Glyphs in Financial Data Visualizations

1   Finance markets are enormous in scale and complexity, so it is important to find effective
2 visualizations for financial market data. Fortunately, financiers are highly competitive and
3 motivated to produce effective visualizations; they face immense pressure to successfully
4 navigate the markets. This competition and pressure to perform results in great visualizations.
5 This essay looks at one visualization in particular and discusses its strengths in terms of
6 perceptual mechanisms.

7   The visualization at hand is shown in Figure 1. This chart depicts the value of a financial
8 market over time. The market value corresponds to the y-axis and the period of time is
9 represented on the x-axis in one-month increments. Each one-month period is represented by a
10 glyph. The glyphs are coloured rectangles which represent both the direction and magnitude of
11 value change for that particular month. The height of each glyph corresponds to the magnitude
12 of change, and the colour corresponds to the direction (green for increases, red for decreases).
13 These simple features make excellent use of perceptual mechanisms including salience,
14 perceptual organization, and ensemble coding.

15   When looking at this chart, the viewer often needs to know how unstable the market is,
16 and at what time was the market unstable. When there are large movements in the market value,
17 the glyphs become taller. Taller glyphs mean there is more brightly coloured ink on the page at
18 the location of larger changes in market value. The bright colours are processed as salient in
19 early vision, which facilitates the draw of attention to the brightly coloured areas of the chart. In
20 this way, the chart naturally draws the attention of the viewer to the critical information because
21 it is more salient.

22   The colour of the glyphs allow for easy perceptual organization based on gestalt principles.
23 If the viewer wants to look for significant periods of market decline, it is easy to perceptually group
24 the red glyphs together. The grouping based on colour similarity gives the viewer a rough sense
25 of where market declines occurred for more than one month. Longer-scale trends can be perceived
26 in the data because of the continuity of the glyphs. Since the markets always start each month
27 where they left off the previous month, the glyphs appear to be continuous. The data in this chart
28 can be perceptually organized in many ways, easing the visual extraction of trends.

29   Another major advantage of this chart is how the viewer can quickly gauge the market
30 stability using ensemble coding. Stable markets will change little from month to month, and so
31 the glyphs will be relatively short rectangles. Conversely, Unstable markets will change greatly
32 from month to month, so the glyphs will be relatively tall rectangles. The average height of
33 rectangles can be extracted as a summary statistic by the viewer's automatic perceptual
34 processes. This means that the market stability can be perceived almost instantly, requiring little
35 effort from the viewer. This feature is especially important for financiers who must efficiently

36   evaluate hundreds of similar charts in a single day, and make accurate decisions based on their
37   perception of the data.

38   In sum, the visualization featured in Figure 1 makes effective use of use of salience,
39   perceptual organization, and ensemble coding to communicate complex data quickly and
40   efficiently to the viewer. The powerful features of this chart directly translate to effective
41   decision making in the financial marketplace.

42

43   Figure 1.