover of functions which exist between the hemispheres. This understanding would allow teachers to teach writing using strategies which would stimulate both hemispheres and encourage students to use the full potential of their brains--both left and right hemispheres.

Teachers are rarely trained in the workings of the brain. Yet the brain is the center of learning. In Human Brain and Human Learning, Leslie Hart describes the brain as an "integration center or 'head office'" (Hart, p. 34). He contends that our educational system goes against the natural workings of the brain and should be restructured to fit the capabilities and processing modes of the brain. With an understanding of the workings of the brain, teachers could begin to design instruction to fit the brain--to create what Hart calls "brain-compatible instructional settings and procedures" (Hart, p. 44).

Without consideration of the hemispheric functions of the brain, teachers often spend time teaching writing as a linear, product-based activity for communicating information. This produces the kind of writing teachers complain about but score high because the surface features (spelling, punctuation, grammar, usage, etc.) are flawless and all the information is stated clearly. But the writing is boring and proves only one thing--little or no learning has taken place through the writing. Yet, Janet Emig tells us that writing

is a "unique mode of learning" (Emig, p. 3). To encourage that learning, teachers need to provide students with strategies which stimulate their brains during the pre-writing stage. I believe that the pre-writing rhetorical strategies included in this work can provide a systematic approach to the writing process which taps the potentials of both hemispheres of the brain. These "brain-compatible" strategies can move students into the writing process with the confidence of having something of value to say and the strategies with which to say it.

## BRAINSTORMING

The rhetorical strategy of brainstorming is a method of discovery which should incorporate both left and right hemispheres of the brain. It can be used as a means of discovering topics of interest to write about or as a means of discovering what the mind already knows or can learn about a topic. Brainstorming can be done individually by a student or collectively by an entire class or small groups of students within a class.

When students brainstorm individually, they put down on paper any ideas which come to mind concerning a topic. This linear act of simply listing information is a left hemisphere activity. The information is processed analytically as separate entities by this hemisphere. These ideas should be expressed as quickly as possible in single words, phrases, or entire sentences depending on the preference of the students. Once the information is written down, students begin to select patterns and relationships with this information. This process of synthesis is a right hemisphere activity. Thus, both hemispheres are involved in the brainstorming process.

Brainstorming is a time to "let the mind run wild" (Bruffee, p. 4). No ideas should, therefore, be censored



or refined by the writer during brainstorming. To keep a focus on the topic during brainstorming, students can consider the analogy of a wheel, with the hub or center as the topic and the ideas and information as the spokes which radiate out from the center. To further stimulate the visual right hemisphere, students could sketch this wheel pattern on their papers, drawing lines connecting relative pieces of information. By doing this activity, students can encourage the synthetic, pattern-forming talents of this hemisphere.

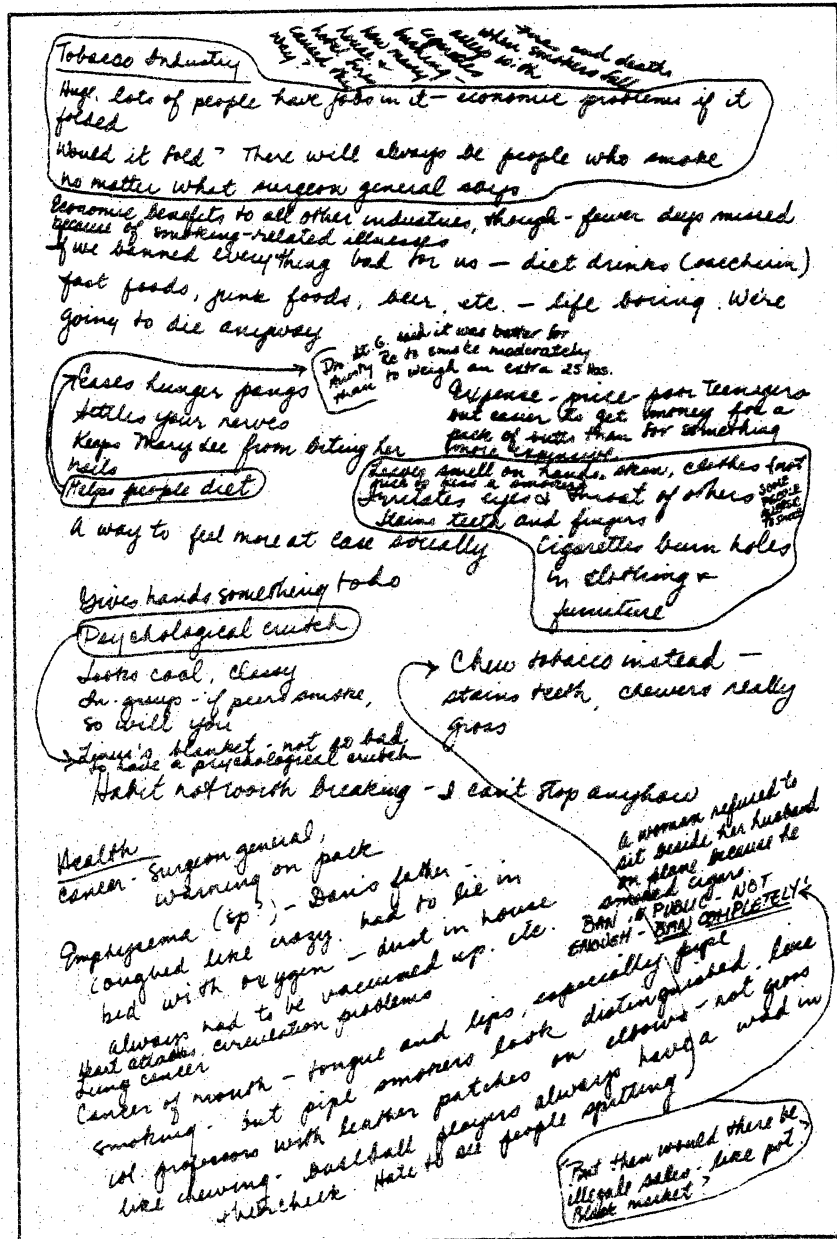
When students brainstorm collectively in small groups or as an entire class, all ideas spoken should be accepted and recorded on the board. The verbalization of these ideas and thoughts, controlled by the verbal left hemisphere, gives meaning to those thoughts. Lev Vygotsky tells us that the relationship between thoughts and the spoken word is "a living process; thought is born through words" (Vygotsky, p. 153). This verbalization of thoughts during brainstorming enhances the thinking and, therefore, the learning power of the brain before the actual writing begins.

During brainstorming as the teacher or student moderator writes these thoughts and ideas on the board to create a visual stimulant for the right hemisphere, neither teacher nor students should censor ideas, as the key to brainstorming is the honesty with which thoughts are recorded. Elizabeth Cowan, author of the college writing text Writing: Brief Edition, Scott, Foresman and Company, 1983, in fact, states

the following rule to her students prior to a class brainstorming activity: "Be absolutely nonjudgmental. No idea should be made fun of or discarded. You and the others in the group must feel completely free to say whatever comes to mind and know that the idea won't be evaluated" (Cowan, p. 10).

Once the information is recorded, follow through activities for brainstorming are needed. Much like a golfer who has learned to hit the ball but cannot get distance from his/her swing until the follow-through of that swing is learned, a student who is learning the art of brainstorming needs to learn strategies to deal with the information discovered. Dean Memering and Frank O'Hare, in their text The Writer's Work: Guide to Effective Composition, Prentice-Hall, Inc., 1980, follow brainstorming through with a visual activity which integrates the left hemisphere's ability to list details and the right hemisphere's ability to put those details into a pattern. Memering and O'Hare have students first circle, underline, and draw arrows throughout the brainstorming notes connecting relevant information (right hemisphere activity). Although this may appear chaotic, it reinforces the need to carefully examine all of the notes created by the brainstorming exercise and creates a visual picture (for the right hemisphere) of the process itself. This holistic method allows a pattern to be formed which helps students to "see" the over-all combinations which can

be created from the brainstorming information. The following student's brainstorming on the topic "The Tobacco Industry" illustrates this method.



(Memering and O'Hare, p. 61)

Only after this visual picture of the brainstorming is completed do Memering and O'Hare recommend listing relevant information into categories for further analysis (a left hemisphere activity). From this analysis a student is able to move easily into the formation of a thesis statement. By this time, the left hemisphere of the brain has analyzed a wealth of material which the right hemisphere can synthesize into a focus for the writing.

## SUBJECT TREES

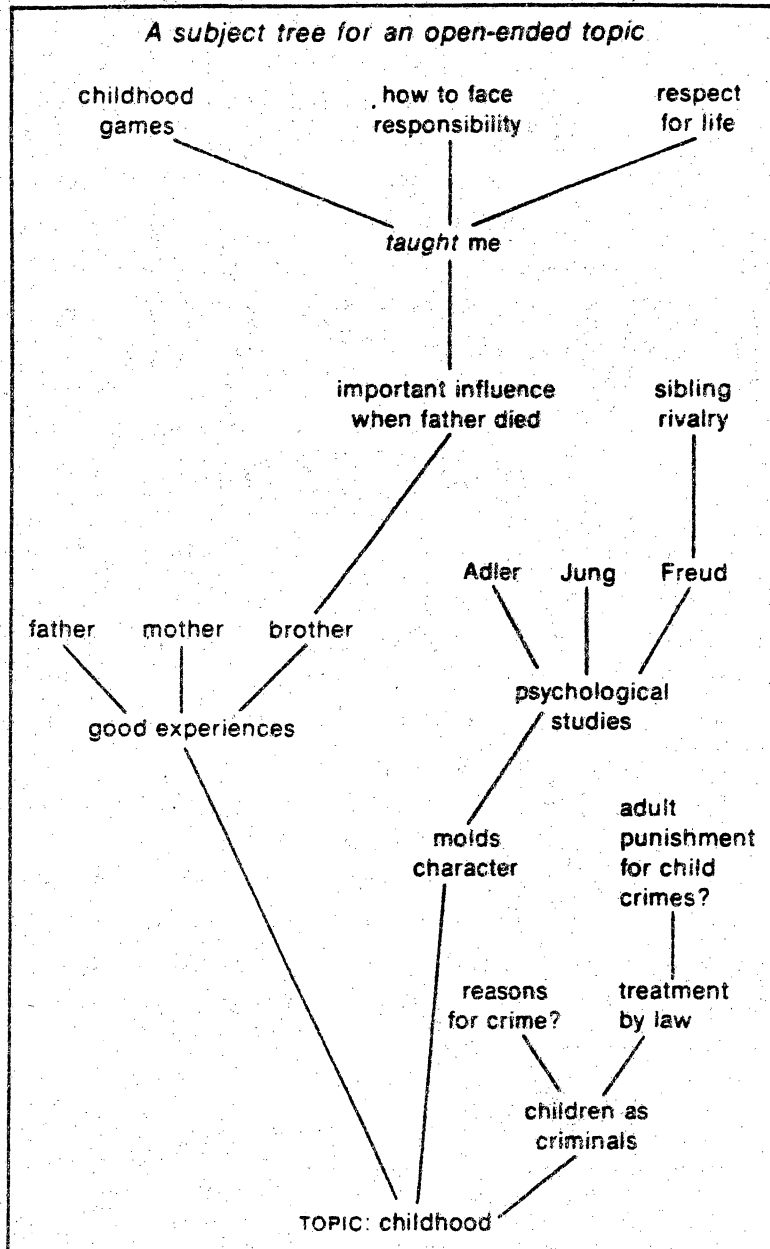
In The Writing Room: A Resource Book for Teachers of English, Harvey Wiener describes what he calls "subject trees" for brainstorming a topic. These "subject trees" allow students' thoughts to develop toward higher levels of specificity by using the strengths of both hemispheres of the brain.

Using the visual image of a tree (to stimulate the visual right hemisphere), Wiener begins by putting the topic as the bottom or "trunk" of the tree. Then as thoughts and ideas are recalled, they are placed on the tree as branches which reach upwards. Eventually, each idea becomes more specific than the preceding one as details become more focused through the left hemispheric activity of analysis.

As the left hemisphere analyzes the topic for the "subject trees," the right hemisphere connects ideas and draws relationships among them. This process of synthesis helps students to find a focus for their writing. A sharing of these "subject trees" in peer groups helps students to understand how other students' minds gathered and organized their information. This verbalization process of the left hemisphere strengthens what Vygotsky considers the infinite complexity of verbal thought (Vygotsky, p. 152) as it once again

draws upon the talents of both the left and right hemispheres.

The following is an example of a "subject tree" on the topic of childhood:



(Wiener, p. 31)

Not only have both hemispheres of the brain been stimulated by such an activity as the "subject tree," but also new related topics have been discovered which could serve as a focus for the writing. Thus, additional "subject trees" could be formed to further develop one of the ideas stimulated by the first tree.

## ISSUE TREES

Similar to Wiener's "subject tree" is Linda Flower's "issue tree" which also integrates left and right hemisphere activities. An "issue tree," as developed by Flower, is a sketch of an upside-down tree that puts ideas in a hierarchical order with the general, most inclusive topic at the top of the paper as the tip of the tree and support ideas branching out from underneath it.

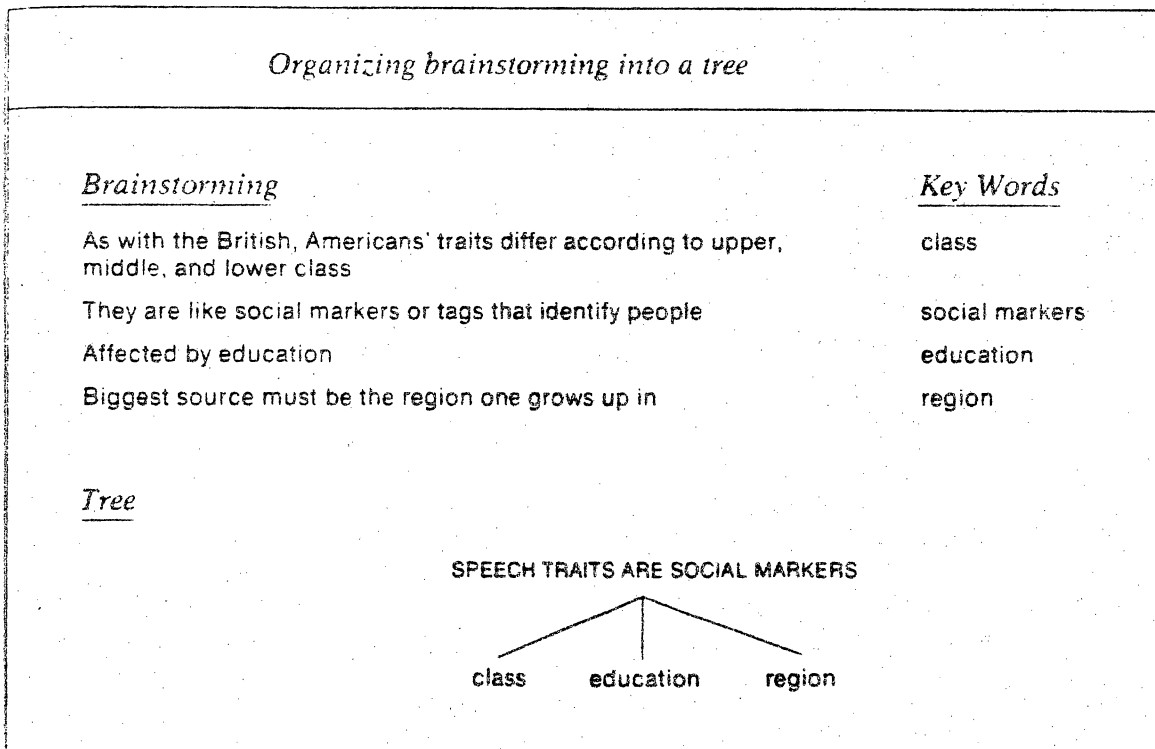
An "issue tree" offers students an opportunity to sketch out or test ideas and relationships. With this activity, students activate the visual right hemisphere as they sketch the tree and also stimulate the left hemisphere as they analyze the information for the tree.

An "issue tree" is divided into parts--through analysis of the issue or topic by the left hemisphere--as students list what they may know about that topic. These parts radiate down from the over-all topic. First of all, students brainstorm a topic on the left side of their papers, listing all information and details that they can recall about the topic. This listing of details is a left hemisphere activity. Next, students further analyze this brainstorming information and pull out specific details, or key words, which they write on the right side of their paper. These key



words are then written under the main topic, forming an image of a tree (an aid to the right hemisphere).

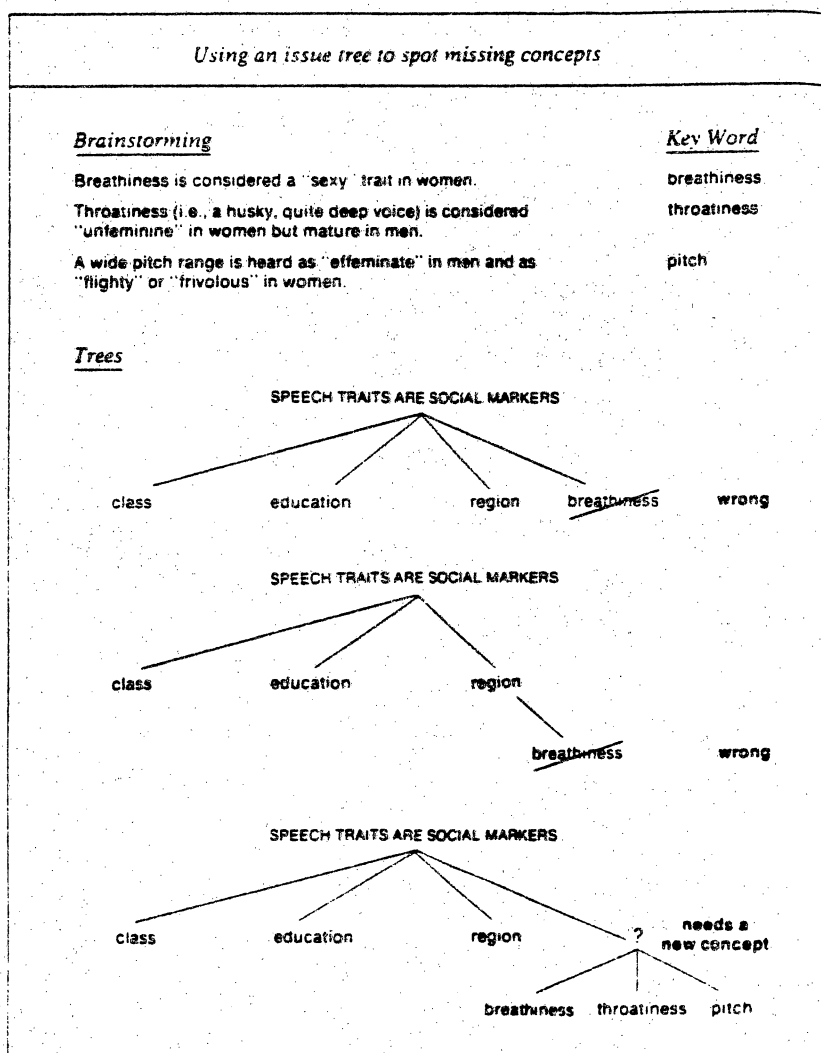
The following "issue tree" is the first in a series created to generate ideas on the topic of the effects of an Englishman's speech traits when that Englishman is a part of our American society.

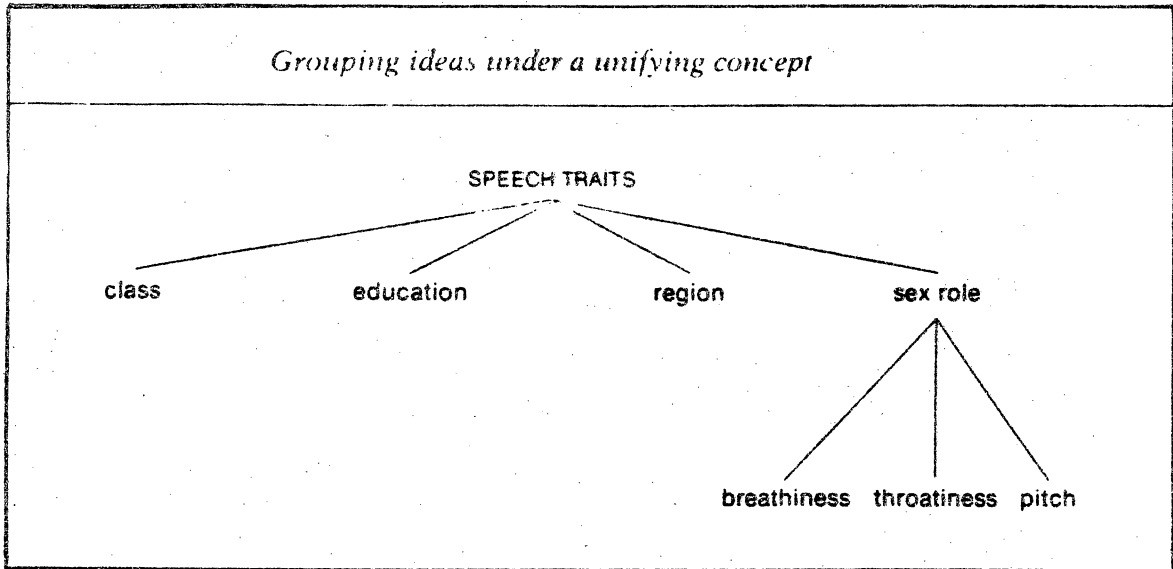


(Flower, p. 89)

In the next step of Flower's "issue tree" brainstorming, the right hemisphere becomes dominant. This step asks the students to spot the missing links in their thoughts and to generate new concepts that will organize the ideas uncovered. The right hemisphere forms patterns and relationships at this point to create whole configurations from the bits and pieces of information through synthesis. This process often

involves the creation of several "issue trees." Note that the following "issue trees" resulted in the student proposing a new unifying idea that was not thought of in the original brainstorming "issue tree." The first tree focused on class, education, and region as branches under speech traits as social markers. The final tree focuses on sex roles.





(Flower, p. 90,91)

Having led to a new unifying concept for the effects of speech traits on the sex roles, the "issue tree" has generated a new area of interest for the student. The development of further "issue trees" dealing with this new interest would lead to the first draft of the writing. During the development of these later "issue trees," the left hemisphere must continue to pull out details from the brainstorming to form the branches of the tree. The right hemisphere must continuously draw associations and generalizations with the information uncovered. The right hemisphere also responds to the visual configurational design of the "issue tree," allowing a pattern or gestalt to form. During the entire process of creating "issue trees," both hemispheres work together in a recursive pattern to prepare the students for the writing that is to come.

## SUBJECT CHARTS

In her text A Rhetoric for Writing Teachers, Oxford Press, 1982, Erika Lindemann discusses a method of developing brainstorming into "subject charts." Much like Wiener's "subject trees" and Flower's "issue trees," these "subject charts" involve both hemispheres during pre-writing. After listing all of the ideas given during a brainstorming session, Lindemann opens up a discussion to guide students into forming relationships among details or discovering areas of interest to the students. This left hemisphere verbalization strengthens learning by combining thought and language (Vygotsky, p. 153) while it brings focus to what could otherwise remain a meaningless list of scattered ideas. The right hemisphere visualizes the "subject chart" in such a way as to allow students to "see" areas of interest or areas which need further exploration.

To guide the brainstorming discussion into a productive activity, Lindemann forces students to examine the subject more closely for useful and interesting details with which to create a "subject chart." She poses the following set of questions to encourage openness from her students:

1. What details seem most forceful?
2. In what ways could details be grouped?
3. What patterns have emerged in the list?

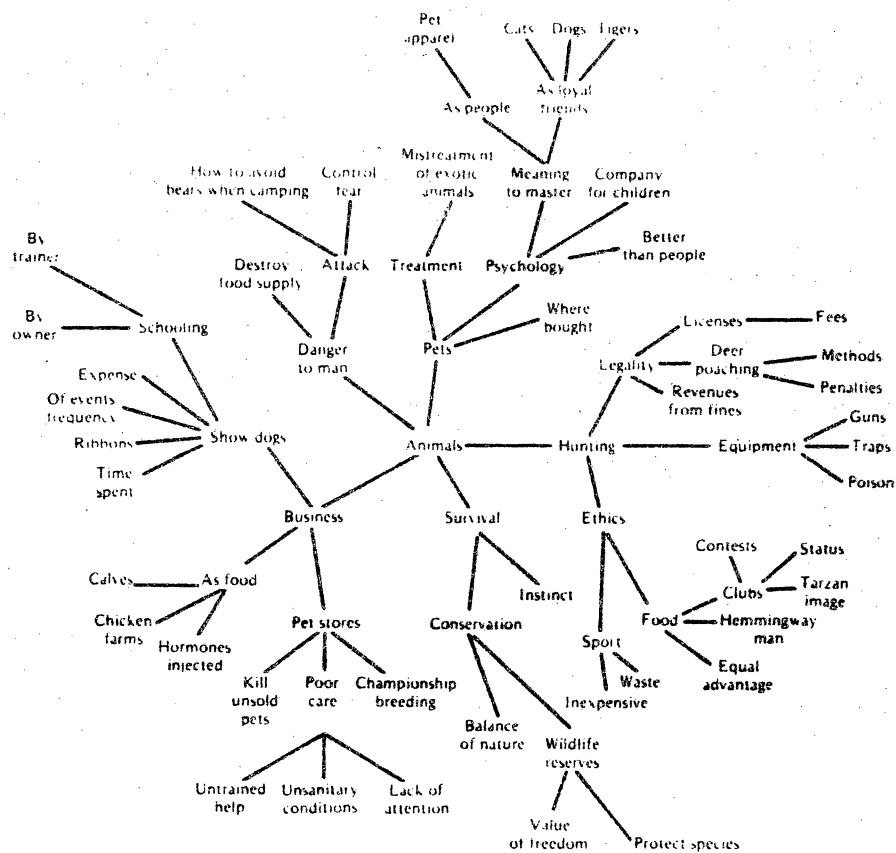
4. What dimensions of the subject seemed to attract the writer's interest?
5. What details must be left out at this point if the first draft is to have unity?

(Lindemann, p. 81)

A discussion of these questions helps students to see relationships (a right hemisphere activity) while it also provides possible options for the spatial organization of the paper (a left hemisphere activity).

For the development of a "subject chart, students take the information from the discussion and regroup items on the list into a branching tree diagram. The main topic is written in the center of a piece of paper, or on the board, and ideas are branched out in related groups. Students can consider any branch of the "subject chart" for the focus of their writing, or they can further explore an area of interest which has been uncovered during the branching process.

The following "subject chart" on the topic "animals" demonstrates the branching technique.



(Lindemann, p. 81)

With such a strong visual context, the right hemisphere of the brain can process the information holistically and lead to the formation of a focused thesis statement. At the same time, the details discovered through the analysis of the subject by the left hemisphere can create diverse areas which can be explored by the writer. The strength and success of this type of rhetorical strategy during pre-writing is directly related to its fine integration of both right and left hemisphere activity.

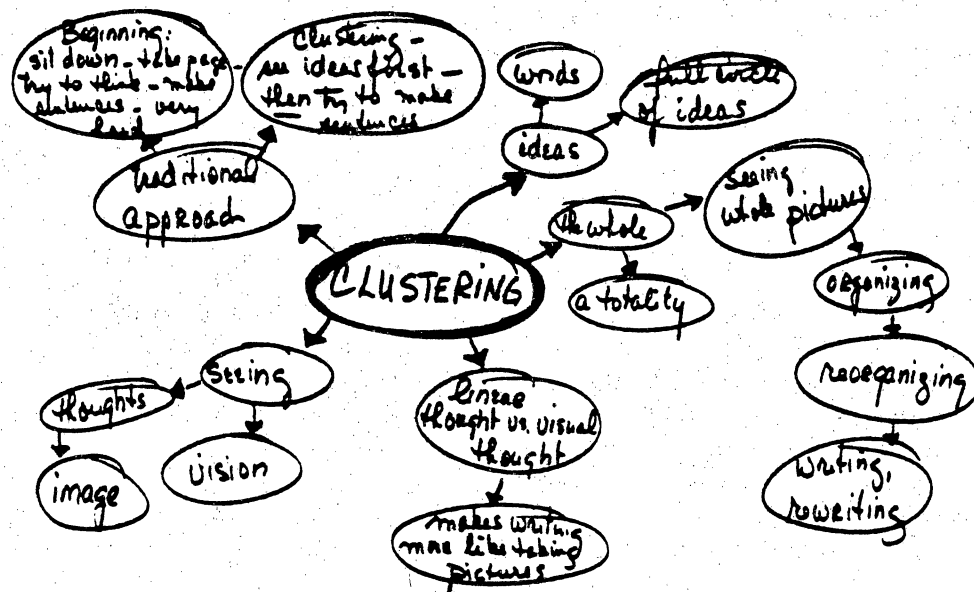
## CLUSTERING

Clustering is another way of organizing brainstorming to incorporate both hemispheres of the brain. Instead of merely listing brainstorming ideas and thoughts in a linear, left hemisphere manner, clustering forms the image of a wheel for the visual right hemisphere. The topic to be discussed is written on the board and/or on the students' papers. A circle is then drawn around this word or phrase. Lines are drawn which radiate out from that center as spokes radiating out from the hub of a wheel. As ideas are generated, they are written at the ends of the lines or spokes, completing the visual image of a wheel. The right hemisphere processes the clustering holistically and can "see" the information as a whole construct. The left hemisphere processes the details of the clustering analytically as separate entities.

During clustering, students need to brainstorm the topic, breaking it down into its various parts. The left hemisphere analyzes this information in a part-specific manner distinguishing each detail as it is placed around the hub of the clustering. Often, however, a word or phrase placed around the center topic will spark a relationship in a student's mind to another thought or idea. This construction of a relationship or pattern requires the holistic processing

mode of the right hemisphere in order to synthesize the information. It also allows the students to let their minds wander into various areas of interest without losing sight of the main topic.

The following clustering example was done on the topic of clustering and illustrates both the visual and associative appeal of this method.



(Rico, p. 34)

The strong visual appeal of clustering makes it easy to remember and to replicate. Students can use this strategy in other rhetorical situations. When they need to prepare for and organize a paper for their history or science class, students can use clustering to gain information and insight as well as to structure what they will write. When students are faced with essay exams, they can use clustering before they begin writing their responses. This clustering need take



only two to five minutes but can help students to remember what they want to say and to organize how they will say it. Clustering before an essay exam often eliminates the fear expressed by many students and allows them to begin responding to the essay question with confidence. This sense of confidence about their writing is especially important for students as they face the essay response for determination of proficiency for high school graduation. In fact, clustering is mentioned as a rhetorical strategy for prospective teachers who, like students wishing to graduate from high school, must write an essay response to pass the C.B.E.S.T. (California Basic Educational Skills Test). The following example of clustering is from the Preparation Guide: California Basic Educational Skills Test prepared by Cliff Notes, Inc., 1983.

#### INTRODUCTION TO THE ESSAY

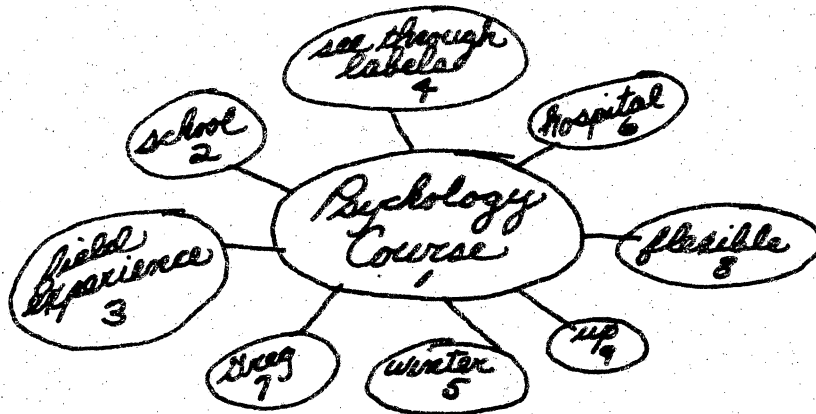
Reflect on your own school years and focus on one such instructor or course. Describe the conditions or qualities that made that particular experience or teacher special.

#### *Clustering*

Use prewriting (clustering) as a way of organizing your thoughts before you write. After you choose a topic, write it down on the prewriting area and draw a circle around that topic:



For a few moments, think of all the elements of that topic and connect them to the central topic cluster:



You can then number the parts of the cluster to give an order to your thoughts. You do not have to use all of the elements of your cluster. Clustering provides a way to put all of your thoughts down on paper before you write so you can quickly see the structure of the whole paper.

(Bobrow, p. 41)

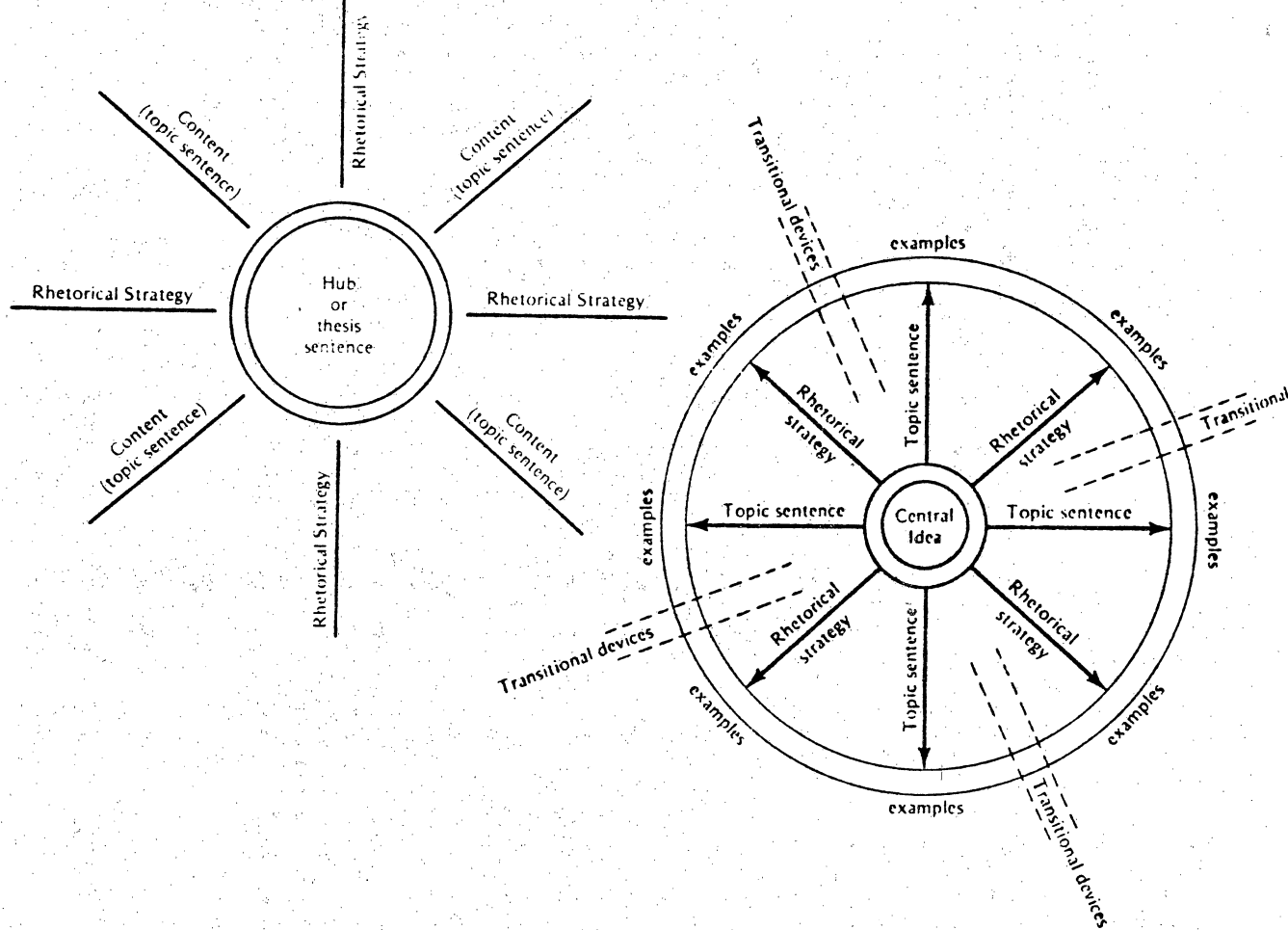
As a pre-writing rhetorical strategy, clustering combines the strengths of both hemispheres of the brain. The left hemisphere analyzes the topic by breaking it down into its parts. It lists these parts one at a time in a sequential manner as they are recalled and then continues to analyze these parts even further into separate, more part-specific details. The right hemisphere visualizes the entire construct of the wheel and forms patterns and associations with the information to give focus to the writing. Because of its dual hemispheric involvement, clustering can bring students confidence in all writing situations.

## COMPRONE'S WHEEL

To help students form patterns and connections with their thoughts during pre-writing, Joseph Comprone, author of Teaching Form and Substance, Wm. C. Brown, 1976, has extended the clustering concept into what he calls "Comprone's Wheel." Although much more structured than clustering, it creates a strong visual context for students (involving the right hemisphere) while it demands lengthy analytic probing of the subject (involving the left hemisphere).

After brainstorming a topic, Comprone has students create the hub of a wheel by writing a thesis sentence which expresses the central idea of the essay. Next, students are to divide that central idea into related subtopics which serve as spokes to support the thesis. Some spokes will determine the rhetorical strategy to be used by answering "how?" and some spokes will determine the content by answering "why?" Finally, around the rim of the wheel students place specific details which connect firmly to the spokes. Comprone stresses that these details must be relevant, arranged in logical order, and have adequate transitions between them. For this section of the wheel, the logical, sequential left hemisphere must be actively at work. The following are the visual images which students use to help

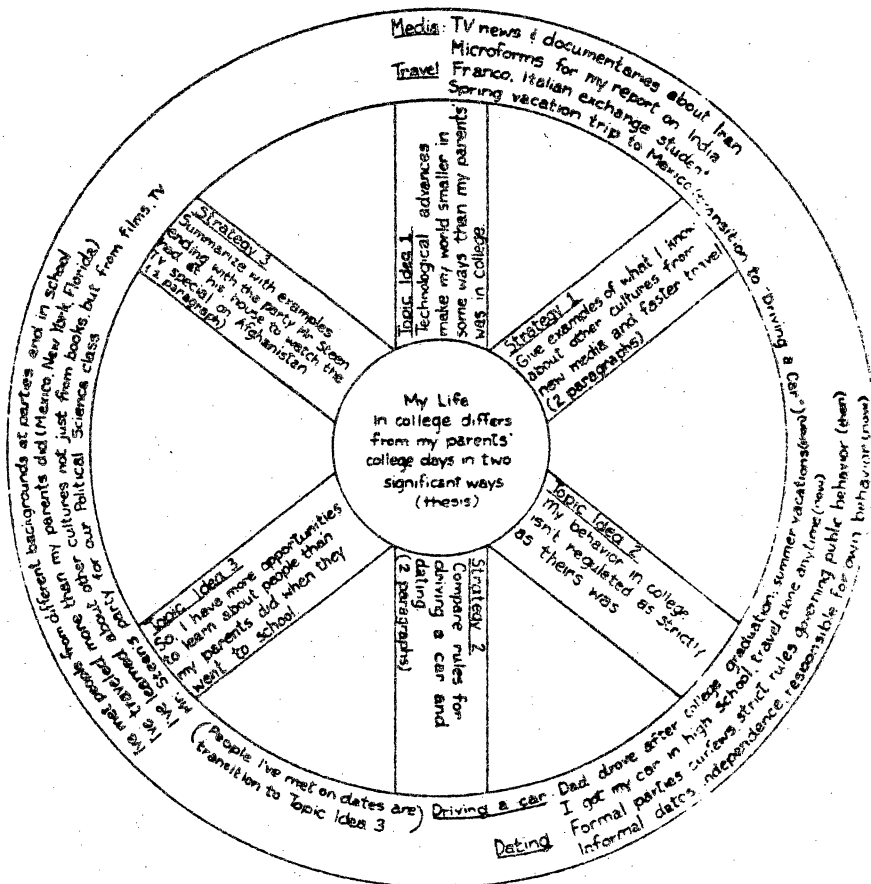
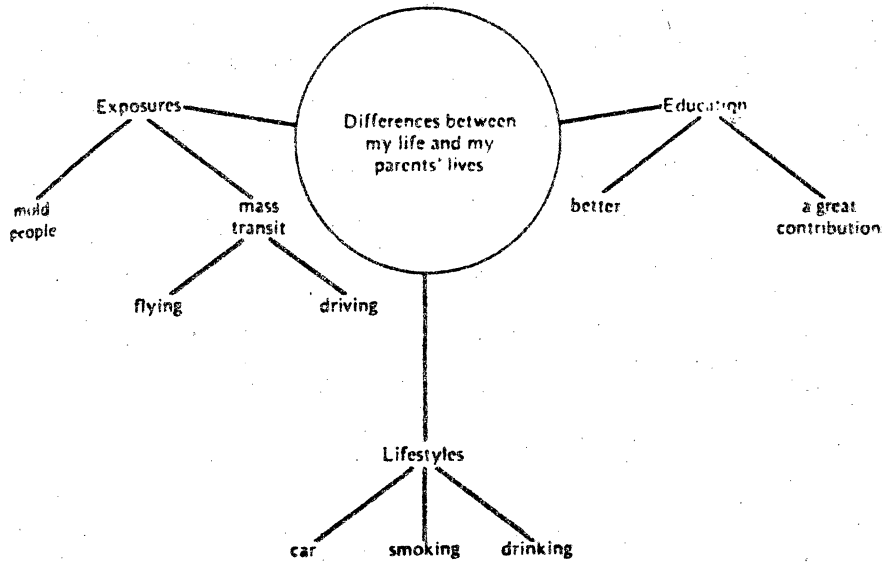
them to "see" (with the right hemisphere) the process involved in creating one of "Comprone's Wheels."



(Lindemann, p. 170 & 172)

This wheel can help students to structure a tightly unified essay during pre-writing. It can also, however, be used as an effective tool for revision. Imagine, if you will, the following wheel, which was created during pre-writing on the differences between the student's life and that of his/her parents, being created after the first draft to see if the essay has any weaknesses in structure or content. The strong visual appeal lends strength to this

strategy as it further incorporates the right and left hemispheres of the brain.



(Lindemann, p. 173)

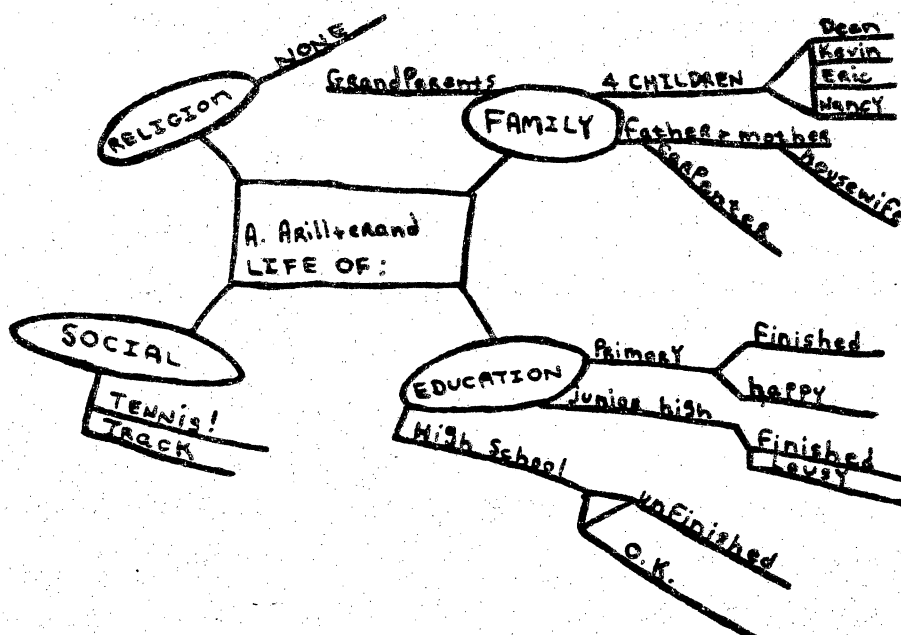
## MAPPING

Mapping is a unique way to integrate the hemispheres during pre-writing. It is organized around the flow from primary ideas to secondary ideas, to tertiary ideas. Much like clustering, mapping begins by writing the topic in the center or hub of a wheel. Spokes radiate out to encompass thoughts and ideas which support the main topic during a brainstorming session. It is at this point that mapping differs from clustering. The wheel image is merely a visual starting point for students to use. With mapping, the visual shape or context of the brainstorming material depends entirely upon the desires and creativity of the individual student.

The best way to explain mapping is through examples. All of the following examples are from Mapping the Writing Journey by Marilyn Hanf Buckley and Owen Boyle of the Bay Area Writing Project.

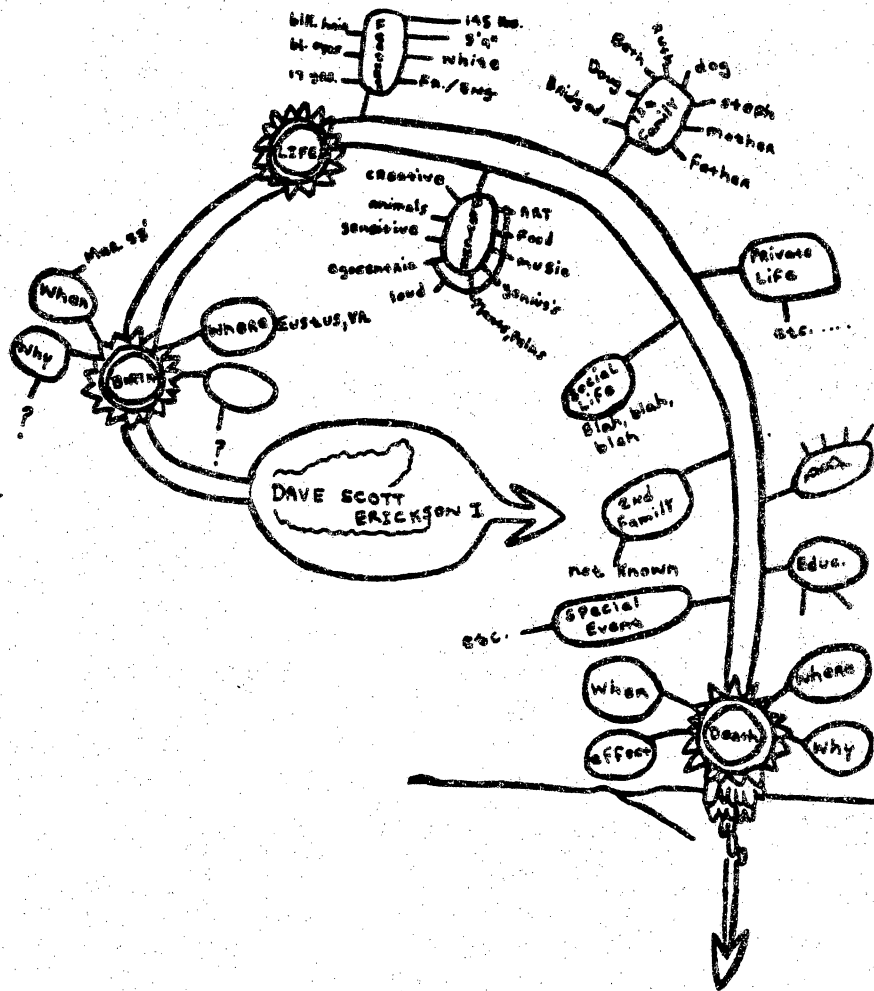
The first examples are mapping exercises for an autobiographical writing. It is wise to use a topic which students are very familiar with the first time they do mapping. After the students brainstorm their topic, the memories of their lives, they choose incidents for their maps which they want to include in their writing. This type of selection,

although dealing with individual parts of their lives, includes the holistic right hemisphere as students have to visualize their entire life span as one pattern. The shape and design of this map is up to the student. Figure A below shows the student's name in the center with clusterings of religion, family, education, and social radiating outwards. The mapping, which uses the part-specific processing mode of the left hemisphere, is done within each sub-topic of secondary ideas in a linear fashion. However, the formulation of relationships and patterns drawn among those sub-topic ideas uses the holistic processing mode of the right hemisphere. One of the strengths of mapping is its incorporation of the processing modes of both hemispheres.



(Buckley, p. 17)

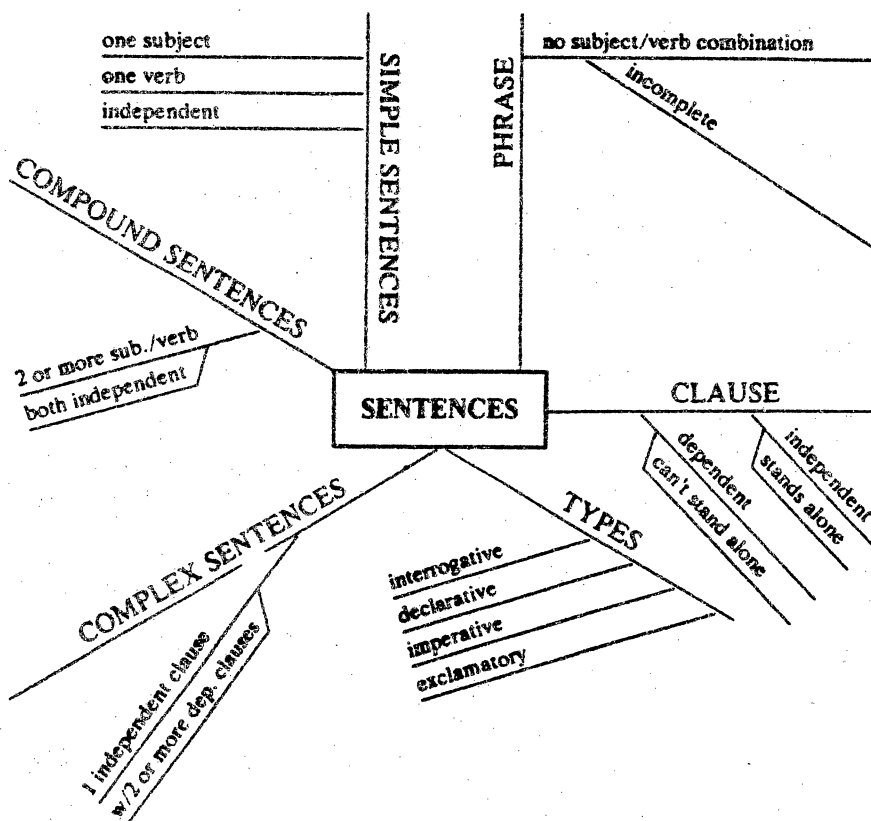
Example B shows one student's journey from birth to projected death as a road map with diversions for secondary details and occurrences. This visual configuration helped to structure the writing while it incorporated the part-specific left hemisphere with the holistic right hemisphere.



(Buckley, p. 18)

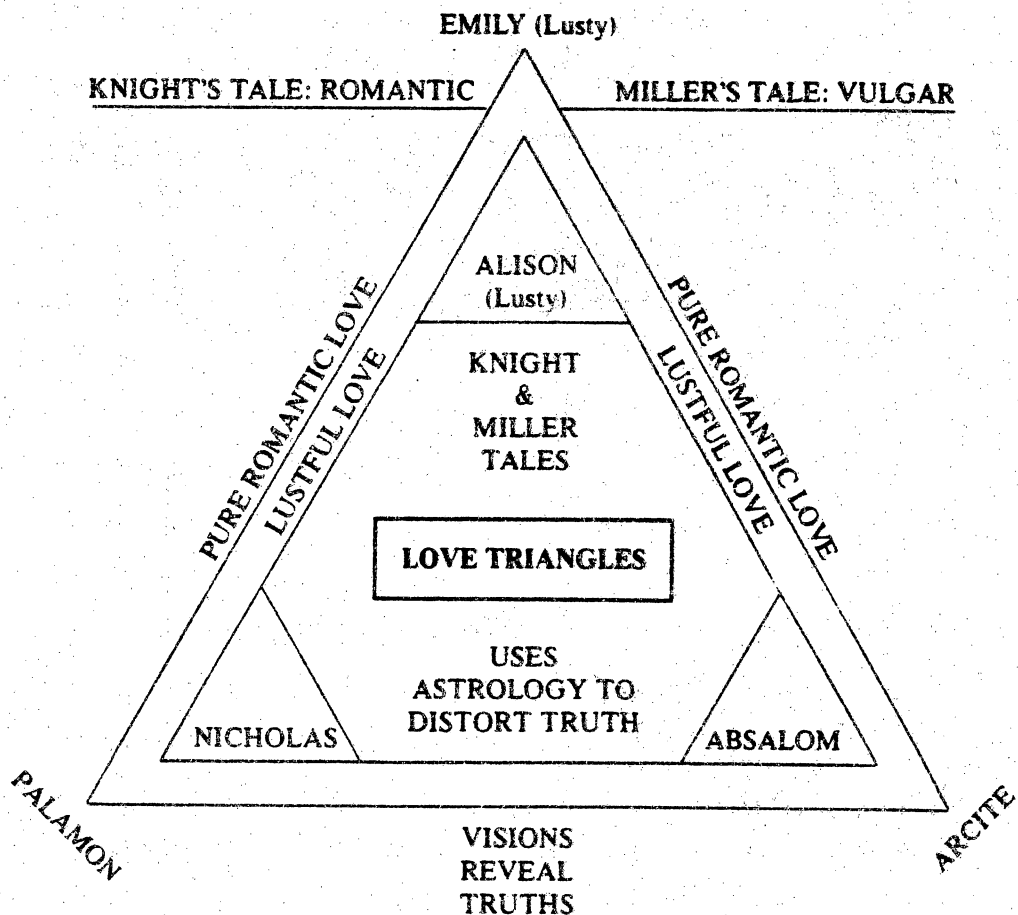


Example C demonstrates an explanatory map about sentences. The map was actually created as notes during a lecture (which opens up a whole new area for mapping). During pre-writing, students were encouraged to share their maps in groups. This verbalization of their maps helped students to better understand the concept of "sentences" through what Vygotsky has called "verbal thought" (Vygotsky, p. 52). Combining this verbal left hemispheric activity with the visual right hemispheric patterning of the map itself allows students to use the strengths of both hemispheres.

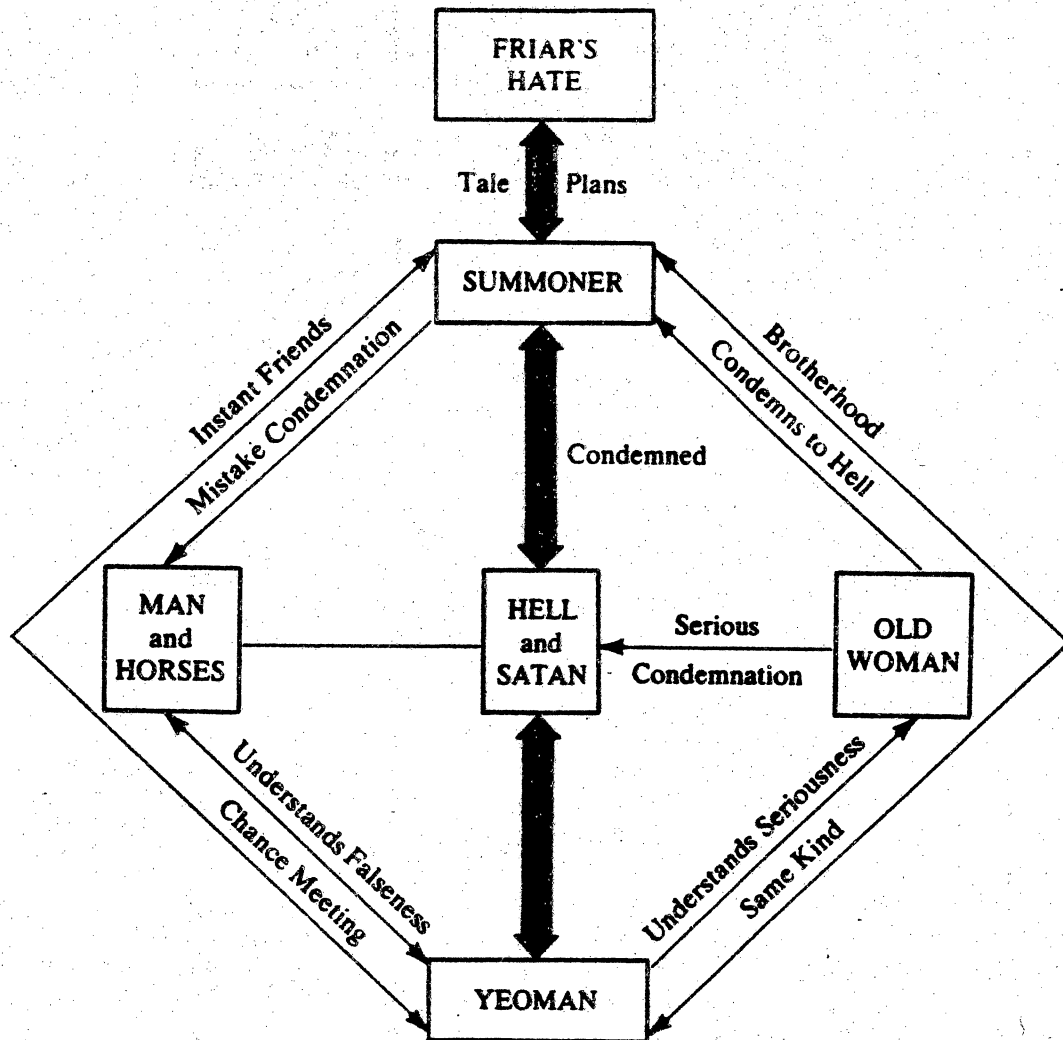


(Buckley, p. 29)

Examples D and E show how mapping can be used when students write about literature. Both maps require analysis or a breaking of the literature into specific parts--a left hemisphere function. Both maps also require synthesis or a patterning of those specific parts into new relationships--a right hemisphere function. Map D led to a comparative paper about Chaucer's "Knight's Tale" and "Miller's Tale." Map E visualized the relationships in Chaucer's "The Summoner's Tale" and helped the student to discover a thesis about the characters involved.



(Buckley, p. 31)



(Buckley, p. 33)

Mapping is a powerful, creative way to let students visualize their writing during pre-writing. It leads to clearly focused writing and, unlike outlining which contains so many restrictions on form, can be taught in one lesson. The strength of mapping as a pre-writing rhetorical strategy lies in its firm integration of the hemispheres.

## HEURISTICS

From Aristotle's time into the Renaissance, "heuristic," "heuristic," and "invention" were all terms for that part of rhetoric and the sciences which involved systematic inquiry. This method of problem solving involved formulating questions whose answers would raise other questions and so on. This self-generating probing would eventually, after exhausting all possibilities, result in a solution to the problem at hand.

Writing begins with inquiry. Whether that inquiry is stimulated in an office, a factory, a home, or a classroom, the chances of discovering insight through writing are increased by heuristic search during pre-writing. Heuristic strategies can answer questions which one had not even formulated at the start of such a search. As each new question is answered, other questions are formed which lead into directions unplanned and as yet undiscovered. Heuristic inquiry leads to discovery.

A workable heuristic, or set of probes, incorporates the functions and information processing modes of both hemispheres. During pre-writing, a heuristic helps students to focus in on their subject and to discover what they have to say about that subject. A heuristic can draw from students

what they know or can recall about a subject, what they can learn about the subject, and what they can hypothesize about that subject.

In Rhetoric: Discovery and Change, Young, Becker, and Pike explain quite clearly the three functions of a heuristic:

1. It aids the investigator in retrieving relevant information that he has stored in his mind. (When we have a problem, we generally know more that is relevant to it than we think we do, but we often have difficulty in retrieving the relevant information and bringing it to bear on the problem.)
2. It draws attention to important information that the investigator does not possess but can acquire by direct observation, reading, experimentation and so on.
3. It prepares the investigator's mind for the intuition of an ordering principle, or hypothesis.

(Young, Becker, and Pike, p. 120)

By becoming aware of the systematic approaches to heuristics, students can guide their search for something meaningful to say. They can examine their subjects from multiple perspectives through conscious, open-ended inquiry which can transform their writing into learning. By incorporating the hemispheres of the brain, heuristic search can increase students' writing abilities. The following rhetorical strategies for heuristic search will aid students to find something of value to say during the pre-writing stage.

## JOURNALISTIC PROBES

One of the simplest, and most often used, forms of heuristic search is the journalistic probe. To gather information for a newspaper article, journalists are trained to focus on six questions--Who? What? Where? When? Why? How? Focusing on their topics from these six perspectives, journalists gather the necessary information with which to complete their assignments. Such a heuristic can be applied to students' writing.

Harvey Wiener, author of The Writing Room: A Resource Book for Teachers of English, combines this detailed information gathering heuristic with a visual brainstorming technique. After writing the topic to be explored across the top of a blank page, Wiener has students list questions along the side of the page at two to three inch intervals. This provides a visual format for the right hemisphere and helps to focus the brainstorming. Wiener recommends the journalistic questions but agrees that the questions may vary according to the assignment at hand. The following example shows the visual effect of this method and the focusing effect the questions had on the student's brainstorming for the topic of a baseball game.

	Topic: baseball game
Who?	my brother Pete and I
What?	helped lose the game
Where?	Highland Park in Fairfield, New Jersey
When?	last July
Why?	both poor players, inexperienced, clumsy, nervous
How?	I struck out 3 times, Pete dropped 2 fly balls

(Wiener, p. 30)

This journalistic approach uncovered the basic information for the student while the visual effect of the questions set along the side of the paper provided an over-all view of where the writing was going. This incorporation of hemispheric functions provides both information and structure for the student during the pre-writing stage of the writing process.

Ann Berthoff, in Forming, Thinking, Writing: The Composing Imagination, takes the journalistic approach to create a one question heuristic probe: How does who do what and why? She abbreviates this question as HDWDWW? This approach, like Wiener's, incorporates the hemispheres and helps students to keep a focus in their writing.

When searching for answers to this question students use the functions and information processing modes of both hemispheres. For example, in the description of a snowshoe, students need to know ways (how?) in which someone (who?) does something (what?) and why (why?) he or she does it. The answers to the first three questions involve searching for details within the writing. This information is processed through analysis in the left hemisphere. The last question, however, involves more than merely finding details. To uncover the "why?" students must take information from the writing, synthesize it into a pattern, and process it holistically to determine the motivation. This process of synthesis generally takes place in the right hemisphere.

Berthoff further incorporates the hemispheres by stressing the need for verbalization during this heuristic search. This verbalization activates the left hemisphere and provides a better understanding of the information for students before they move into the writing. As each explanation emerges, the HDWDWW? heuristic is applied until all information is clear and complete. This journalistic method is simple and easy for students to follow, incorporates both hemispheres of the brain, and provides students with material and possibilities for a focus during the pre-writing stage.



CLASSICAL INVENTION:  
ARISTOTLE'S "TOPOI"

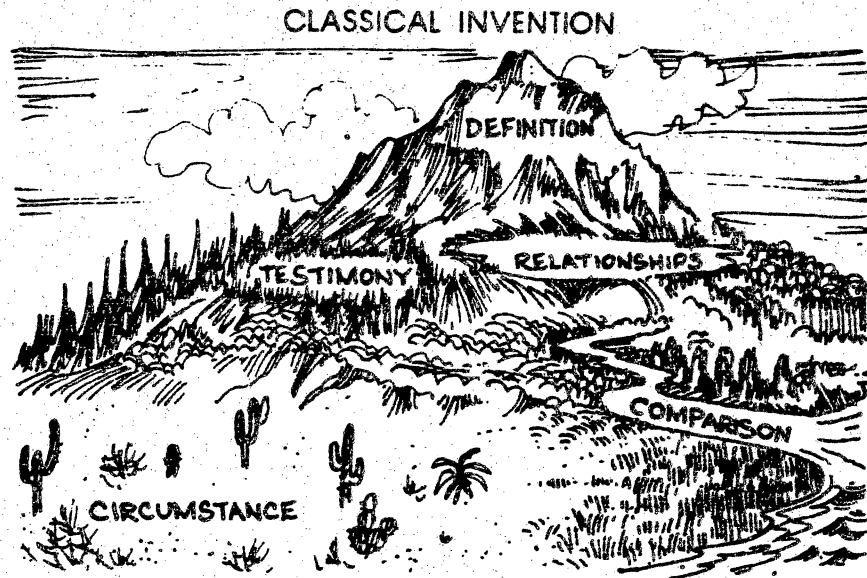
When creating methods of heuristic search for his students of oratory, Aristotle devised two sets of topics or "topoi"--places in the mind from which various lines of argument could be drawn. One set he intended for universal application, that is, approaches which could be used for all branches of knowledge. The other set was intended for particular application, that is, approaches which could best be used for specific sciences such as ethics and politics. Aristotle's "universal" or "common" topics can be applied to the teaching of writing.

Often referred to as classical invention, Aristotle's "universal" or "common" topics can be classified as definition, comparison, relationship, circumstance, and testimony. Used as logical lines of arguments in most persuasive situations, these topics dealt first with the basic knowledge of a subject on the definition level--a knowledge of all possible definitions for a subject. Comparing this subject to others like or unlike it and then forming relationships with those comparisons adds more perspectives for the orator. Aristotle further instructed his orators to be aware of the effects caused by the subject on itself and on any other,

particularly any opposing, subjects. The category of circumstance allowed the orator to be totally aware of the capabilities of his subject in any circumstances. Lastly, Aristotle urged his orators to prove their arguments by giving testimony from many sources as proof. Although Aristotle's topoi were created for orators whose main purpose was to persuade, these topoi can be applied to the various modes of discourse required by today's students.

Today's students, states Elizabeth Cowan in her text Writing: Brief Edition, use Aristotle's topics each day as they discover the meaning of a new term (definition), compare one thing to another (comparison), consider relationships of cause and effect (relationship), ponder if something will or won't happen or be possible (circumstance), and decide whether to accept or reject some advertising claim (testimony) (Cowan, p. 27). To structure these topics into a useful heuristic which incorporates the hemispheres and provides students with a pre-writing rhetorical strategy that will fit all of their writing needs, Cowan has devised a mnemonic for Aristotle's "common topics." She has students imagine a vast portion of land ranging from a mountain to the desert. As one passes through this area, he/she encounters each of the "places" or "topics" for heuristic search. By answering a set of questions at each "place," a student can produce much information with various perspectives which he/she can draw upon at will according to need.

Because of the visual right hemisphere appeal of Cowan's mnemonic and the thoroughness of her questions, I will re-create both her visual image and her probes.



(Cowan, p. 25)

Cowan's directions for the probing activity are simple. Students are to take their topics, here meaning their subjects, and insert them into the blanks in each question. Students answer each question in the topoi groups by writing in brief notes and adding any other questions which come to mind. When finished, the students reread their answers and star ones that they think will be the most useful in giving them something to say for their writing. Cowan's probes are as follows:

### Definition

1. How does the dictionary define \_\_\_\_\_?
2. What earlier words did \_\_\_\_\_ come from?
3. What do I mean by \_\_\_\_\_?
4. What group of things does \_\_\_\_\_ seem to belong to? How is \_\_\_\_\_ different from other things in this group?
5. What parts can \_\_\_\_\_ be divided into?
6. Does \_\_\_\_\_ mean something now that it didn't years ago? If so, what?
7. What other words mean approximately the same as \_\_\_\_\_?
8. What are some concrete examples of \_\_\_\_\_?
9. When is the meaning of \_\_\_\_\_ misunderstood?

### Comparison

1. What is \_\_\_\_\_ similar to? In what ways?
2. What is \_\_\_\_\_ different from? In what ways?
3. \_\_\_\_\_ is superior to what? In what ways?
4. \_\_\_\_\_ is inferior to what? In what ways?
5. \_\_\_\_\_ is most unlike what? (What is opposite to?) In what ways?
6. \_\_\_\_\_ is most like what? In what ways?

### Relationship

1. What causes \_\_\_\_\_?
2. What are the effects of \_\_\_\_\_?
3. What is the purpose of \_\_\_\_\_?
4. Why does \_\_\_\_\_ happen?

5. What is the consequence of \_\_\_\_\_?
6. What comes before \_\_\_\_\_?
7. What comes after \_\_\_\_\_?

#### Testimony

1. What have I heard people say about \_\_\_\_\_?
2. Do I know any facts or statistics about \_\_\_\_\_?  
If so, what?
3. Have I talked with anyone about \_\_\_\_\_?
4. Do I know any famous or well-known saying (e.g. "A bird in hand is worth two in the bush") about \_\_\_\_\_?
5. Can I quote any proverbs or any poems about \_\_\_\_\_?
6. Are there any laws about \_\_\_\_\_?
7. Do I remember any songs about \_\_\_\_\_? Do I remember anything I've read about \_\_\_\_\_ in books or magazines? Anything I've seen in a movie or on television?
8. Do I want to do any research on \_\_\_\_\_?

#### Circumstance

1. Is \_\_\_\_\_ possible or impossible?
2. What qualities, conditions, or circumstances make \_\_\_\_\_ possible or impossible?
3. Supposing that \_\_\_\_\_ is possible, is it also feasible? Why?
4. When did \_\_\_\_\_ happen previously?
5. Who has done or experienced \_\_\_\_\_?
6. Who can do \_\_\_\_\_?

7. If \_\_\_\_\_ starts, what makes it end?
8. What would it take for \_\_\_\_\_ to happen now?
9. What would prevent \_\_\_\_\_ from happening?

One of the major strengths of this form of heuristic search is its constant shifting back and forth from left to right hemisphere. Within each topoi group, the questions involve activity by both hemispheres. For example, in the "definition" topoi, students recall or look up the definition of their topic and thoroughly analyze it through the left hemisphere processing mode of analysis. However, in the same topoi group of questions, students must also compare their topics to other topics like or unlike theirs by forming patterns and relationships using the right hemisphere processing mode of synthesis. This integration of the hemispheres plus the visual aid of the range of land combine to provide students with a useful method of heuristic search.

## D'ANGELO'S TOPICS AND HEURISTIC PROBES

In his text Process and Thought in Composition, Frank D'Angelo creates a heuristic procedure which takes Aristotle's "common" topics or "topoi" and classifies them into ten categories. Under each category he lists specific questions which students should consider when trying to discover what they have to say about a subject. This discovery involves probing with both hemispheres of the brain.

When answering D'Angelo's questions, students must process information through analysis as they search for details, definitions, logical reasons, and examples. Yet students must also be able to synthesize these details into patterns, configurations of holistic categories, and relationships of cause and effect. Both hemispheres are involved in this recursive process.

Following is D'Angelo's classifications and heuristic probes for students to use when exploring a subject. By incorporating the information processing modes of both hemispheres, this procedure allows students to accumulate information and discover a focus for their writing during the pre-writing stage.

## IDENTIFICATION

Who or what is it?  
Who or what is doing it or did it?  
Who or what caused it to happen?  
To whom did it happen?

## ANALYSIS

What are its pieces, parts, or sections?  
How may they logically be divided?  
What is the logical order?  
What is the exact number?

## DESCRIPTION

What are its constituent parts?  
What are its features or physical characteristics?  
How is it organized in space?

## CLASSIFICATION

What are its common attributes?  
What are its basic categories?

## EXEMPLIFICATION

What are some representative instances, examples or illustrations?

## DEFINITION

What are its limits or boundaries?  
What are its classes?  
What are its common attributes?  
What is its etymology?

## COMPARISON

What is it like?  
How is it similar to other things?  
How does it differ from other things?

## NARRATION

What happened?  
What is happening?  
What will happen?  
When did it happen?  
Where did it happen?



## PROCESS

How did it happen?  
How does it work?  
What are its stages or phases?  
How do you make it or do it?

## CAUSE AND EFFECT

Why did it happen?  
What are its causes?  
What are its effects?  
What is its purpose?  
How is it related causally to  
something else?

(D'Angelo, p. 44-5)

Although lengthy with its thirty-five questions, this procedure allows students to thoroughly examine a subject before they start writing. Based in classical invention, D'Angelo's topics and heuristic probes incorporate both hemispheres of the brain.

## CUBING

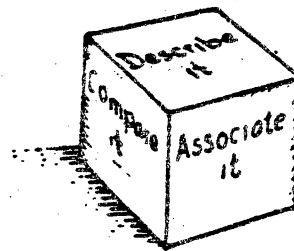
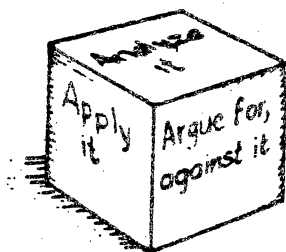
In Writing: Brief Edition, Elizabeth Cowan has taken Aristotle's "topoi," discussed earlier in this work under "Classical Invention," and very succinctly synthesized them into six statements. Each statement represents a point of view or perspective from which students can view their subjects during pre-writing. She incorporates these points of view with brainstorming to form what she calls "cubing."

Cubing is a pre-writing rhetorical strategy which helps students find a focus for their writing by incorporating the hemispheres. To guide brainstorming, cubing forces students to look at their topics from six distinct points of view for a total of three to five minutes for each perspective. Within eighteen to thirty minutes, students have brainstormed a topic thoroughly, discovering various approaches from which they can structure their writing.

First of all, students must imagine the visual image of a solid block or cube. The best visual aid would, of course, be an actual block, but a picture of one can serve the purpose of stimulating the visual right hemisphere. Each side of the cube has directions written on it. Following the directions given, students respond to each direction quickly, for no more than five minutes per side, putting down

thoughts, ideas, or details as they are recalled from the analytic left hemisphere. To be effective, cubing must be done rapidly, in succession, and must address each side of the cube. The objective is to look at the topic from all perspectives, not merely to find details about the topic. The following directions are written on the cube.

1. Describe it.
2. Compare it.
3. Associate it.
4. Analyze it.
5. Apply it.
6. Argue for or against it.



(Cowan, p. 21)

First, students are told to describe their topic. This requires visualizing it as an over-all entity with the holistic processing mode of the right hemisphere. However, the details of that topic must be perceived by the left hemisphere as it becomes aware of the parts that make up that whole. The senses should be considered as students try to quickly determine what the topic looks, smells, sounds, tastes, and feels like. Colors, shapes and sizes are considered during this first, descriptive step.

Next, students are told to compare their topic. They can say what the topic is similar to, how it is similar to that object, or even why it is similar. They also tell what the topic is different from, in what ways it is different, and even why it is different from this other object. For this part of cubing, the right hemisphere must form relationships and patterns from the details of the two objects or topics.

Third, students must associate their topic. As an extension of step two, this association requires students to write anything at all which comes into their minds which can be related to their topic. They can write similar things, different things, different times, places, people, etc. The right hemisphere's talent for synthesizing parts into wholes and forming associations with them comes strongly into focus in this part of cubing.

Fourth, students must analyze their topic. They must take it apart, discover its parts, tell how it is made. This part-specific task is processed in the analytic left hemisphere and will help students to discover information about their topic from a detailed perspective.

Fifth, students must apply their topic. They discover how it can be used, what it can be used for, what they can do with it. Often, creative, non-practical uses for their topic appear which can lead to an interesting, imaginative piece of writing.

Last, students are to argue for or against their topic. They must take a stand and give reasons for that stand. The logical talents of the left hemisphere come into focus here as rational arguments are drawn.

The cubing process, done swiftly and in sequence, provides a rich source of materials for students to consider during pre-writing. When deciding what to say about their topic, students can look over their cubing notes and find an area of interest, an area that perhaps brought a smile to their faces as they were swiftly considering it, or an area which they want to further develop before they start writing. Demonstrating a strong integration of the hemispheres, cubing will always give students something to say about any given topic.

## BURKE'S PENTAD

The pentad created by twentieth century rhetorician Kenneth Burke is often associated with Aristotle's "topoi." Burke has created a heuristic of five terms, each leading logically to related questions which will help students gather resources for their writing. Although Burke intended this pentad as a means to "help a critic perceive what was going on in a text that was already written" (Burke, p. 332), his heuristic probes can be applied to the writing process.

Terming his questions as "dramatistic" to stress language primarily as a mode of action rather than as a mode of knowledge, Burke gives credit to the Medieval Latin hexameter of "quis" (who), "quid" (what), "ubi" (where), "quibus auxiliis" (by what means), "cur" (why), "quomodo" (how), and "quando" (when) as the original basis for his pentad. Like contemporary journalistic probes, Burke's pentad uses the following terms and questions:

ACT	What was done?
SCENE	When or where was it done?
AGENT	Who did it?
AGENCY	How was it done?
PURPOSE	Why was it done?

In an article entitled "Kenneth Burke and the Teaching of Writing," Joseph Comprone has systematically taken the probes of Burke's pentad and applied them to the teaching of writing. Because he has given specific teacher directions which transform the pentad from a tool for literary analysis to a tool for the teaching of writing, I will give Comprone's directions and comments in their entirety but will add my own commentary explaining how this heuristic method activates both hemispheres of the brain.

ACTION    What is happening in this writing as far as readers are concerned? (Answers to this question might entail discussion in workshops of what the reader sees in the writing so far. In other words, the writer, with the help of workshop interaction, hears what readers find in the scene or context suggested by the writing.)

(Comprone, p. 338)

This probe involves both right and left hemispheric activities. First, discussion is suggested which involves the verbal left hemisphere and helps with the learning process discussed by Vygotsky as the relationship between thought and language (Vygotsky, p. 153). The readers of the writing are asked to "see" what is involved in the writing, to form a visual, holistic image of the over-all pattern of the writing thus far.

AGENT    Who is writing this piece? (This question would enable writers to hear how they sound to readers, to comprehend how the signs they have put on paper create an image of themselves for readers.)

(Comprone, p. 338)

With this heuristic, students are asked to take the information given about the author through the subtleties of voice, tone, point of view, etc. and form an image of the author. This process of synthesis takes place in the right hemisphere.

AGENCY How are writers achieving their ends? What formal route is being taken to the final destination? (These questions would encourage writers to see pattern and design as a means of acting on readers. Burke's most pointed theory as far as this approach to the middle stage of the composing process is concerned is his idea that form is "correct" only in so far as writers are gratifying needs, fulfilling expectations that their own symbolic actions have created in their readers. What does this signify for a student writer remaking a first draft in a process-oriented classroom? It means that the simultaneous looking back and looking ahead to what has been acted out and what might be acted out for readers becomes the writer's main concern. Classroom discussions, private conferences, heuristically-directed questioning become the teacher's means of creating the writer's peculiarly swivel-necked way of looking back and ahead simultaneously, seeing form as established in what has already been said and completed in what has not yet been said.)

(Comprone, p. 338)

For this part of the heuristic probe, students are to look at the details of form (a left hemisphere analytic task) to discover how the writer is accomplishing what he/she set out to do. It is the right hemisphere, however, that draws relationships with these specific forms (or patterns and designs to use Comprone's terms) to determine the over-all



"formal route" used by the writer. The discussions and conferences held during this step further integrate the verbal left hemisphere.

SCENE At this middle stage in the writing process, how has the context, the original field of experience from which symbolic action has evolved, changed? Can the writers take on perspectives in incongruity, seeing the original field (scene) as readers might see it, matching their own terministic screens with those that others might create? (With this sequence of questions we should as teachers remember Burke's admonitions concerning dichotomous modes of thought and the search for logical fallacies and contradictions. People, Burke suggests, naturally think in dialectical terms, posing one screen against another. But the writing teacher can probably best teach writing by encouraging students to take on multiple perspectives without denying the integrity of their own. Writers should learn to hold and support their own views, but in the end the result of the various interactions within the composing process should be to alter that initial screen by having reflected on it the shadows of other perspectives.)

(Comprone, p. 339)

To understand Comprone's adaptation of Burke's pentad for this step in the heuristic search, I will restate the probe as I see it. Has the writer learned any perspectives of the world (terministic screens) which might alter his/her own original view of the world and thus change the context from which he/she is writing? To deal with this step, the writer must be aware of similarities and differences which exist between his/her terministic screen (view of the world) and

those of others--his/her audience. This complexity of comparisons involves analyzing one's own "terministic screen" and analyzing the "terministic screens" of others, a left hemisphere activity. Forming comparative patterns with this information, however, involves the right hemisphere through synthesis. The purpose of the writing, Comprone tells us, should be to help the writer hold on to his/her own view of the world while becoming aware of other views and altering his/her own as he/she sees fit after reflection. The "scene," therefore, may change during the writing process if the left and right hemisphere activities described in this stage of the heuristic search are followed by the writer.

PURPOSE Why is this piece being written? (Counter to the approaches of many current rhetoricians and teachers, the pentad suggests to us that considerations of purpose should not control the entire writing process. In fact, they should be ignored until after the first draft has been composed, and then they should be considered in an equal equational relationship with the other elements of the pentad.)

(Comprone, p. 339)

This final step in the pentad allows for the discovery of an over-all purpose for the writing. It forces students to "see" beyond the details of form and reasons for individual sections of the writing, and it instead makes the students "see" the writing holistically--as an entity in itself with an over-all purpose.

Burke's pentad approach to writing allows writing to be taught as a process. As Comprone's application of the pentad shows, this set of five heuristic probes stresses critical skills and processing modes of both hemispheres of the brain.

## PARTICLE, WAVE, FIELD HEURISTIC PROCEDURE

Rhetoricians Alton Becker and Richard Young joined with linguist Kenneth Pike to create a heuristic procedure for the exploration of a subject (which they refer to as a "unit of experience") during pre-writing. Their procedure involves changing the "perspectives" with which students view their subjects. Shifting perspectives, as we found with Burke's pentad, involves a shifting back and forth between the left and right hemispheres of the brain. The heuristic which is used during this shifting process provides structure for the students' search and results in a wealth of material generated during the pre-writing stage.

When students begin to explore a subject or unit of experience, they should, according to Young, Becker, and Pike, view that subject from three separate perspectives--as a particle, as a wave, and as a field. First, the unit would be explored as a static, isolated entity--a "particle." From this perspective, the unit would be logically, almost clinically, analyzed piece by piece using the analytic talents of the left hemisphere. Second, the unit would be explored as a dynamic object or event--a "wave." From this perspective, the unit would be explored for change, requiring the right hemisphere to perceive patterns of change as it begins to

synthesize the new arrangement of information. Third, the unit would be explored as part of a larger context--a "field." To take the field perspective means to focus on the relationship (patterns, structures, organizational principles, networks, systems, and functions) that connect this unit to other units in a larger system. Once again, the right hemisphere must form associations and create patterns with the relationships formed. Thus, the hemispheres become cooperatively involved in this activity.

Viewing a unit of experience from these three perspectives would certainly increase the information a student could gather during pre-writing. However, Young, Becker, and Pike increase the potential of this heuristic search by adding three characteristics for a unit which can be explored within each perspective. These three characteristics are the contrastive features of the unit, the variant forms of the unit, and the distributions of the unit in larger contexts. The contrastive features focuses on how this unit differs from everything else. The variant forms deals with how much the unit can change and still be itself. Finally, the distributions of the unit involves how the unit fits into larger systems of which it is a part. These three characteristics are then combined with the three perspectives from which the unit was explored.

To aid students in exploring these three characteristics of a unit within the three perspectives of particle, wave,

and field, Young, Becker, and Pike have created a set of heuristic probes which ask specific questions for exploration. All of the questions should be explored in each area to allow for extensive search and a clear understanding of the unit being explored.

In Rhetoric: Discovery and Change, Young, Becker, and Pike have combined all of their perspectives, characteristics, and heuristic probes into a chart. This chart can stimulate the right hemisphere by allowing students to holistically visualize this rather complex over-all heuristic procedure. It can also stimulate the left hemisphere by allowing students to logically follow this step-by-step procedure through to its completion. Without this chart as a visual aid, Young, Becker, and Pike's procedure is confusing to students because of its complex, detailed operations. However, when given this chart, students follow the heuristic procedure with relative ease and explore their subjects thoroughly as they shift back and forth between the right and left hemispheres of the brain. The following is a copy of their chart.

	Contrast	Variation	Distribution
<b>PARTICLE</b>	<p>1) View the unit as an isolated, static entity.</p> <p>What are its contrastive features, i.e., the features that differentiate it from similar things and serve to identify it?</p>	<p>4) View the unit as a specific variant form of the concept, i.e., as one among a group of instances that illustrate the concept.</p> <p>What is the <i>range</i> of physical variation of the concept, i.e., how can instances vary without becoming something else?</p>	<p>7) View the unit as part of a larger context.</p> <p>How is it appropriately or typically classified? What is its typical position in a temporal sequence? In space, i.e., in a scene or geographical array. In a system of classes?</p>
<b>WAVE</b>	<p>2) View the unit as a dynamic object or event.</p> <p>What physical features distinguish it from similar objects or events? In particular, what is its nucleus?</p>	<p>5) View the unit as a dynamic process.</p> <p>How is it changing?</p>	<p>8) View the unit as a part of a larger, dynamic context.</p> <p>How does it interact with and merge into its environment? Are its borders clear-cut or indeterminate?</p>
<b>FIELD</b>	<p>3) View the unit as an abstract, multidimensional system.</p> <p>How are the components organized in relation to one another? More specifically, how are they related by class, in class systems, in temporal sequence, and in space?</p>	<p>6) View the unit as a multidimensional physical system.</p> <p>How do particular instances of the system vary?</p>	<p>9) View the unit as an abstract system within a larger system.</p> <p>What is its position in the larger system? What systemic features and components make it a part of the larger system?</p>

(Young, Becker and Pike, p. 127)

## CONCLUSIONS

Pre-writing should be a time for thinking before writing--a time for one to uncover what is already known about a topic and to discover what can be learned about that topic. Pre-writing should allow students to "let their minds run wild" as they explore their topics for information and areas of interest for their writing. To guide this process of discovery, students and teachers need to become aware of specific rhetorical strategies for this pre-writing process.

Brain research is suggesting that each hemisphere of the brain specializes in different functions and processes information in different ways but that hemispheric interplay and crossover of hemispheric functions allow the hemispheres to cooperate with one another. Studies have shown that lateral dominance affects our functioning abilities within these modes but that, with experience, everyone can learn to draw on the other non-dominant hemisphere of the brain more effectively. Since most students will perform better using the functions and information processing modes of one hemisphere over the other, students and teachers need to be aware of strategies which will capitalize on this hemispheric strength and stimulate hemispheric cooperation. For example, if a student is strongly oriented to the visual-spatial mode



of the right hemisphere and is, therefore experiencing difficulty in learning the pre-writing left hemisphere strategy of outlining in a sequential, linear fashion, he/she should be allowed to work within the strengths of the visual-spatial right hemisphere by using mapping techniques to "see" where his/her writing is going. Pre-writing rhetorical strategies should take into account the hemisphericity of the brain.

More research needs to be done in the area of lateral dominance, which, at this writing, is believed to be determined before birth. A major area of need is research in determining if someone who has a strong dominance in one hemisphere can build up the other hemisphere to an equal strength. For example, if someone shows dominance in the left hemisphere, can he/she strengthen the right hemisphere's functions and information processing modes to equal the strength of the left hemisphere?

Further research should be conducted in unlocking the pathways to the limbic system of the brain, that system which controls the emotions. Although some research has been done over the past twenty years by behavioral scientists who wish to alter behavior by controlling the limbic system, more studies are needed to determine if, indeed, the emotions are controlled by the right hemisphere, how they are controlled, and how teachers of writing can tap into that emotive system during the writing process.

The whole concept of writing as a mode of learning needs to be further studied. Lev Vygotsky opened up the possibility of the relationship between thought and word as the key to learning. Janet Emig has studied student writers to uncover the learning process of writing, especially that learning triggered in the subconscious through emotions and intuition. More research needs to be done in these areas to relate writing and learning by searching for ways to unlock the subconscious mind during the writing process.

Cognitive psychologists continue to research modes of cognition or learning styles. Research needs to be continued in this area and joined with protocol research on writers so that correlations can be drawn between modes of cognition and the information processing modes of the hemispheres. This research would be of interest to teachers who teach a wide variety of students whose learning modalities and hemispheric functions and processing modes differ extensively within any given classroom. Such research could lead to the creation of teaching strategies for writing which would further stress the cognitive and hemispheric strengths of students.

Aside from the need for further research, the immediate need is for teachers and students of writing to become aware of hemispheric differences and the relationship these differences have to the teaching of writing. Teachers must teach to those differences by presenting rhetorical strategies

during pre-writing which will activate the functions and information processing modes of both hemispheres.

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