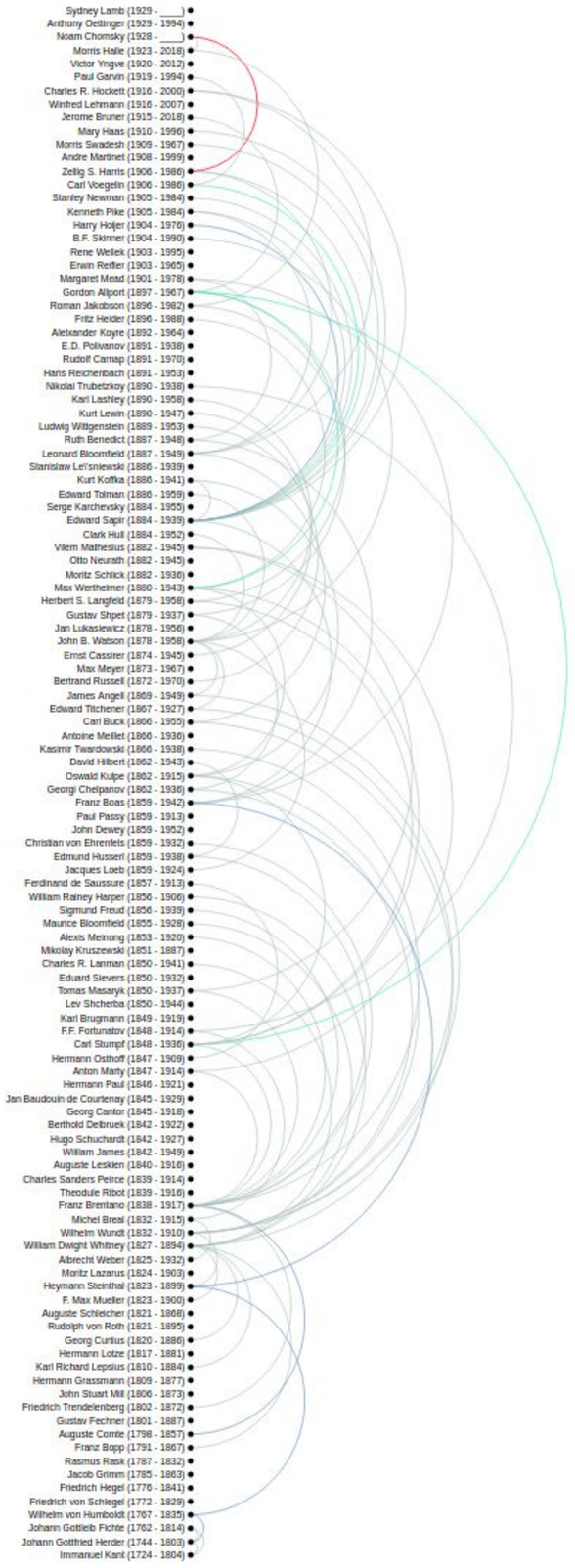
About

This prototype demonstrates that the data in `volume1-poster.pdf` can be loaded and manipulated by d3.js.

A vertical arc diagram (right) was chosen as the display format to quickly test that all people and links were present and correct.

The final result is the graphic on the right, showing people and color-coded relationships. Friendly relationships are muted, while hostile relationships stand out in bright red.

This prototype is a good step to more design-focused prototype, because the data tasks, like parsing, organizing, loading, and manipulating the data in d3.js, have already been figured out.



How it was done

(1) The volume1-poster data was converted to a single JSON file so it could easily be loaded by d3.js.

(2) People came from `volume1-poster.csv`, parsed by a simple nodejs script (see `get_people`).

Links came from hard-coded relationships in `volume1-poster.py` because they seemed to match the links in `volume1-poster.pdf` better than the link data in `volume1-poster.csv`.

(3) A d3.js script was loaded into Chrome from a simple local static web server. The d3.js script first made a request to the web server to load the JSON file containing the data.

(4) Then it created an SVG element in the DOM of the webpage.

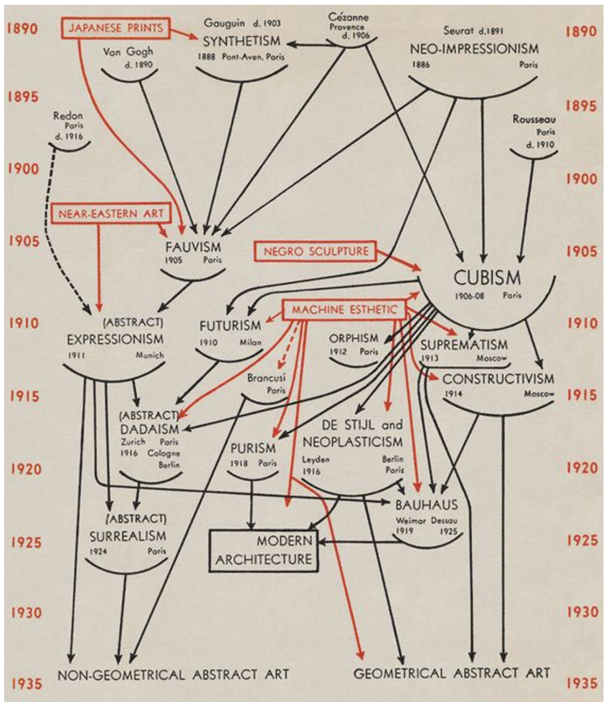
(5) Finally the d3.js script inserted arcs and text elements for each person and link (code for arcs shown at right).

```
"people": [
  {
    "first": "Moritz",
    "last": "Lazarus",
    "born": "1824",
    "died": "1903",
    "profession": "unknown",
    "key": ""
  },
  {
    "first": "Heymann",
    "last": "Steinthal",
    "born": "1823",
    "died": "1899",
    "profession": "anthropologist",
    "key": ""
  },
```

```
"links": [
  {
    "from": "Herder",
    "to": "Fichte",
    "type": "teacher"
  },
  {
    "from": "Kant",
    "to": "Fichte",
    "type": "teacher"
  },
  {
    "from": "Langfeld",
    "to": "Allport",
    "type": "teacher"
  },
```

```
function get_people(file) {

    // Array to return
    let people = [];

    // Read the file into memory and split by lines
    // (This prototype assumes a small file size)
    let lines = fs.readFileSync(file, 'utf-8').split('\n');

    // Parse the person information from each line
    lines.forEach(function(line) {

        // Split the line by commas (csv)
        let parts = line.split(',');

        // Skip lines with not enough data. We need at
        // least ("P", first, last, born, died)
        if (parts.length < 5)
            return;

        // Skip lines that don't start with "P"
        // (Matches original/volume1-poster.py)
        if (parts[0] !== "P")
            return;

        // Create the person structure with defaults for
        // profession and key
        let person = {
            first: parts[1],
            last: parts[2],
            born: parts[3],
            died: parts[4],
            profession: "linguist",
            key: ""
        };

        // Set the profession if one is available
        if (parts.length >= 7)
            person.profession = parts[6];

        // Replace empty professions with "unknown"
        if (person.profession.trim() === "")
            person.profession = "unknown";

        // Set the key if one is available
        if (parts.length >= 8)
            person.key = parts[7];

        // Add to the output array
        people.push(person);
    });

    return people;
}
```

```
// Load and parse the json data
d3.json("data/all.json").then(function(genealogy) {


// Create the SVG
var svg = d3.select("#svg-container").append("svg")
        .attr("width", width)
        .attr("height", height);


// Make the arcs
const path = svg.insert("g", "*")
          .attr("fill", "none")
          .attr("stroke-opacity", 0.6)
          .attr("stroke-width", 1.5)
          .selectAll("path")
          .data(graph.links)
          .join("path")
          .attr("stroke", function(d) {
              switch (d.type) {
              case "teacher":
                  return "#b2c2bd";
              case "influence":
                  return "#6d93c7";
              case "postDoc":
                  return "#65dbb7";
              case "hostile":
                  return "#ff0000";
              default:
                  return "#aaa";
              }
          })
          .attr("d", make_arc);
```



Cubism and Abstract Art chart

Alfred Barr, Director of the Museum of Modern Art (New York), designed this chart for the museum's 1936 exhibition *Cubism and Abstract Art.* It attempts to show the influence of modern art styles on each other over time, with a single feature (more or less "geometric") being a way to organize the styles horizontally.

You can find a large version it in Tufte's Beautiful Evidence, p.64.

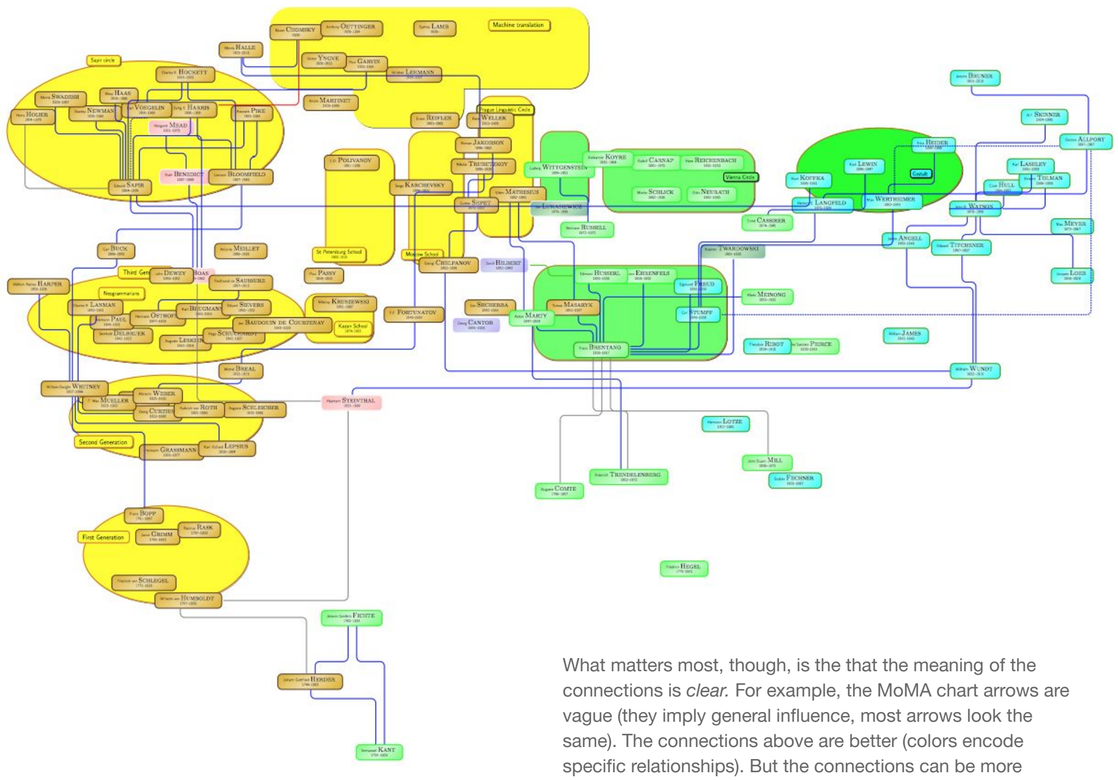
Compared to the Battle in the Mind Fields poster (middle), it is strikingly similar in subject matter (historical genealogy of influences in professional work) and layout (y-axis is time, x-axis is an interesting feature of the elements).

Here though, the axes are labeled with a time scale (every 5 years) and an art style range (bottom). This makes the meaning of the axes obvious and it gives the elements more context. In the Battle in the Mind Fields poster, the meaning of the axes is at best implied.

Information space: Art-historical 2-space

Analytical features: Connections of influence imply causality. Unfortunately, there isn't enough meaning to the arrows to know why they exist and what they mean.

It's also possible to compare the relative influence of different art styles (Cubism versus Fauvism) based on the number of connections, and well as the relative importance of styles based on font size.



Battle in the Mind Fields Volume 1 poster

This, of course, is the poster we are re-imagining based on the Battle of the Mind Fields book, Volume 1.

The connections between boxes show the influence of people and circles of thought on each other over time.

Similar to the MoMA chart (left), the y-axis represents time, the x-axis represents a feature of the elements (professions: linguists - yellow, philosophers - green, and psychologists - blue), and the links show the genealogy of influences.

A triumph of this visualization is that it is relatively easy to trace genealogy from person to person, all the way from top to bottom. Inspect the prototype from this week (vertical arc diagram), and you'll see how difficult the same task is in that design.

The diagram also takes up the horizontal and vertical space very well, making good use of 2-space.

Unlike the MoMA chart, the connections do not have arrows, implying no directionality of influence ("influence of person a on person b"). Some connections might be more meaningful with arrows (teacher-student), and others less so (colleagues).

What matters most, though, is the that the meaning of the connections is *clear.* For example, the MoMA chart arrows are vague (they imply general influence, most arrows look the same). The connections above are better (colors encode specific relationships). But the connections can be more differentiated, and all need descriptions via a legend or in-place annotations.

To understand the need for differentiation, inspect some of the regions with many overlapping blue lines. It is sometimes difficult to follow them, because they are all the same thickness, color, and brightness, like tangled electrical cords.

Another important difference: Compared with the MoMA chart, the colors above are all roughly the same loudness (most lines and shapes are bright or rich in color, a few lines are grey). This has the effect that nothing is highlighted — because everything is highlighted. Compare this to the MoMA chart where the red names and arrows stand out. One could justly criticise the red in the MoMA chart, but it works very well at drawing the eye to important detail.

Another differentiator is the readability of the text. The MoMA chart has fewer names and dates, making it easier to avoid problematic overlaps. In the Battle in the Mind Fields poster, there are several places where the text is partially hidden (Lukasiewicz, Boas).

Finally, the eye is drawn to thick areas, like the clump of connections emitted from the top of Sapir (above) and the clump emitted from the bottom left of Cubism (left). It can be misleading, for example with Brentaro (above), to show clusters of connections in multiple places (top and right). Because they then appear more sparse than they really are, at a distance and at a cursory glance.

Information space: Thought-historical 2-space

Analytical features: Connections of influence also imply causality. The degree of influence can be compared locally (immediate connections) and historically (Kant is very influential because his influence multiplies over time).

One can also compare membership (or lack thereof) in a school of thought, and influences of schools of thought on each other.

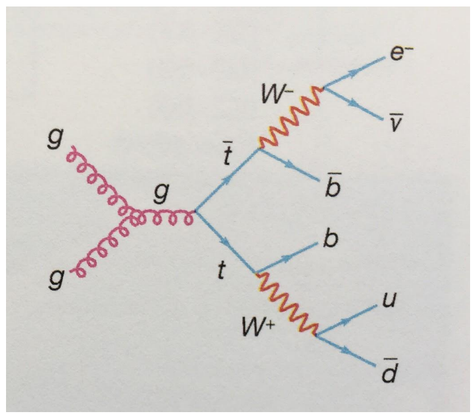
Lack of connections (Hegel) and lack of membership (far righthand side) suggest that some disciplines (psychology) don't change over time in the same way as others (linguistics, which is much more grouped into schools of thought). This available comparison of change over time may or may not be intended.

It is also possible to infer change over time from the shape of the diagram, which starts sparse and concentrated at the bottom and branches out over time like a tree. This is something that the MoMA chart doesn't do: one cannot infer anything from its shape.

Finally there is good micro versus macro detail. The macro detail is the three most common colors spread across the x-axis (yellow, green, blue), and the shape of the diagram, as mentioned above. The micro detail includes names, dates, connections, and labels for schools of thought —anything you need to look closely at to read.

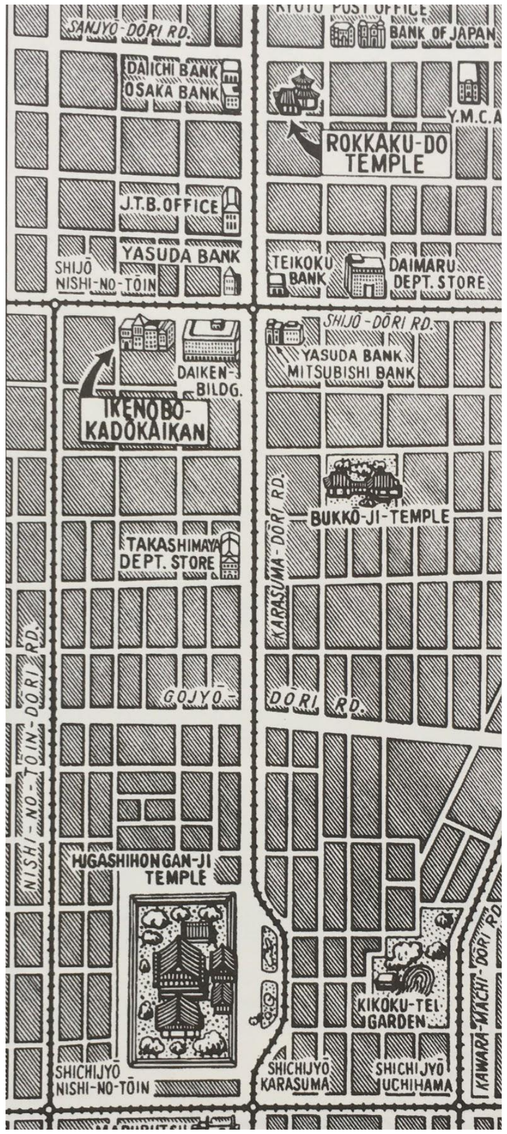
Differentiated lines

Supply lines under Potsdamer Platz (1924) by Artur Furst. Beautiful, precise differentiation of overlapping lines using color, texture, and size. Designed to model Berlin's underground city infrastructure.



Feynman diagrams re-imagined (2006) by Edward Tufte. Shows how directional connections (blue) can be mixed with non-directional connections (pink and red). Also note how the shape of the lines help to immediately see the structure of the diagram.

Routes along a spatial grid



Illustrated map of Kyoto Japan (date and author unknown). Shows how easy it is to follow routes along a grid. While it doesn't show multiple lines or routes along the same street, applying a grid like this to a network diagram (nodes are like buildings in the map) could help the reader to follow connections and notice similarities in paths.

Small multiples ("vignettes") around a large map or image

Saint Kirill of Belozersk with scenes from his life (early 16th century). Shows 19 scenes (miniature stories) in the margin of this beautiful silk cloth. The scenes could be close-ups of sections of the large middle image. Or they could be different views of the same information, to highlight detail and show more context.

As a design, it's a great way to show something large like the Battle in the Mind Fields diagram, with smaller diagrams around the margins to highlight and explain sub-narratives.