**Question 1 (15 points)**

Consider the design shown in Figure 1 and answer the following questions. Justify your answers and strengthen your arguments/conclusions with reference to relevant concepts, principles, theories, heuristics, or other considerations.

1. What is the primary purpose of the design? (**5** pts)

The ultimate goal of information visualization is to let viewers gain insights. Likewise, with the information provided by this visualization, the primary purpose of this design is to let viewers know about the career life of the authors of 100 best english novels of 1990. In other words, using the original words from the visualization, is to convey “the authors of the 100 best english novels of 1900 accodring to the Modern Library ranking”.

The top left side of the visualization are heavily text based explanations. The primary purpose of this section is to mention the topic, briefly explain the elements of the circles, list data sources and references.

The bottom left side are sample circles explanations , the primary purpose of this section is to guide viewers how to read the graphic visualizations on the right side. By looking at these explanations, the first important thing is that it tells how circles are ordered: from the earliest success to the last. The second information is there are eight detailed information in the visualization, and splitted in two parts: title and circle.

The right side is the graphic visualization, the primary purpose is to transform raw data to visualization, in order to convey the career and life history of authors to the viewers.

1. Which part of the design is particularly effective to serve the intended purpose? Why? (**5** pts)

Based on Gestalt principles, a natural grouping should be constructed with similarity, proximity, alignment, conformity and common fate. In this design, each section shows some of them, which are particularly effective to serve the intended purpose.

For similarity, the text explanation section uses only letters, while the graph section is using a similar format: title above the circle, author name above and numbers plus city below and the same dot orders and triangle colors.

For proximity, the text explanation section uses the same line margin, while the objects in the graph section have the same distance to each other.

For alignment, the text explanation section aligns the text to the right, and the objects in the graph section are aligned as well.

For conformity, the text explanation section uses letters only and the graph section uses title plus circle graph only.

For common fate, the graph section uses clockwise direction for the circles, so it is effective for viewers to group them together naturally.

1. Does any part of the design have weaknesses that may hinder its effectiveness? Why? (**5** pts)

In the previous question, the discussion of effective parts of the design is based on the sections, it is because as an entirety, the design lacks similarity, proximity, alignment, conformity and common fate according to Gestalt principles.

For similarity, the text explanation section uses only letters, while the other two sections use both letters and graphs.

For proximity, each section uses different distance standards.

For alignment, the text explanation section aligns to the right, the graph section aligns to each other, but in the instruction section the first paragraph aligns to the right and the rest aligns to the circle samples.

For conformity, the text explanation section uses only letters, while the other two sections use both letters and graphs. In other words, each section uses a different structure format therefore they seem unrelated.

For common fate, it takes a lot of time to distinguish three section’s relationship and group them together with a pattern.

According to “First Impression”: A simple object will communicate more quickly than a detailed object with a hard to recognize contour. The long paragraph in the text explanation section is “a hard to recognize contour” in this situation, it makes viewers take a lot of time to read and understand the content.

Based on the “Law of Prägnanz”: Our mind fills the gaps effortlessly. In this design, three sections are separated, they have their own format and are hard to find a trend, therefore it is hard for our mind to fill the gaps in order to connect them together.

For “Continuity”, the triangles in the circles are different, they are not in a straight line or a smooth curve that can be perceived as a group.

For “Closure”, the three sections have their own format to align and present, therefore it makes them more separate to each other, making the design no longer an integral.

For “Uniform Connectedness”, the triangles in the circles have different quantities, colors and shapes, therefore it is hard for viewers to compare and group them together.

**Question 2 (10 points)**

Consider the redesign shown in Figure 2 and answer the following questions. Justify your answers and strengthen your arguments/conclusions with reference to relevant concepts, principles, theories, heuristics, or other considerations.

1. What do you think are some of the most significant changes made in the redesign? (**3** pts)

It removes the text explanation section, simplifies the instruction section and moves it to the header. For the chart section, remove many raw data information: city names, novel ranking numbers, age numbers. Transform circles to straight lines, render career life data as curved lines. Use age as X axis and name as Y axis, no other raw data(texts or numbers). Assign colors to continents and apply the colors to both straight and curved lines. Align everything to the left and use the same distance relatively.

1. In your opinion, what are key advantages of redesigned visual encoding over the original design? Why? (**4** pts)

For similarity, all the graphs use the same format: author’s name on the left, use a straight line to represent the life span, curves to represent the masterpieces.

For proximity, all lines have the same distance to each other.

For alignment, everything is aligned to the left.

For conformity, the lines follow the designed rules in the instruction section.

For common fate, the instruction section uses the least words and graph samples to explain how to read this visualization, therefore the viewers can understand the purpose of the instruction section in a short amount of time.

By fulfilling these qualities in Gestalt principles, the key advantage of the redesigned visualization is to make the grouping natural.

According to “First Impression”: A simple object will communicate more quickly than a detailed object with a hard to recognize contour. In the redesign, there are no longer any long paragraphs. So the viewers don't have to spend a lot of time reading the text.

Based on the “Law of Prägnanz”: Our mind fills the gaps effortlessly. In the redesign, two sections are closely connected to each other so there is no separated object.

For “Continuity”, the straight lines’ direction are the same: from left to right, therefore it represents the continuity and makes the viewer easier to group them together.

For “Closure”, the two sections are closely connected to each other, therefore the redesign is more like a entirety compared to the original design.

For “Uniform Connectedness”, the straight lines have the same direction, use the same curved line to represent the masterpiece and use the same color system. So everything is related and the grouping is natural.

1. What are lessons learned concerning information visualization in general from your overall experience in exploring, decoding, and comparing the two visualizations? (**3** pts)

By analyzing these two designs, I have learned three important things.

The first thing is: the primary purpose of the visualization should be discovered by the viewer, not from text explanation. In the original design, viewers have to read a long paragraph in the explain section in order to understand what the visualization conveys. However, in the redesign, there is no such thing to describe what this visualization is doing, but viewers can figure out by themselves by looking at it. This means the redesign is a better one compared to the original version.

The second thing is: focus the primary purpose, don’t put too much information in the visualization. In original design, there is a lot of raw data such as texts and numbers on the graph. Some of them are unnecessary, such as the triangle's shape, direction, and area are meaningless. Furthermore, it interferes viewers’ focus and makes visualization hard to read. In the redesign, the simple instructions and graphs are a good sample that focus conveying the primary purpose rather than show everything on the visualization.

The last thing is: follow the design rules such as Gestalt principles, Law of Prägnanz and etc. Although some rules are performed in the original design and the individual sections are great, the entirety of the visualization is not following the design rules. When applying the design rules, it must start from the big picture, otherwise it is partially effective or not effective at all.

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