

Using Gestalt Theory to Teach Document Design and Graphics

Patrick Moore

The University of Arkansas at Little Rock

Chad Fitz

Systematics, Inc., Little Rock, Arkansas

Gestalt psychology principles of figure-ground segregation, symmetry, closure, proximity, good continuation, and similarity provide a simple yet powerful analytic vocabulary for discussing page layout and graphics. The six principles apply readily to typography, white space, data tables and maps, the relation between graphics and text, and other facets of textual design. The principles explain many difficulties that readers have in processing texts and graphics, and they explain why well-designed pages and graphics are effective.

In "Toward a Rhetoric of Visuals for the Computer Era," Ben Barton and Marthalee Barton say that methods of teaching visuals in technical communication are impoverished because they are "strongly ad hoc, behaviorist and atheoretical" (128). They suggest three things: that as technical communication teachers we adopt a more rhetorical orientation to presenting visuals, that we develop better case studies for visuals, and that we apply principles from Gestalt psychology to improve the visual literacy of students (141). This essay develops the third of their suggestions.

Stephen Bernhardt's essay, "Seeing the Text," contains a useful application of Gestalt theory to a two-page fact sheet about wetlands. Our essay, however, differs from Bernhardt's treatment in several ways. We develop and illustrate six Gestalt principles, compared to Bernhardt's discussion of four. We also devote more space to graphical illustrations, tabular arrays of data, and integrating visuals into text. Aside from a small illustration of a duck floating in reeds, Bernhardt's one figure consists almost entirely of prose paragraphs, which are broken by headings, subheadings, and white space. We show how the principles of Gestalt psychology can be applied to many other kinds of

documents. Finally, at the end of our essay, we distinguish between Gestalt psychology and rhetoric. Gestalt psychology is not about persuasion; it is about perceiving organized structures and patterns. Bernhardt does not conflate Gestalt psychology and rhetoric, but neither does he sharply differentiate the two. We think that the distinction is worth making.

The principles of Gestalt psychology go a long way towards explaining why some documents are effective and why others seem visually confusing or badly designed. Because the basic principles of Gestalt psychology are relatively simple and extremely useful, students studying document design and graphics find them easy to learn and apply, and they find that the principles offer powerful strategies for making their own designs more effective.

After a brief overview of Gestalt theory, this article discusses and illustrates six key principles of Gestalt psychology. Then we present exercises that students may use to improve their understanding of the principles and develop their document design skills. In our conclusion, we distinguish between Gestalt theory and rhetoric.

An Overview of Gestalt Theory

Gestalt theory was developed by Max Wertheimer, Wolfgang Kohler, and Kurt Koffka. They rejected the prevailing structuralist ideas that complex perceptions could be best understood by breaking down experience into its simplest components. They believed that people perceive a structure of components that they treat as a whole or "gestalt." As Wertheimer explained it:

The fundamental "formula" of Gestalt theory might be expressed in this way: There are wholes, the behavior of which is not determined by that of their individual elements, but where the part-processes are themselves determined by the intrinsic nature of the whole. It is the hope of Gestalt theory to determine the nature of such wholes. (2)

In the illustration below, for example, it is easy to read that the individual elements are X's. But the figure that the viewer perceives in all the X's is a rectangle:

```

x x x x x x x x x
x                                     x
x                                     x
x x x x x x x x x

```

Gestalt theory tries to understand how viewers perceive wholes in groups of individual elements. (Because the focus of this essay is pedagogy and not a thorough discussion of the theoretical background of Gestalt psychology, readers who want more detailed information should see Wertheimer, Koffka, Rock, and Spoehr and Lehmkuhle.)

The next sections briefly summarize and illustrate some key principles of Gestalt psychology.

Figure-Ground Segregation

A figure is a shape that is perceived as being in front of or surrounded by a homogeneous background. We cannot perceive figures unless they are separate in some way from their backgrounds, for example, separated by their different size or contrast. We cannot read a letter clearly on a page if the letter does not appear to be surrounded by the white space of the page.

The figure-ground segregation is especially important for incorporating type into visuals. The type must be sufficiently separated from the other parts of the visual or the type will be hard to read. In the top third of figure 1, for example, the second "l" in "all" is hard to perceive immediately, as are the "m" in "majors" and the "a" in "alpha." Several other problems with figure-ground segregation are also illustrated by Edward Tufte in his chapter, "Data-Ink and Graphical Redesign." His illustrations show what happens when the grid on graph paper is too heavy for the type that is to be placed on it (91, 94). The grid can be so dense that it tends to be perceived as the figure, and thus it interferes with the clarity of the data that is mapped onto it. Similarly, with the wider availability of color today, document designers must be careful to make sure that their colors contrast sufficiently so that the figure can be readily distinguished from the ground.

Symmetry (Equilibrium)

According to Webster, symmetry refers to the perception of balance in the "size, shape, and relative position of parts on opposite sides of a dividing line." Asymmetrical elements on a page seem unstable, and they distract readers from the content of the message because readers expect elements on a page to be in equilibrium. The lack of equilibrium makes readers feel that something is wrong.

In figure 2, the lack of balance in the layout below the title does not give the reader any clear point from which to begin sorting the information, and it does not provide any clear sense of what path to take through the data. The reader is forced to scan around for a time to find where to begin. Because there is no natural place to start, the reader feels uncomfortable. Figure 3 corrects the problem by centering a line of text (i.e., "We carry a full line of computers and accessories") beneath the title, and next by centering the two columns of information about computers and accessories below the line of text. The three illustrations of computers are then centered at the bottom of the page. Compared to figure 2, figure 3 is highly symmetrical and provides a clear path through the information. Visuals that are not centered on

MEMO MEMO

TO: ALL PRE-HEALTH

MAJORS

FROM: ALPHA EPSILON

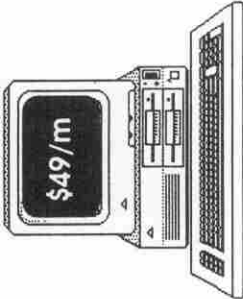
DELTA

THE PRE-HEALTH HONOR SOCIETY

MEET IN THE FOYER
 OF THE LIBRARY IN
 THE ED II BUILDING AT
 12:30 PM THURSDAY
 FOR A TOUR OF UAMS

Figure 1. An example of poor figure-ground segregation.

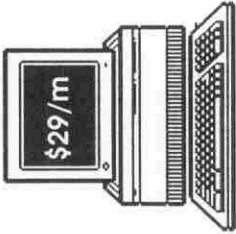
the page, visuals that use white space irregularly, and visuals that have other such symmetry problems make readers anxious about where to start processing information and make them wonder if something is not wrong with the page or design.



*We carry a
full line of
computers and
accessories*


✓ Modems
✓ IBM
✓ Zenith
✓ Toshiba
✓ Blue Chip
✓ and more!

✓ Disk drives
✓ Monitors



✓ Software
✓ Cables

✓ Printers



✓ Macintosh
✓ Wyse

O'Malley's Computer Emporium

Figure 2. An example of poor symmetry.

Closure

Closed areas, according to Koffka, "seem to be self-sustaining, stable organizations" (151). If an area is not closed, readers search in the local context of the page to see what the area belongs to and then they fill in the gaps in order to complete it. In figure 4, for example,

O'Malley's Computer Emporium

We carry a full line of computers and accessories

- ✓ IBM
- ✓ Macintosh
- ✓ Zenith
- ✓ Toshiba
- ✓ Blue Chip
- ✓ Wyse

- ✓ Printers
- ✓ Modems
- ✓ Disk drives
- ✓ Software
- ✓ Cables
- ✓ Monitors

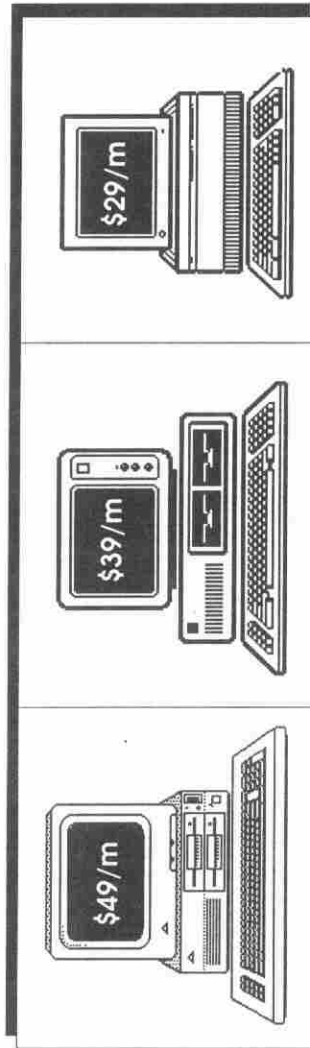


Figure 3. An example of improved symmetry.

the square in the foreground prevents complete closure of the circular shape, but the viewer fills in the blocked area and perceives a circle. If the area is already closed, as the square is in figure 4, then readers recognize it as complete and they proceed with their processing.

Lack of closure is often a problem when visuals are integrated into a text. If the visual is full of text itself (e.g., a table of data or an

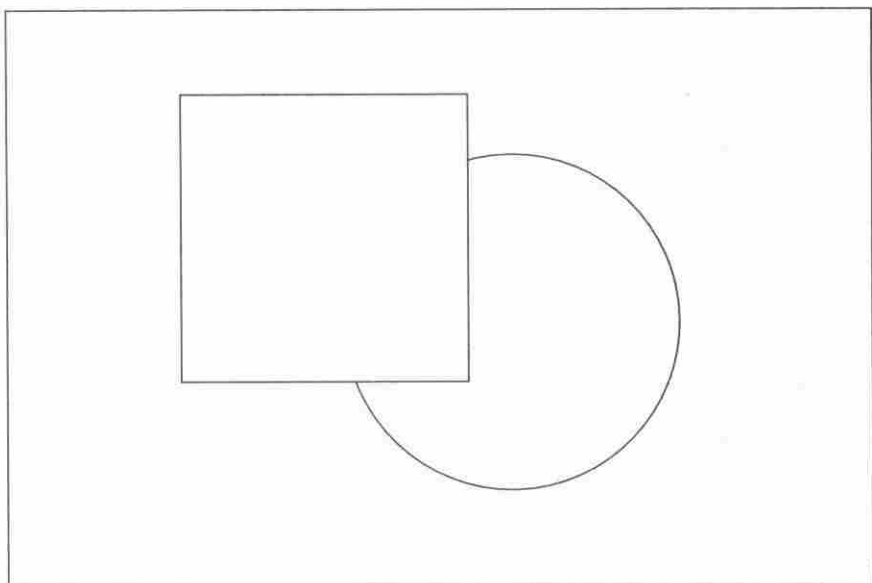


Figure 4. An example of clear closure.

illustration of a computer screen) and the visual has text above it and below it on the page, then the reader may not be able to see readily where the surrounding text breaks off and the visual begins. Figure 5 illustrates such a problem. Because the sense of closure seems to be disrupted in figure 5 and no obvious solution is presented immediately, the reader of figure 5 becomes confused, at least briefly, until he or she sorts out the illustration of the computer screen from the surrounding text. Drawing a box around the area, as illustrated in figure 6, will supply enough closure to stabilize the area and distinguish it from the surrounding text. Sometimes it is only necessary to draw a set of horizontal lines on the top or bottom of an area, or a set of vertical lines to the right and left, to give the area enough closure so that the reader can see it readily.

Proximity

According to Koffka, when an area "contains a number of equal parts, those among them which are in greater proximity will be organized into a higher unit" (164-65). For example, at first glance, the table in figure 7 looks like it has two groups of three columns each. But the content does not support such an interpretation. There are really three groups of two columns each, an arrangement that is better illustrated in figure 8. The designer of figure 7 violated the proximity Gestalt, clustering some columns together that should not have been. The improper proximity gives the wrong visual impression about how the information is to be grouped and used.

Section 7: Printing the Financial Statements and General Ledger Reports

7.1 Introduction

This section discusses how to print all of the financial statements and the general ledger reports.

The financial statements and general ledger reports menu is the second entry on the general ledger main menu. To call up the menu for the financial statements and general ledger reports, first press "2" and then the [Return] key. The screen illustrated below then appears on your computer terminal.

G/L Financial Statements and Reports

1. Balance Sheet and P&L (Post Journal Entries, Ending Balances only).
2. Balance Sheet and P&L (Previously Posted Balances, Ending Balances only).
3. General Ledger (Post Journal Entries, Print all Detail).
4. Comparison P&L (Current year, Forecast, Last Year).
5. Return to the G/L Master Menu.

Enter your choice? __

At this point in Section 7, we will branch into four subsections in order to examine each of these options in more detail. The fifth option, "Return to the G/L Master Menu," is self-explanatory.

In the sections that follow, we assume that the starting point of each section is the General Ledger report choices menu that is illustrated above.

Figure 5. An example of poor closure.

Another proximity problem often occurs when there are several visuals on a page and the heading associated with one visual is ambiguously close to several of the visuals, as in figure 9. The structure of figure 9 makes it harder to see right away which heading goes with which visual. Figure 10 corrects the problem in two ways: first by aligning the visuals side by side so that a heading can only fit easily at the bottom of each visual, and second by placing each heading unambiguously close to the one visual that it defines.

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Figure 6. An example of improved closure.

Good Continuation

The law of good continuation says that, other things being equal, human perception tends to continue a shape or form beyond its terminal point. As Koffka says, "any curve will proceed in its own natural way, a circle as a circle, an ellipse as an ellipse, and so forth" (153). For example, in figure 11 (suggested by figure 12.5 in Kanizsa) we tend to perceive a rectangle laid over four circles because we

Number of copies	Total cost	Number of copies	Total cost	Number of copies	Total cost
2	\$ 44	10	\$164	18	\$272
3	59	11	179	19	284
4	74	12	193	20	296
5	89	13	207	21	307
6	104	14	221	22	318
7	119	15	234	23	329
8	134	16	247	24	340
9	149	17	260	25	350

Figure 7. An example of poor use of proximity.

Number of copies	Total cost	Number of copies	Total cost	Number of copies	Total cost
2	\$ 44	10	\$164	18	\$272
3	59	11	179	19	284
4	74	12	193	20	296
5	89	13	207	21	307
6	104	14	221	22	318
7	119	15	234	23	329
8	134	16	247	24	340
9	149	17	260	25	350

Figure 8. An example of improved use of proximity.

continue the horizontal and vertical lines in the circles. The so-called "rivers" of white space in justified text (i.e., the vertical bands of white space that appear across several lines of text when spaces between words line up) are created by the law of good continuation working on stretched-out word spacing.

Good continuation is especially important in the design of tables. The vertical line of the columns must be continuous. In figure 12, for example, the good continuation between the column headings and the data in the individual columns is significantly diminished because of the light and bold horizontal lines and the other headings (i.e., "Developed Nations" and "Developing Nations") interspersed in the body of the table. All the horizontal lines inadvertently create areas of strong closure around groups of numbers, and the closure interferes with the reader's ability to connect the column headings with all the data in each column. Thus readers studying the bottom few items of the table may have trouble associating the data with the headings at the top of the page, because nine lines of various weights and several bold headings interrupt the good continuation between the column

Training at Bill's Career Center



Computer repair (six-month program)

Welding (nine-month program)



Construction (six-month program)



Carpentry (nine-month program)



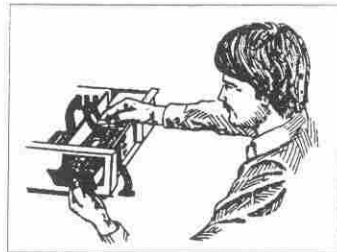
Figure 9. An example of poor use of proximity.

headings and their corresponding data. Figure 13 removes the unnecessary internal closure and improves the continuation by deleting the horizontal lines and by moving the two internal headings to the left margin. However, the word "Nations" still interferes slightly with the good continuation of the "College Graduates" column. Figure 13 could be improved further if the second word (i.e., "Nations") in the two interior headings were positioned under "Developed" and "Developing."

Training at Bill's Career Center



Welding (nine-month program)



Computer repair (six-month program)



Construction (six-month program)



Carpentry (nine-month program)

Figure 10. An example of improved use of proximity.

Similarity

The law of similarity, says Bernhardt, "suggests that units which resemble each other in shape, size, color, or direction will be seen together as a homogeneous grouping" (72). For example, changes in spacing, typesize, or typestyle suggest a change in subject matter, emphasis, or focus. However, if the spacing, typesize, or typestyle

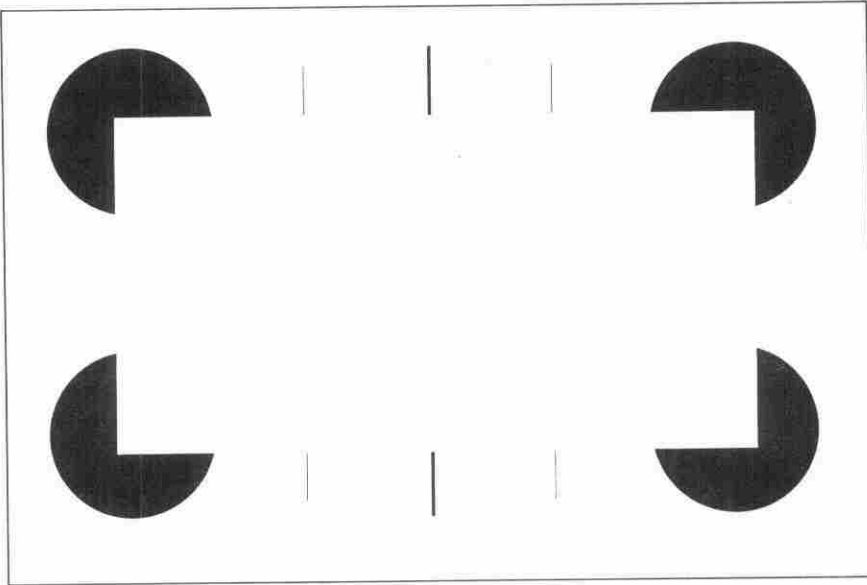


Figure 11. An example of good continuation.

changes but the subject matter, emphasis, or focus does not, the reader will be confused. Similarly, if the typesize, typestyle, and spacing remain the same, even though changes have occurred in the content of the text, the reader will also be confused.

Desktop publishing beginners often make frequent changes in typesize or typestyle for their own pleasure. But they fail to recognize that such changes, unless they have a clear textual motivation, will confuse readers, who will try to make the changes in typography consistent with some pattern of change in the content of the text. Figure 14 represents a piece of instruction documentation similar to one submitted by a student who had just purchased a computer system. Some people find the typographical design of this document so busy that they feel very stressed trying to read it. Figure 15 corrects the violations of the similarity law represented in figure 14 and allows readers to perceive the information with much less stress.

Applying the Principles of Gestalt

Carefully applying the laws of Gestalt to one's textual and graphic designs is one way to create effective texts and graphics. Figure 16 is a graphic developed by a student, Stephanie Zerkel, to illustrate the numerous test failures of an airline pilot whose errors on a commercial flight killed many people.

Scientific "Brain Power" Around the World^a

Country	College Graduates ^b	Scientists	Engineers	PhD.s
United States	979.5	180.7	77.1	393.3
Developed Nations				
USSR	839.5	61.7	352.3	N/A
Japan	378.7	33.5	74.5	23.5
Germany	172.5	35.4	30.2	22.3
France	164.4	30.6	15.0	53.9
Britain	132.7	31.4	17.0	37.4
Canada	118.9	21.1	8.4	19.8
Developing Nations				
Brazil	244.6	34.1	20.0	8.9
China	227.7	44.7	72.7	14.2
Philippines ^c	212.0	26.3	23.4	N/A
South Korea	155.0	16.9	21.9	20.7
Mexico	112.8	20.4	25.3	8.0
Egypt	101.0	11.4	9.3	10.4

^aSource: United Nations Educational, Scientific, and Cultural Organization (UNESCO), *Statistical Yearbook, 1988*, Tables 3-10; pp. 3-306.

^bAll figures are thousands.

^cFigures for the Philippines are based on estimates.

Figure 12. An example of poor continuation.

Zerkel's graphic is effective for many reasons.

1. The words are sharp and bold to create effective figure-ground segregation. Because Zerkel uses a light screen to set the graphic off from the surrounding text (which is not included here), the bold font guarantees that the figure-ground segregation will be clear.

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Country	College Graduates ^b	Scientists	Engineers	PhD.s
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Figure 13. An example of improved continuation.

2. The graphic is generally symmetrical, though a half an inch might have been trimmed off the right side to make the five listed items seem more centered.
3. Zerkel creates strong closure with the horizontal bars at the top and bottom. She strengthens the sense of closure with the light screen, which compensates for the lack of vertical lines to bound the right and left sides of the graphic.

2.2 The GROUP DIRECTORY DISPLAY FACILITY

The Group Directory Display (GDD) facility of CZY-MB allows you to **view** the group directories that are maintained within the system mainframe with the help of the Group Directory Maintenance (GDM) facility.

ENTERING THE GDD FACILITY

The GDD facility can be initially implemented directly from the GIP, or main page, of the CZY-MB system. Simply **type GDD** in the *verb* field and press **ENTER**.

Next, **type** the **GROUP CODE** in field *p1* and press **ENTER**.

Note: Field *p2* is not used by this facility. *It should be left blank.*

After a few seconds, the **GROUP DIRECTORY DISPLAY** screen will appear on your monitor. The **GROUP CODE** that you selected should be displayed in the *group* field on the top center of your monitor. The operator IDs of the specified group will now be listed left to right on your monitor.

Another group can be viewed from the GDD page simply by typing the **GROUP CODE** in the *group name* field and pressing **ENTER**.

If the list of operator IDs occupies more than one screen, the **PAGE FORWARD/BACKWARD** keys found on the right hand side of your keyboard will allow you to **scroll** through the entire listing. No portion of this list will be lost.

Figure 14. An example of poor similarity.

4. She uses the proximity Gestalt by placing each representation of the airplane close to its accompanying text.
5. Zerkel makes very effective use of the good continuation Gestalt by representing a sequence of planes, each diving lower and lower toward the fatal end. The reader can almost see the plane diving into the ground. However, the strong sense of

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Figure 15. An example of improved similarity.

- causality suggested by the use of good continuation could be seen as inappropriately rhetorical.
6. She applies the similarity Gestalt by using the same typesize and typestyle for the five numbered lines, and by using the same plane for each numbered item, except, of course, for the last one, where the plane disintegrates.

Tests Bruecher Failed

1. FAA instrument test 
 2. Pilot-in-command test 
 3. Pilot-in-command test (second time) 
 4. Captain of passenger plane test 
 5. Continental Flight 1713 
-

Bruecher failed four important tests, but Continental failed also; they did not fully check into Bruecher's background.

Figure 16. An example of Gestalt principles applied.

In short, then, this graphic is made effective by Zerkel's conformity to the Gestalt principles, and it is made dramatic and interesting by her imaginative use of the continuation Gestalt.

Classroom Exercises

Classroom exercises for teaching Gestalt theory can be developed in several ways. Instructors who prefer to teach inductively can use an overhead projector to present samples of bad applications of Gestalt principles such as the ones that we have used to illustrate this article. Students can then be asked to explain why the visual is confusing. Or instructors can present the sample bad application of the Gestalt principle and then show the improved version and ask students to infer the principle. These kinds of activities can take place in small groups or in a presentation to the entire class.

After students have learned the principles of Gestalt psychology, an instructor can ask students to find examples of Gestalt violations in fliers or other documents. Students can make transparencies of the bad page or graphic, write a one-page analysis, and then put their transparencies on the overhead projector and present their analysis to the class.

Students can also revise the document with the bad Gestalt and then explain to the class how the revision eliminates the defects of the old design and, if applicable, how their revision uses other Gestalt principles to improve upon the design of the original. Figures 17 and 18 represent the before and after versions of one such exercise, again by Zerkel. Figure 17 had problems with symmetry, closure, and proximity Gestalts, and even the figure-ground segregation was affected because the letters were so poorly handwritten that some letters (e.g., e's and a's) were hard to distinguish. The revision eliminated these problems and added the image of the house so the reader could immediately identify what was being sold. If instructors want to emphasize the rhetoric of visuals, then they may request that students consider any possible rhetorical effects that are enhanced by violating or conforming with the Gestalt principles. For example, the messy handwriting and other Gestalt problems in figure 17 could suggest that the house is a bargain and that the seller is unsophisticated.

Conclusion

Knowing the principles of Gestalt psychology can give students a vocabulary for analyzing the visual dimensions of their document and graphic designs. As Barton and Barton point out in their article, however, Gestalt theory is limited. Gestalt theory focuses on cognitive perception: how the human brain—any human brain—groups distinct shapes, how it distinguishes a figure from a ground, how it continues a shape beyond its terminal point, and so on. Gestalt psychology is not about such rhetorical concerns as the individual character of a speaker or audience, human emotions, argumentation, and so on. That is, Gestalt psychology does not address some of the most important characteristics that make us human: our capacities for belief and for feeling emotions.

In figure 16, for example, the Gestalt principle of similarity enables the reader to see that the four shapes that resemble airplanes are all the same, despite the fact that each succeeding one seems to rotate clockwise a few degrees and to drop lower on the page. This similarity suggests that the four shapes at the ends of lines 1 through 4 represent the same thing. The principle of good continuation enables the reader to see the airplane-like shape continuing beyond its last representation into the blob of ink that represents a crash at the end of line 5.

But much of the rest of figure 16 is the domain of rhetoric: If the reader is persuaded that these visual representations are true, then that is rhetoric. If these representations arouse a reader's emotions, then that is rhetoric. If the reader believes that the information in figure 16 represents a failure of the pilot and his airline, then that is rhetoric. And if the reader believes that all of these failed tests contributed to the ultimate fatal airplane crash, then that is rhetoric. Gestalt theory,

HOUSE FOR SALE
 BY OWNER - BROADMOOR AREA
 1400 SF, 3br 1.5 ba, fully insulated
 All Brick, Double Driveway, Landscaped
 (save \$4,000 Realtor Fee)

CENTRAL H & AC
 NEW YW carpet (Hardwood underneath)
 NEW VINYL FLOORING
 NEW DRAPES & ALUM MINIBLINDS
 FLOORED STAIR-UP ATTIC (100SF)
 STORM DOORS & WINDOWS
 Good Roof Gourd Tiles

HOUSE FOR SALE
 (BY Owner--Save \$4000 Realtor Fee)
 1400sf, Broadmoor Area (Near UALR)
 All brick, full insul, storm drs & wd
 3 bdr, 1.5 ba, floored stand-up att
 New w/w carpet (hdw flrs underneath)
 New vinyl firing, drapes, dbl drive
 Landscaped yd, 10x12x16 SPAR bldg
 Alum miniblinds, ONLY \$57,500
 Call Jane 123-4567 or 987-6543

\$57,500
 CALL JANE
 123-4567 or 987-6543

Figure 17. A poor use of Gestalt principles.

then, says nothing directly about the impact of a document or graphic design on a reader's beliefs and feelings; that is, Gestalt theory says nothing about the rhetoric of a design. But in some situations, such as figure 16, the rhetoric of a design may be of overwhelming importance. In other situations, for example, figure 11, rhetoric may have little or no importance.

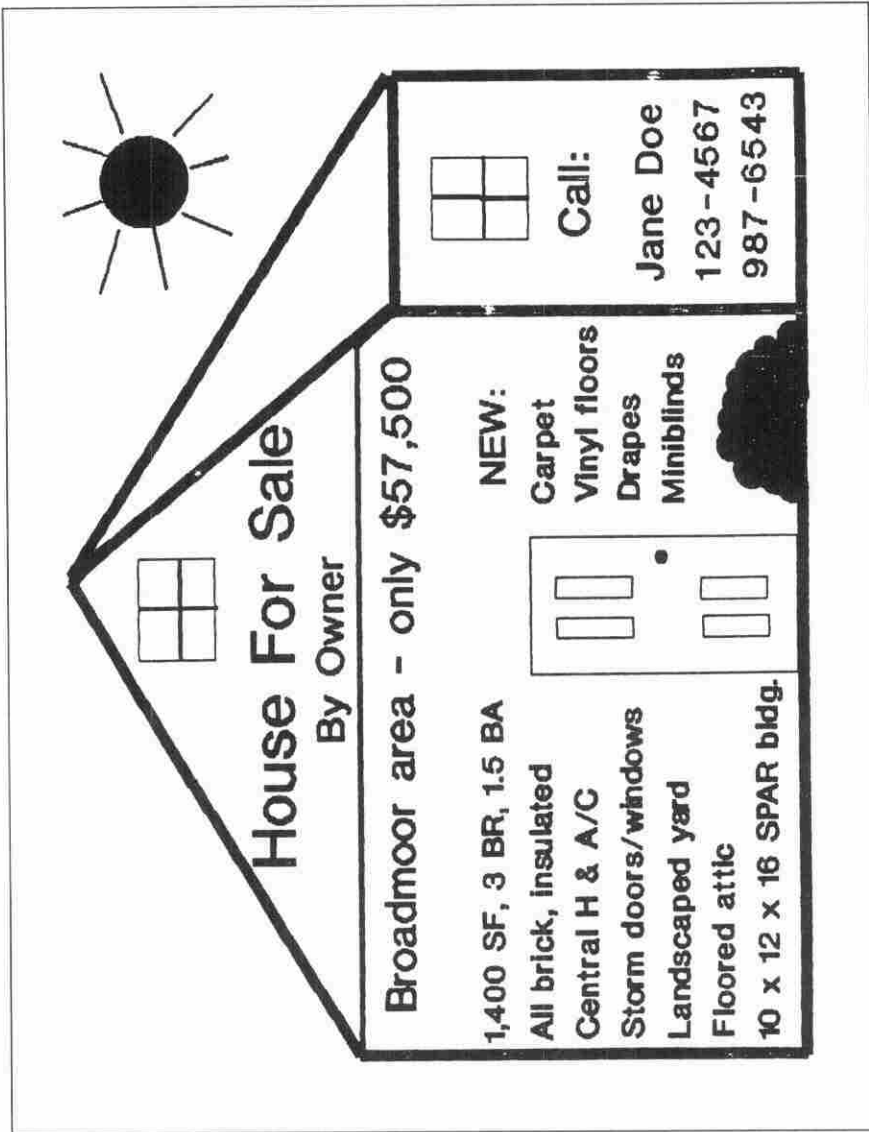


Figure 18. An improved use of Gestalt principles.

But knowing Gestalt theory will help students understand why the rhetoric of some document or graphic designs persuades an audience, while the rhetoric of other designs fails. For example, if many or even several of the Gestalt principles are violated in document design, the reader will be so distracted that he or she may not understand the rhetorical message. Teachers might also use the principles of Gestalt

psychology as a transition to a discussion of the rhetoric of visual design. Thus, even though the principles of Gestalt are limited, they offer an important approach to explaining how to make document and graphic designs more effective, an approach that students have found to be very effective, useful, and easy to learn.

Acknowledgement

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Patrick Moore teaches document design, instrumental discourse, the politics of professional communication, and instruction writing at the University of Arkansas at Little Rock. His articles have appeared in *The Technical Writing Teacher*, *Journal of Business and Technical Communication*, *The Bulletin of the ABC*, *The Writing Instructor*, and other journals. He has written over sixty computer software manuals.

Chad Fitz has over four years of experience in document design and is currently a technical writer at Systematics Inc. in Little Rock, Arkansas. He holds a Master's degree in Technical and Expository Writing from the University of Arkansas at Little Rock.