idyll

Matthew Conlen

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Ph.D. student at University of Washington

data science

visualization

journalism

open source

data

exploration

communication

data

exploration

communication

data exploration

Vega (Lite)

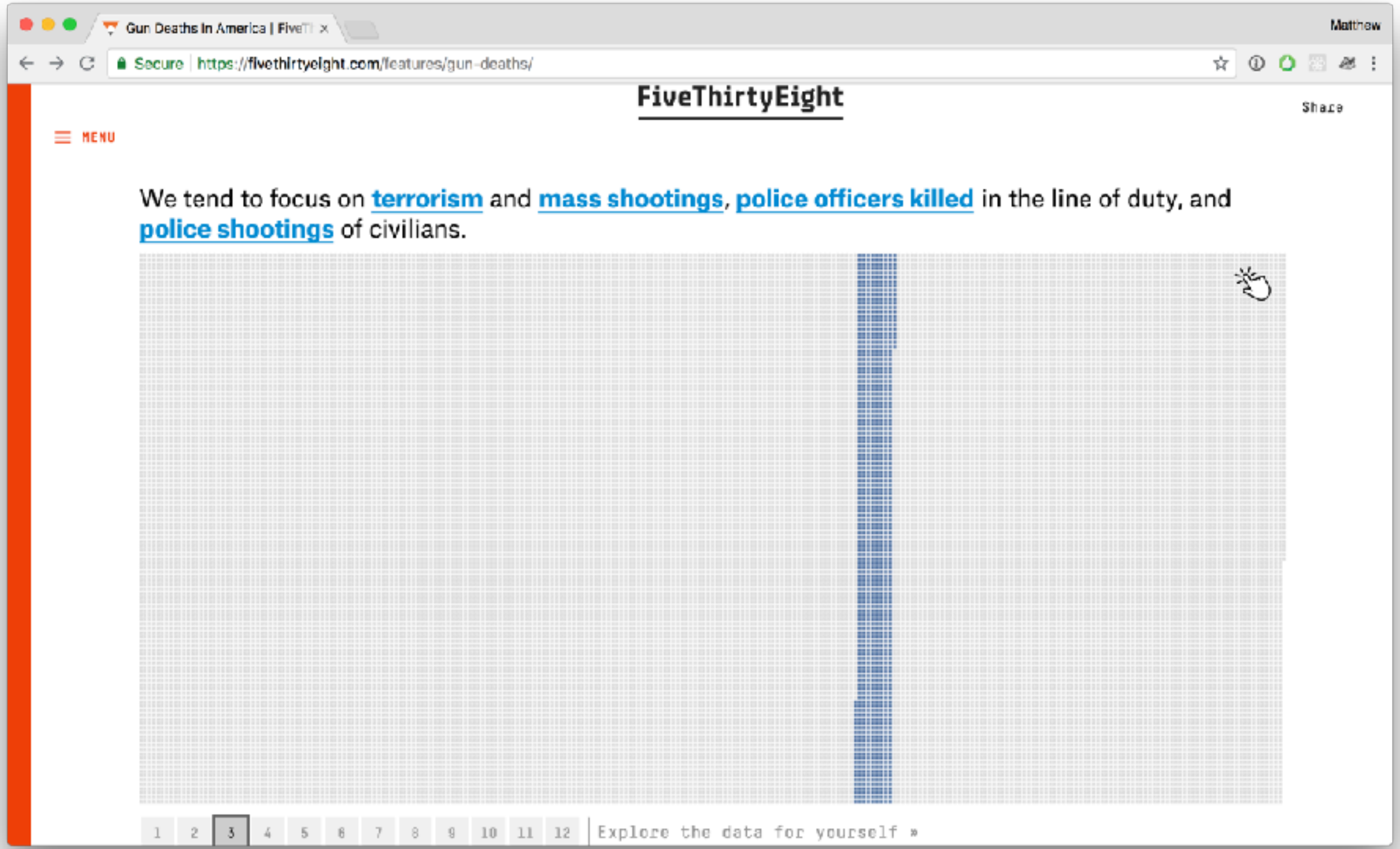
Voyager

data

exploration

communication

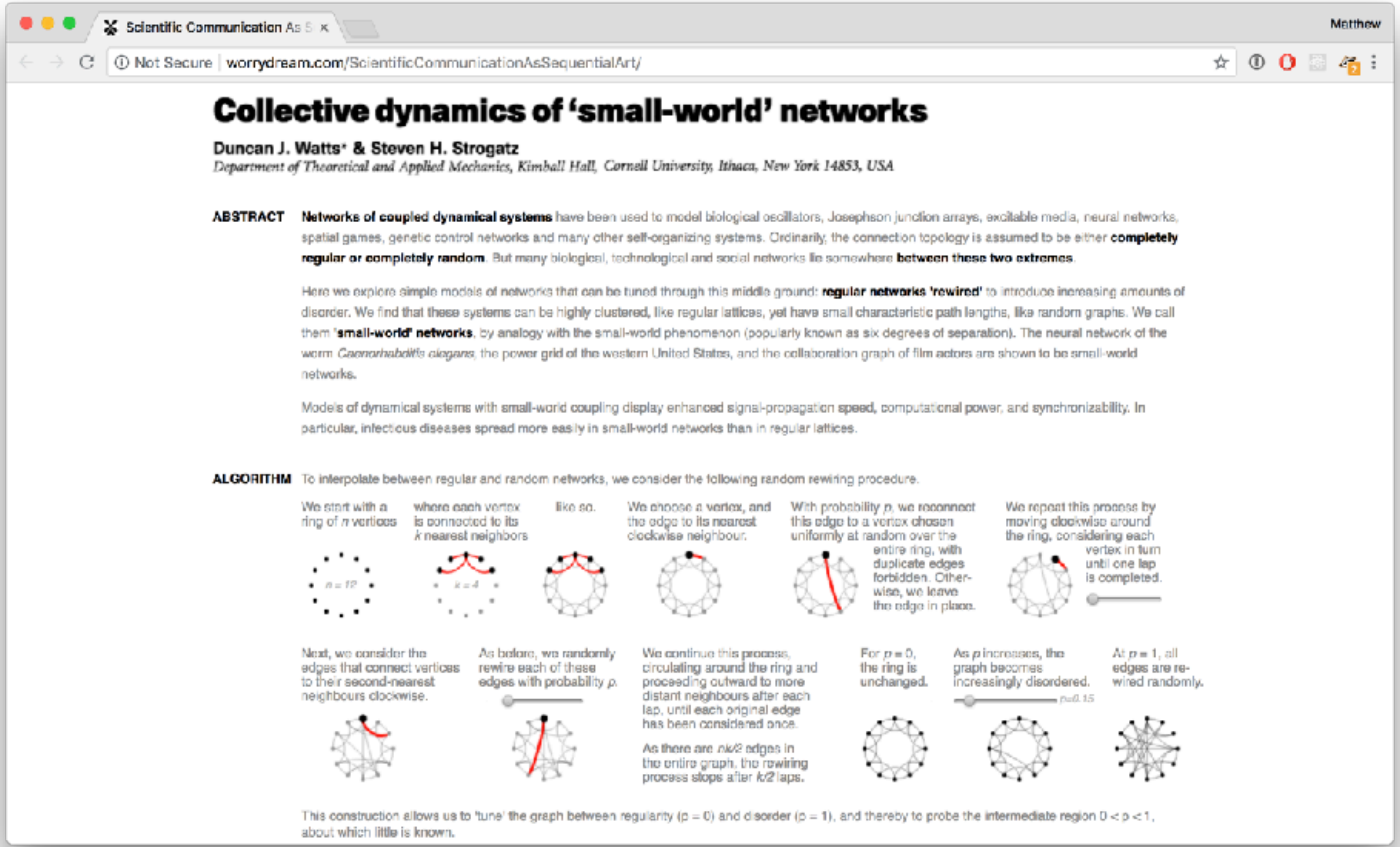
data + communication


Gun Deaths In America | FiveTh
Matthew
Secure https://fivethirtyeight.com/features/gun-deaths/
FiveThirtyEight
Share
MENU
1 2 3 4 5 6 7 8 9 10 11 12
Explore the data for yourself »

We tend to focus on terrorism and mass shootings, police officers killed in the line of duty, and police shootings of civilians.

data journalism

data + communication



Scientific Communication As S ×

Matthew

Not Secure | worrydream.com/ScientificCommunicationAsSequentialArt/

Collective dynamics of 'small-world' networks

Duncan J. Watts* & Steven H. Strogatz
Department of Theoretical and Applied Mechanics, Kimball Hall, Cornell University, Ithaca, New York 14853, USA

ABSTRACT **Networks of coupled dynamical systems** have been used to model biological oscillators, Josephson junction arrays, excitable media, neural networks, spatial games, genetic control networks and many other self-organizing systems. Ordinarily, the connection topology is assumed to be either **completely regular or completely random**. But many biological, technological and social networks lie somewhere **between these two extremes**.

Here we explore simple models of networks that can be tuned through this middle ground: **regular networks 'rewired'** to introduce increasing amounts of disorder. We find that these systems can be highly clustered, like regular lattices, yet have small characteristic path lengths, like random graphs. We call them **'small-world' networks**, by analogy with the small-world phenomenon (popularly known as six degrees of separation). The neural network of the worm *Caenorhabditis elegans*, the power grid of the western United States, and the collaboration graph of film actors are shown to be small-world networks.

Models of dynamical systems with small-world coupling display enhanced signal-propagation speed, computational power, and synchronizability. In particular, infectious diseases spread more easily in small-world networks than in regular lattices.

ALGORITHM To interpolate between regular and random networks, we consider the following random rewiring procedure.

We start with a ring of n vertices where each vertex is connected to its k nearest neighbors like so.

We choose a vertex, and the edge to its nearest clockwise neighbour.

With probability p, we reconnect this edge to a vertex chosen uniformly at random over the entire ring, with duplicate edges forbidden. Otherwise, we leave the edge in place.

We repeat this process by moving clockwise around the ring, considering each vertex in turn until one lap is completed.

Next, we consider the edges that connect vertices to their second-nearest neighbours clockwise.

As before, we randomly rewire each of these edges with probability p.

We continue this process, circulating around the ring and proceeding outward to more distant neighbours after each lap, until each original edge has been considered once.

As there are $nk/2$ edges in the entire graph, the rewiring process stops after $k/2$ laps.

For $p = 0$, the ring is unchanged.

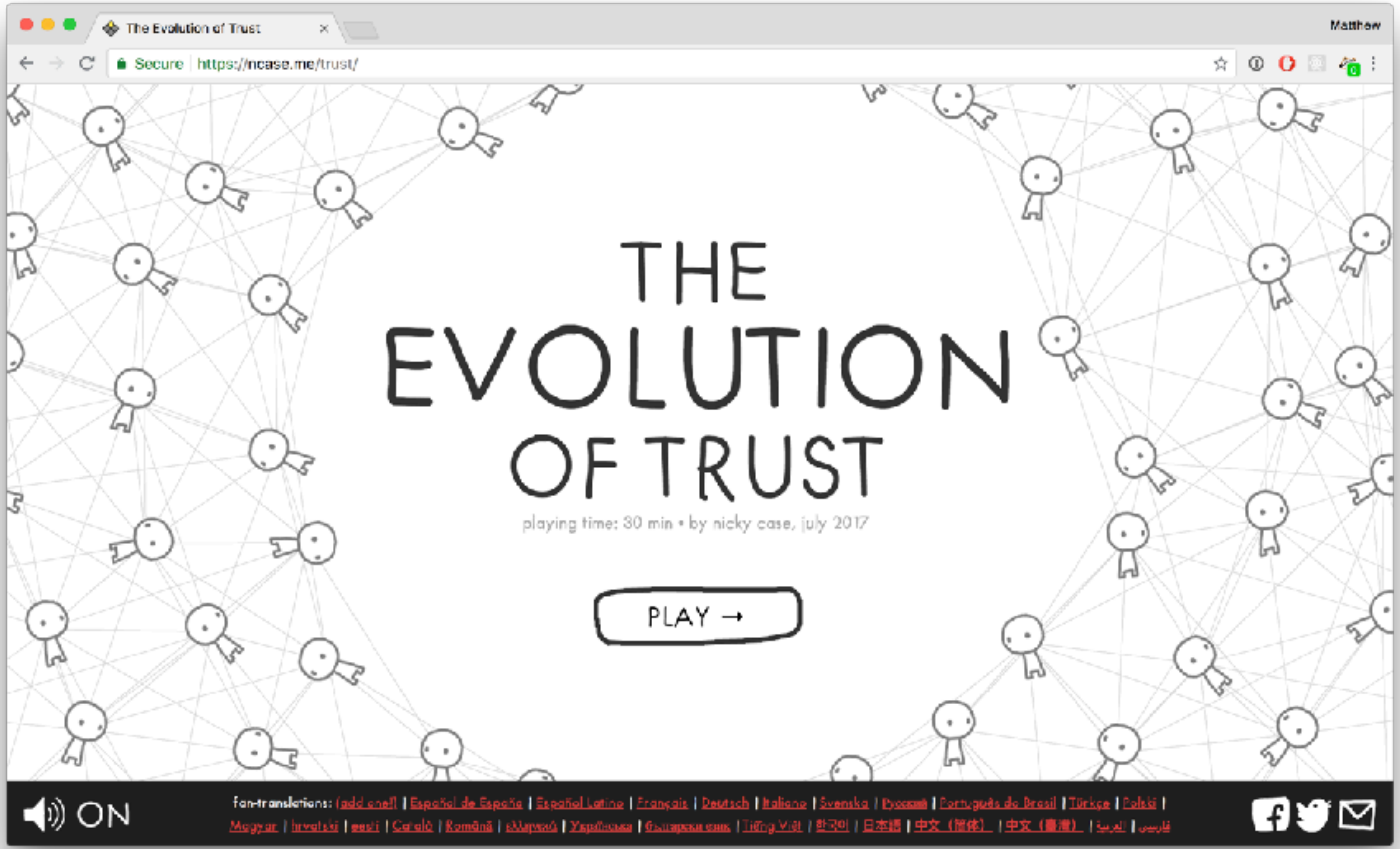
As p increases, the graph becomes increasingly disordered.

At $p = 1$, all edges are rewired randomly.

This construction allows us to 'tune' the graph between regularity ($p = 0$) and disorder ($p = 1$), and thereby to probe the intermediate region $0 < p < 1$, about which little is known.

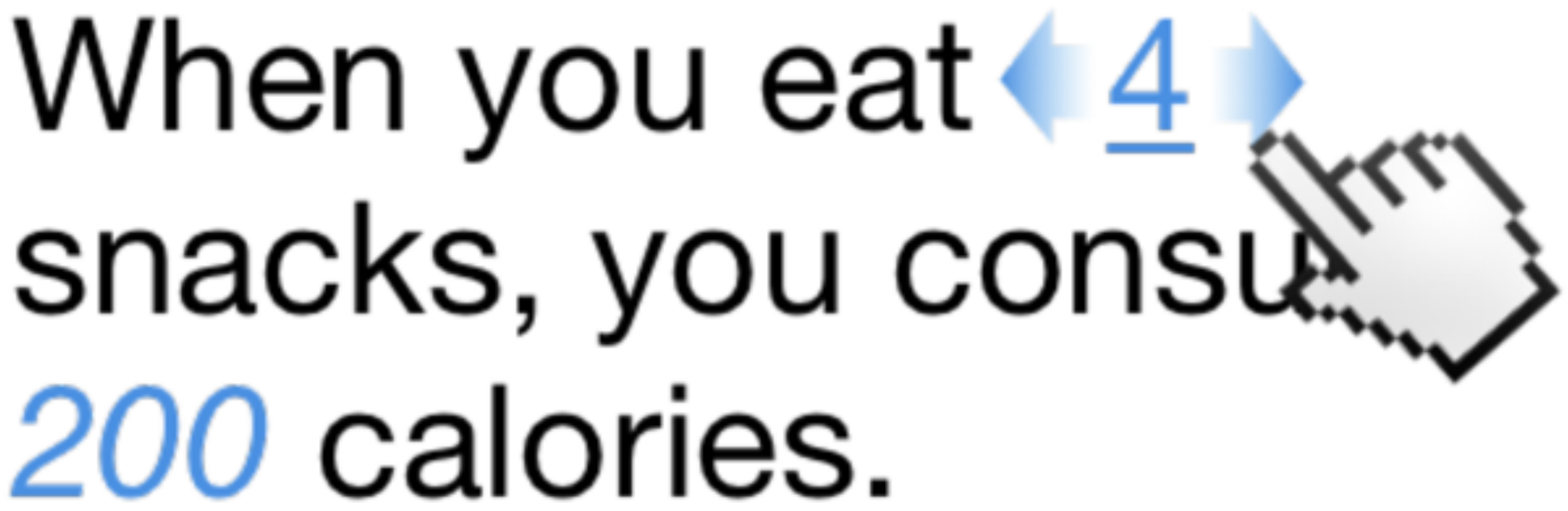
scientific communication

data + communication


The Evolution of Trust
Matthew
Secure https://ncase.me/trust/
THE EVOLUTION OF TRUST
playing time: 30 min • by nicky case, july 2017
PLAY →
ON
fan-translations: (add one!) | Español de España | Español Latino | Français | Deutsch | Italiano | Svenska | Русский | Português do Brasil | Türkçe | Polski |
Magyar | hrvatski | eesti | Català | Română | ελληνικά | Українська | Български език | Tiếng Việt | 한국어 | 日本語 | 中文（简体） | 中文（臺灣） | العربية | فارسی

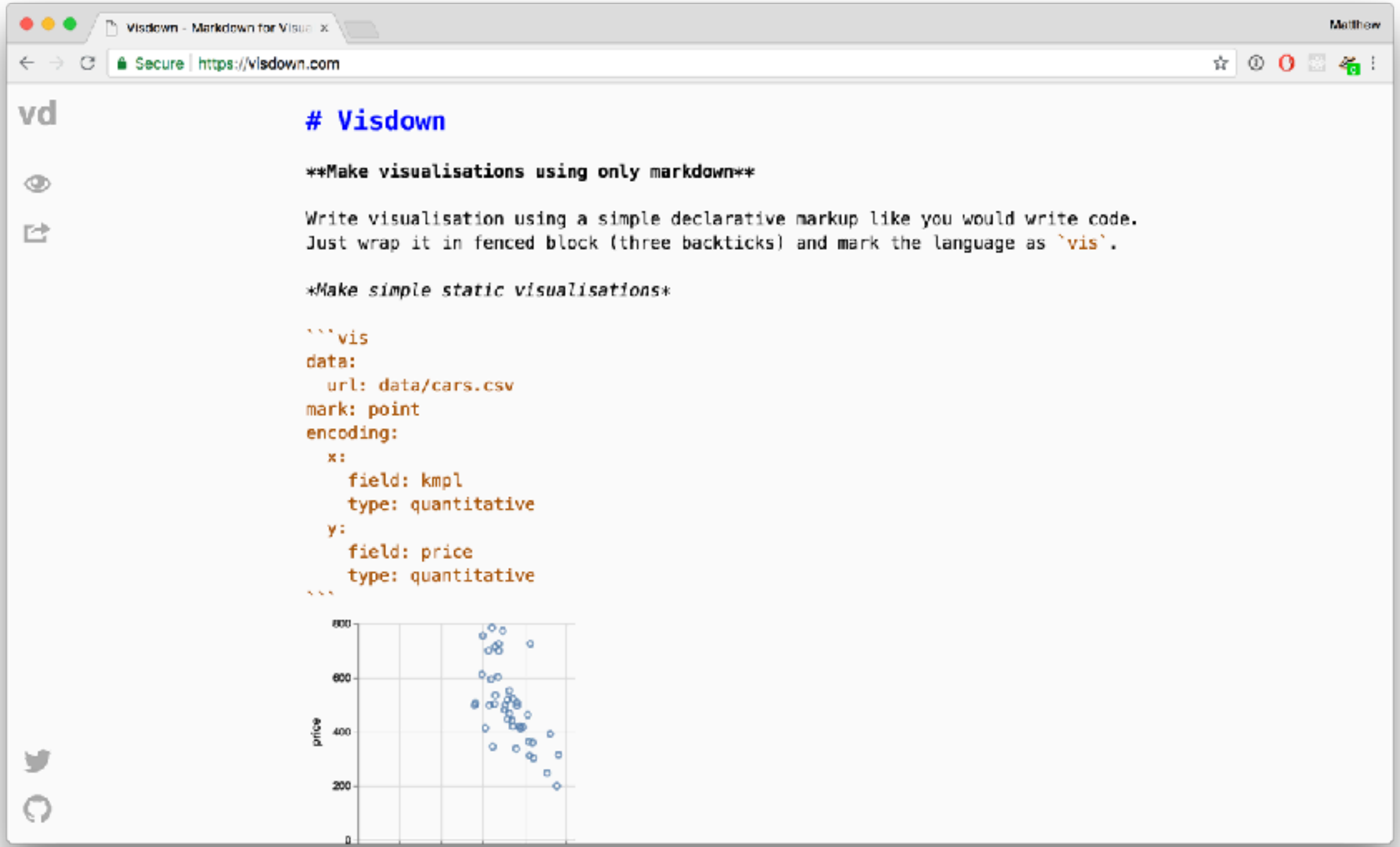
explorable explanations

tools


When you eat 4 snacks, you consu 200 calories.

tangle.js

tools



Visdown

Make visualisations using only markdown

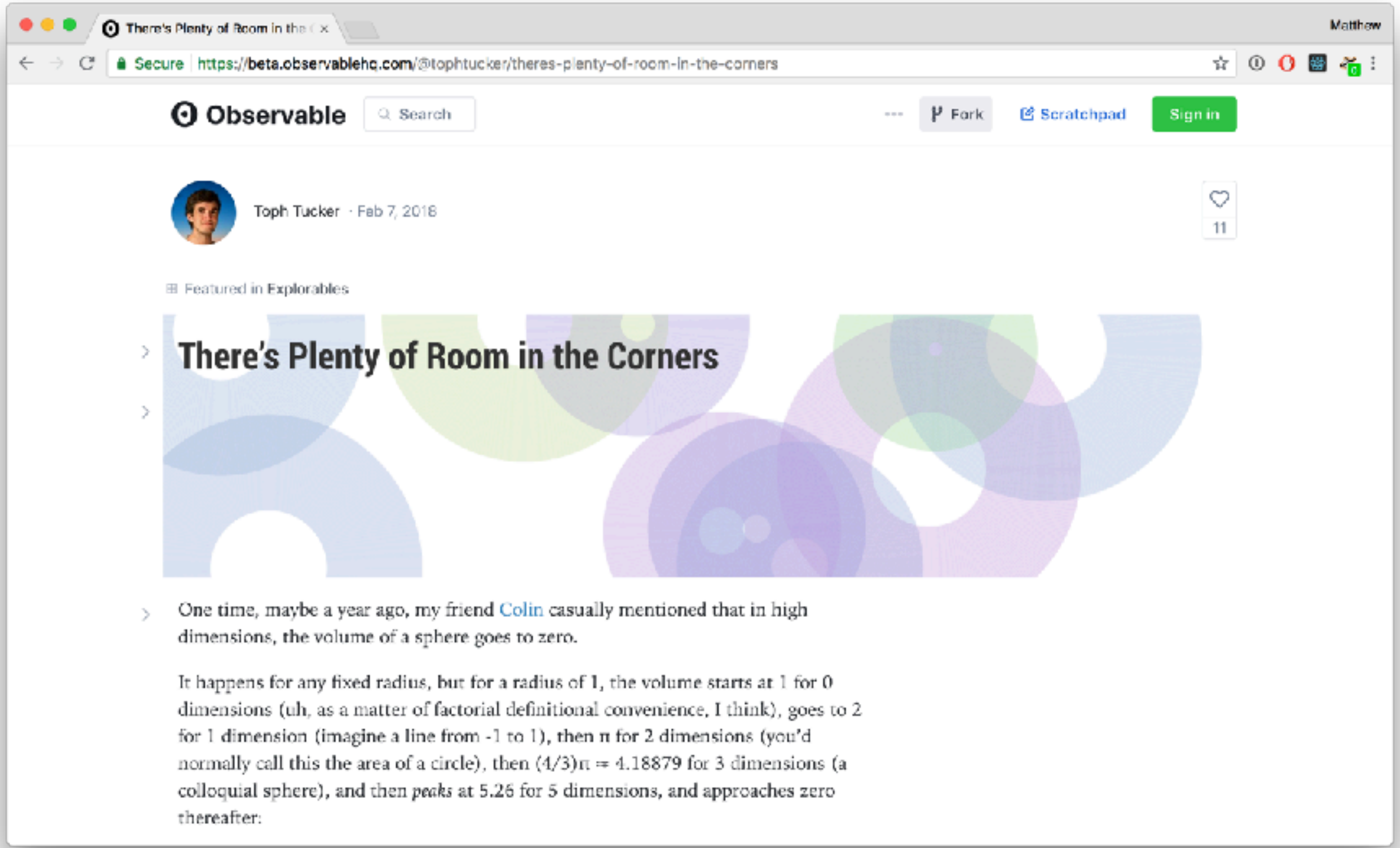
Write visualisation using a simple declarative markup like you would write code.
Just wrap it in fenced block (three backticks) and mark the language as `vis`.

Make simple static visualisations

~~~
```vis
data:
  url: data/cars.csv
mark: point
encoding:
  x:
    field: kmpl
    type: quantitative
  y:
    field: price
    type: quantitative
```
~~~

visdown

tools


There's Plenty of Room in the C
Matthew
Secure
https://beta.observablehq.com/@tophtucker/theres-plenty-of-room-in-the-corners
Observable
Search
Fork
Scratchpad
Sign in
Toph Tucker · Feb 7, 2018
11
Featured in Explorables

There's Plenty of Room in the Corners

One time, maybe a year ago, my friend Colin casually mentioned that in high dimensions, the volume of a sphere goes to zero.

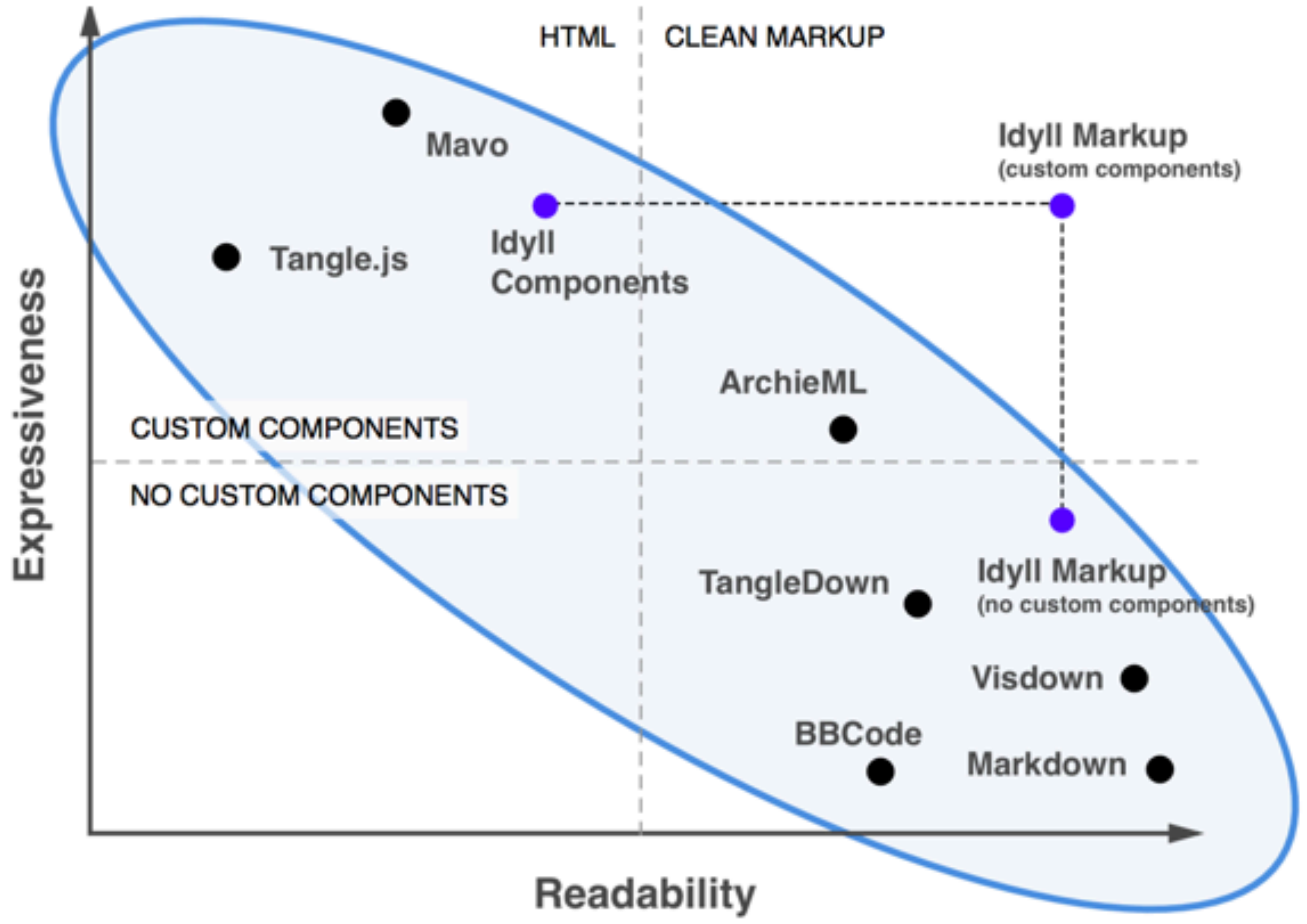
It happens for any fixed radius, but for a radius of 1, the volume starts at 1 for 0 dimensions (uh, as a matter of factorial definitional convenience, I think), goes to 2 for 1 dimension (imagine a line from -1 to 1), then π for 2 dimensions (you'd normally call this the area of a circle), then (4/3)π ≈ 4.18879 for 3 dimensions (a colloquial sphere), and then *peaks* at 5.26 for 5 dimensions, and approaches zero thereafter:

observable

motivation

focus on explorable explanations + data journalism

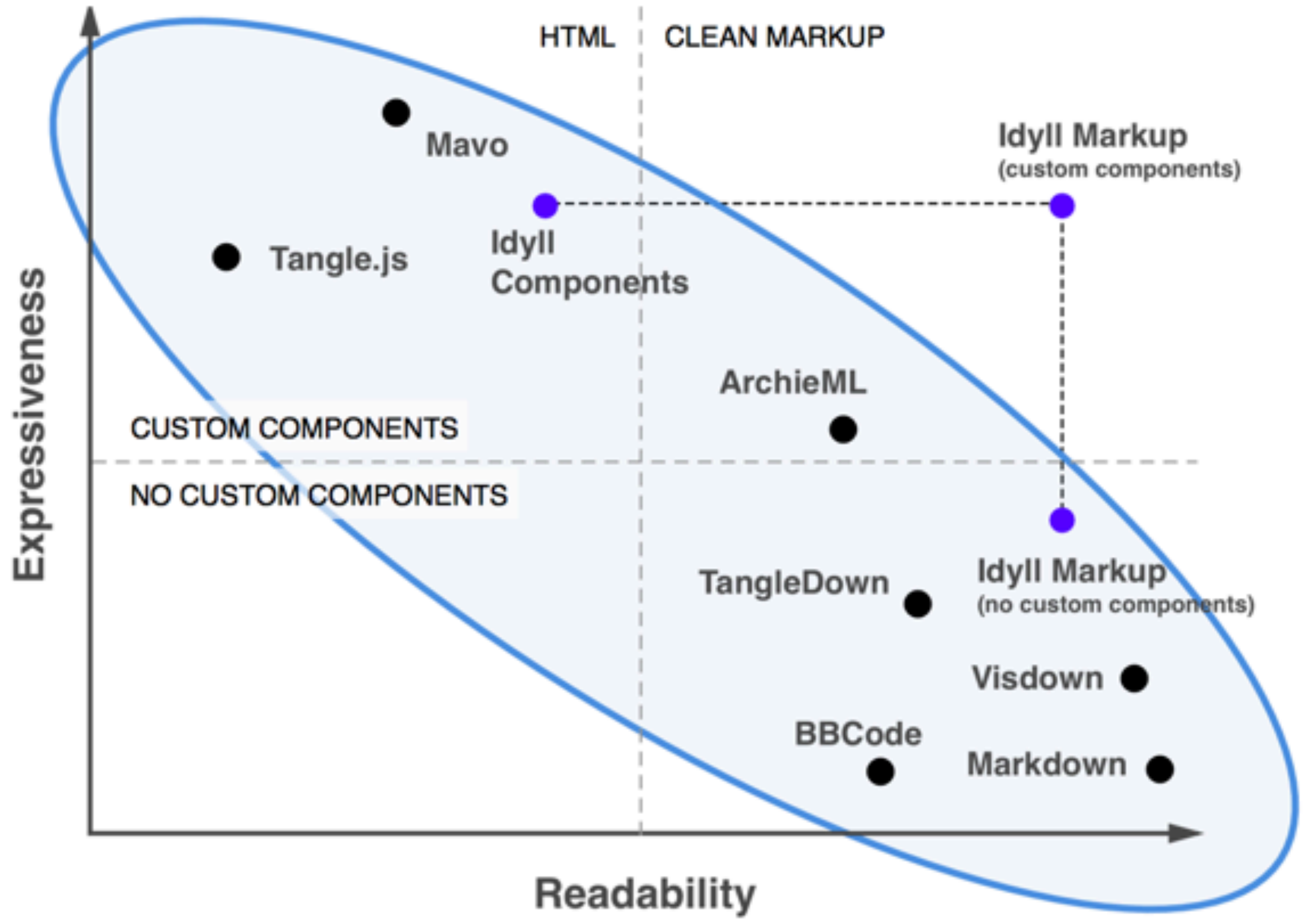
interoperability with existing tools and workflows

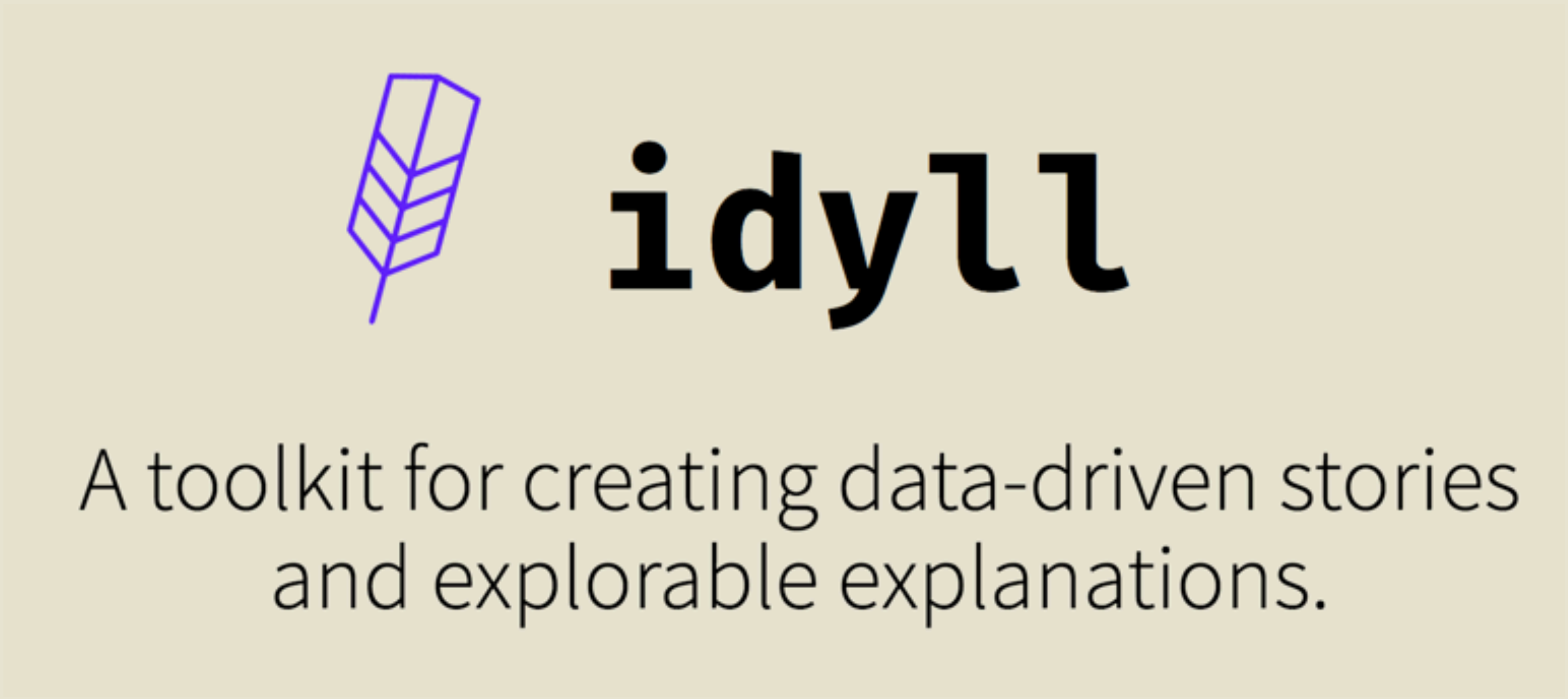


motivation

make common tasks easy and others possible

complete customization of look and feel





idyll

A toolkit for creating data-driven stories and explorable explanations.

https://idyll-lang.org/

idyll

markdown

reactive runtime

embed JavaScript
components

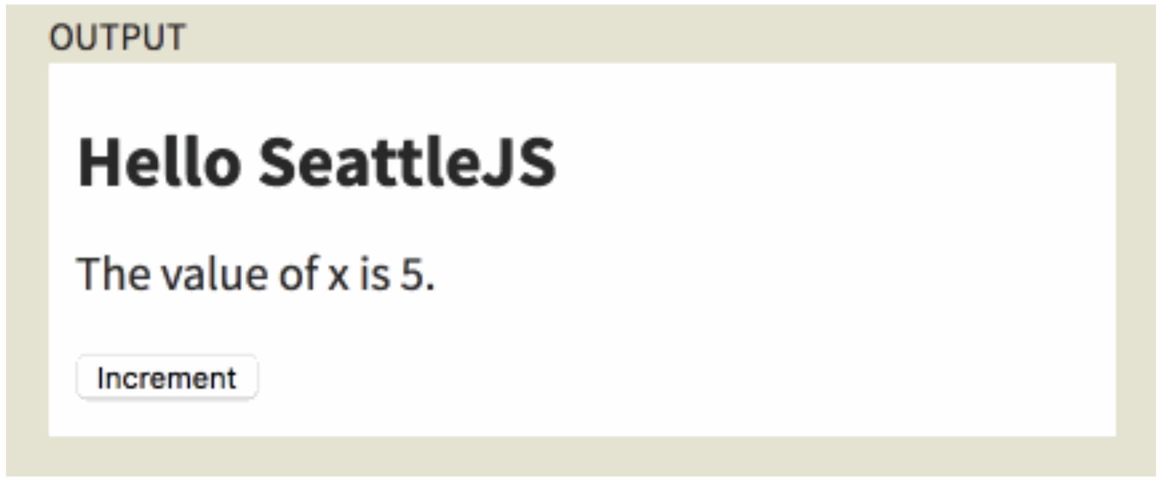
rich standard library

idyll

demos

idyll syntax

```
# Hello SeattleJS

[var name:"x" value:5 /]

The value of x is
[Display value:x format:"d" /].

[Button onClick:`x += 1`]
  Increment
[/Button]
```

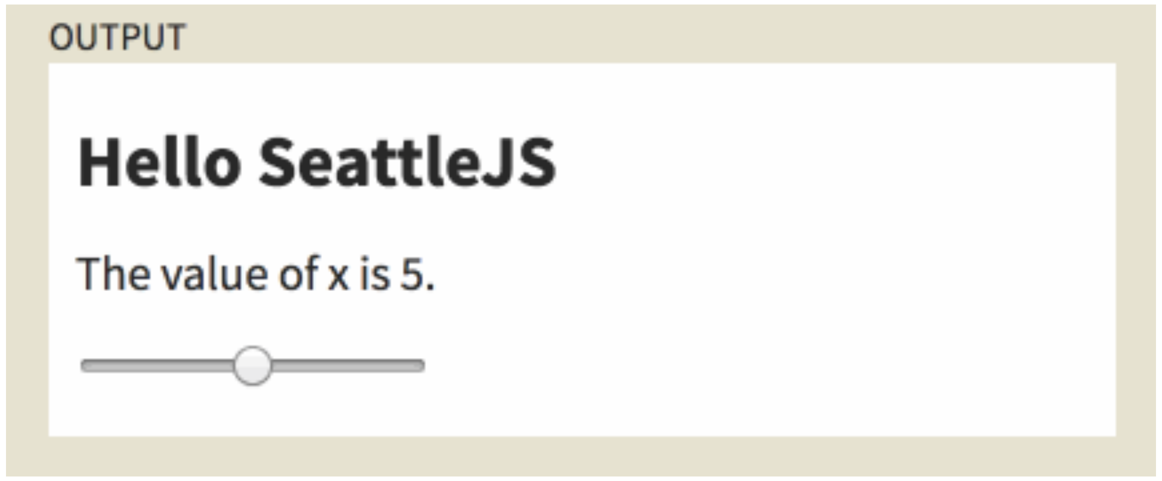

OUTPUT

Hello SeattleJS

The value of x is 5.

idyll syntax

```
# Hello SeattleJS

[var name:"x" value:5 /]

The value of x is
[Display value:x format:"d" /].

[Range value:x min:0 max:10 /]
```


OUTPUT

Hello SeattleJS

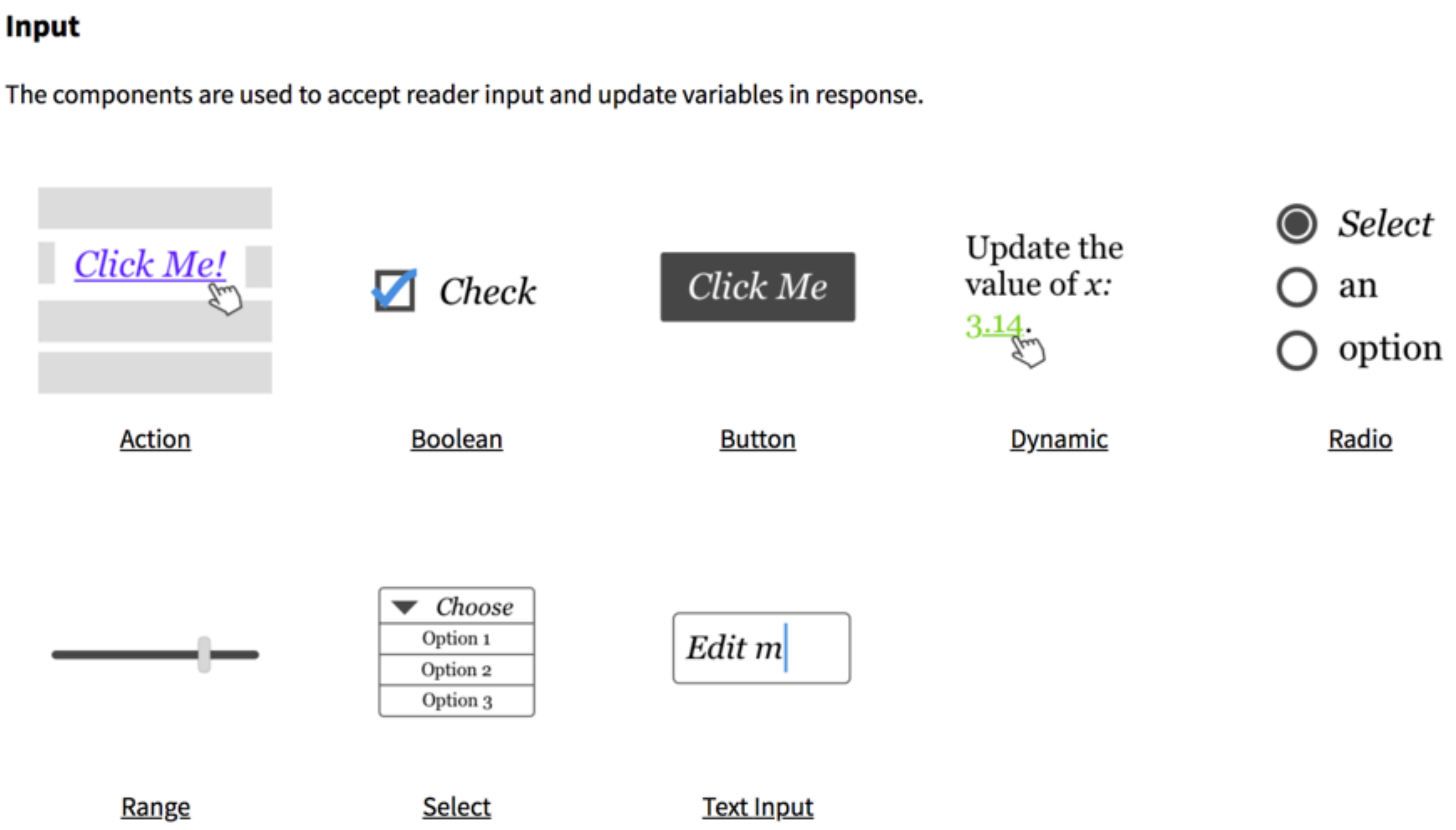
The value of x is 5.

idyll components

28 built-in components

four categories of use:
- input
- presentation
- layout
- helpers

idyll components



Input

The components are used to accept reader input and update variables in response.

idyll components

Presentation

These components render something to the screen, for example the `Chart` component takes data as input and can display several types of charts.

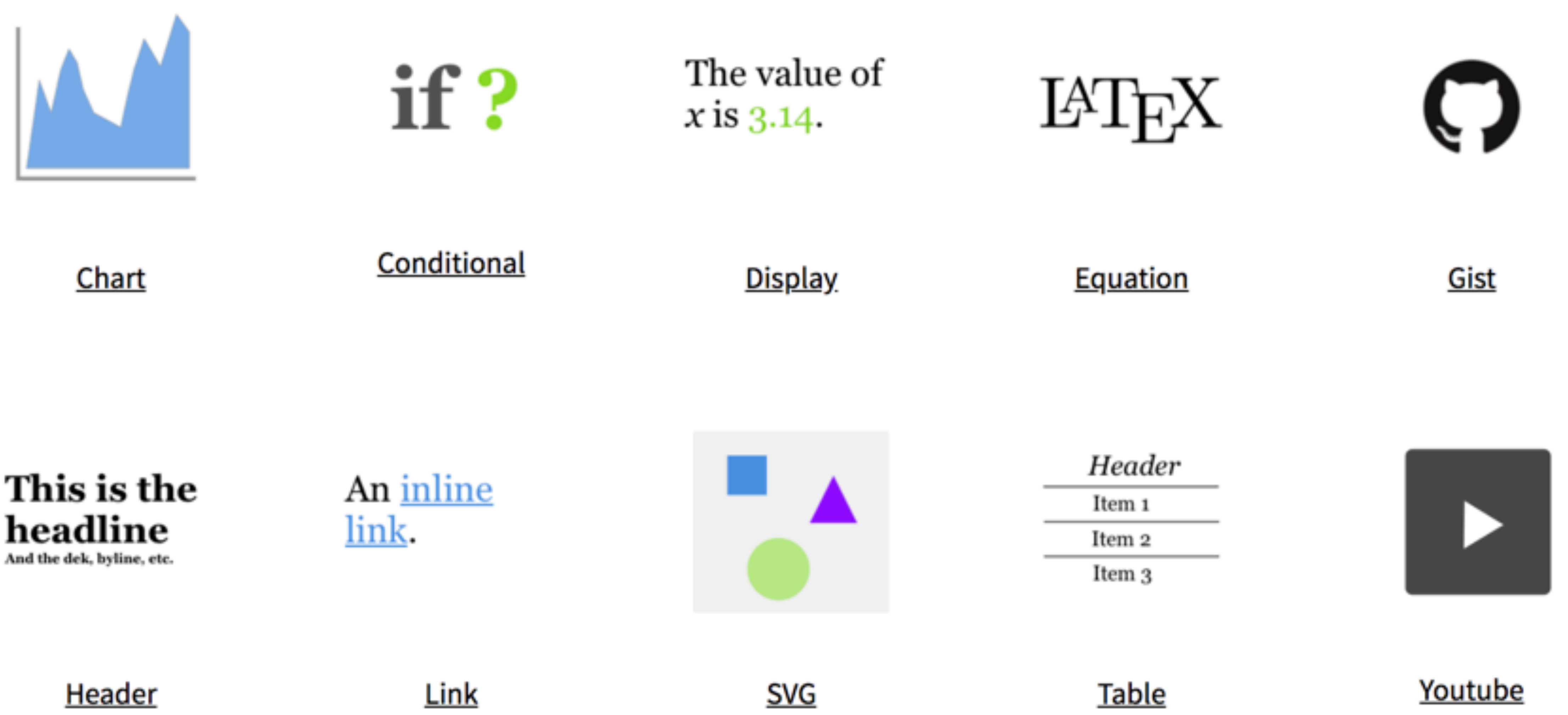
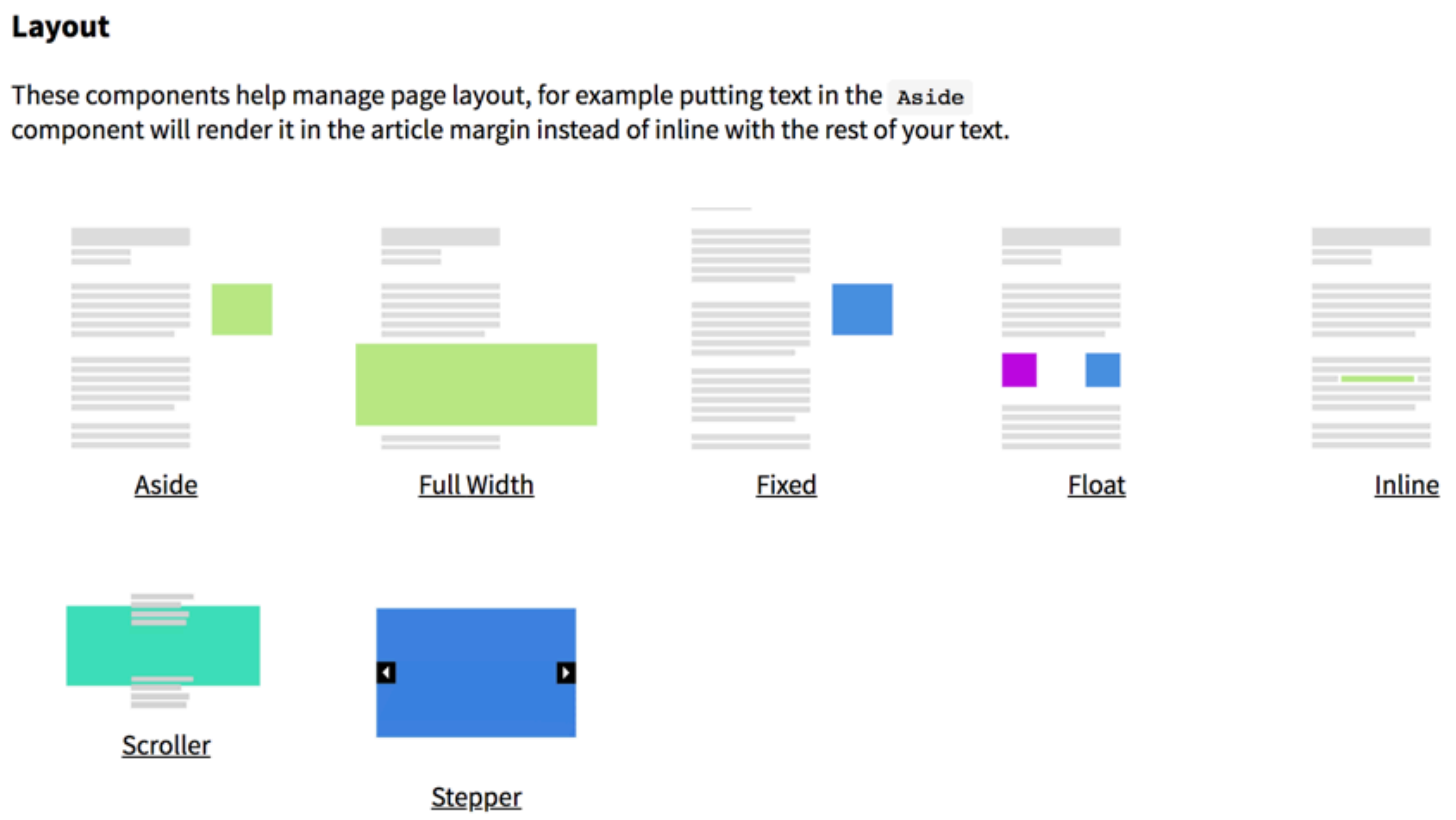


Chart
Conditional
Display
Equation
Gist
Header
Link
SVG
Table
Youtube

idyll components



Layout

These components help manage page layout, for example putting text in the `Aside` component will render it in the article margin instead of inline with the rest of your text.

Aside

Full Width

Fixed

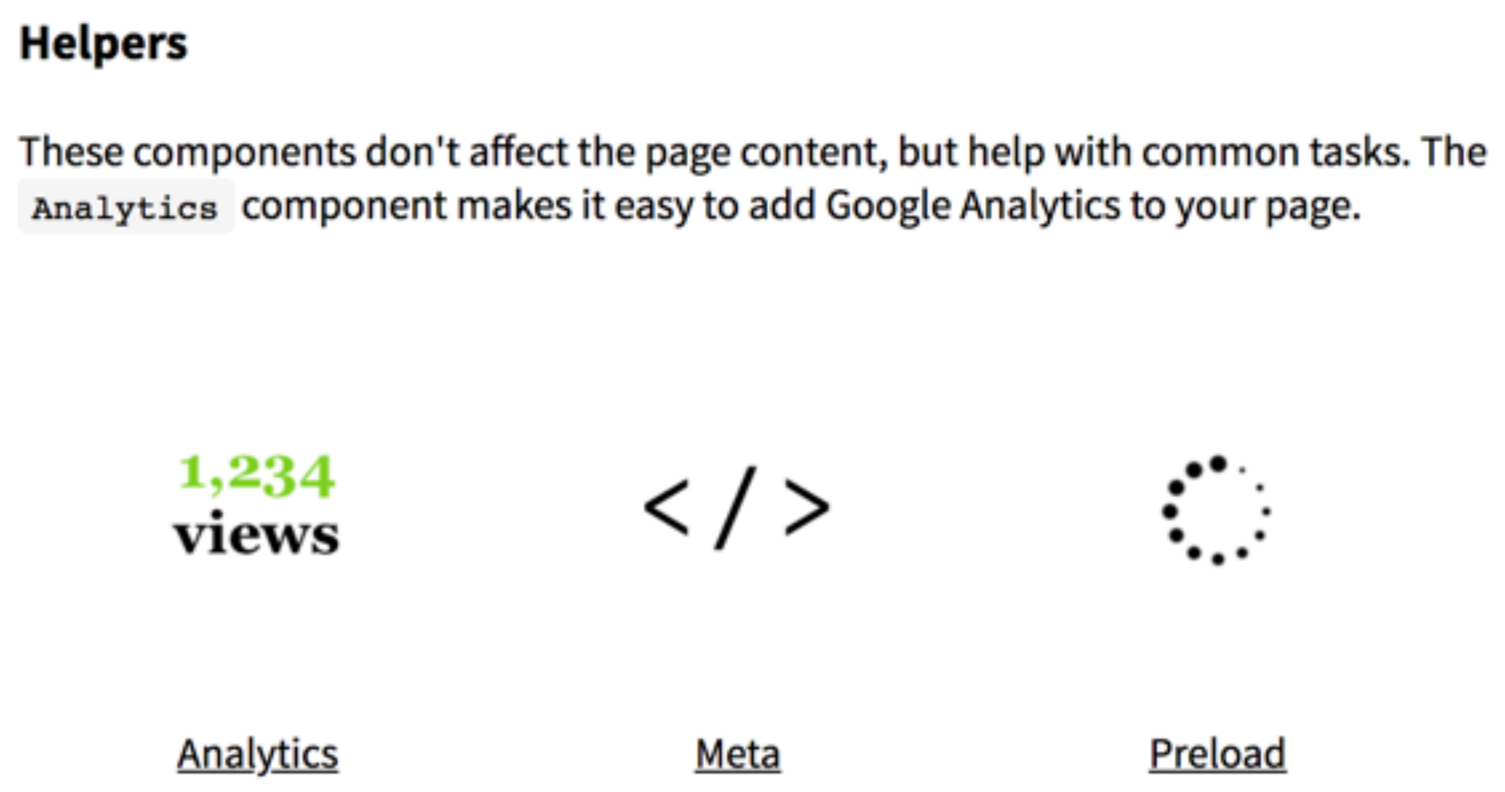
Float

Inline

Scroller

Stepper

idyll components



Helpers

These components don't affect the page content, but help with common tasks. The `Analytics` component makes it easy to add Google Analytics to your page.

Analytics

Meta

Preload

making common tasks fast

```
[Data
  name:”myCSVData”
  source:”my-file.csv” /]

[Table data:myCSVData /]
```

making common tasks fast

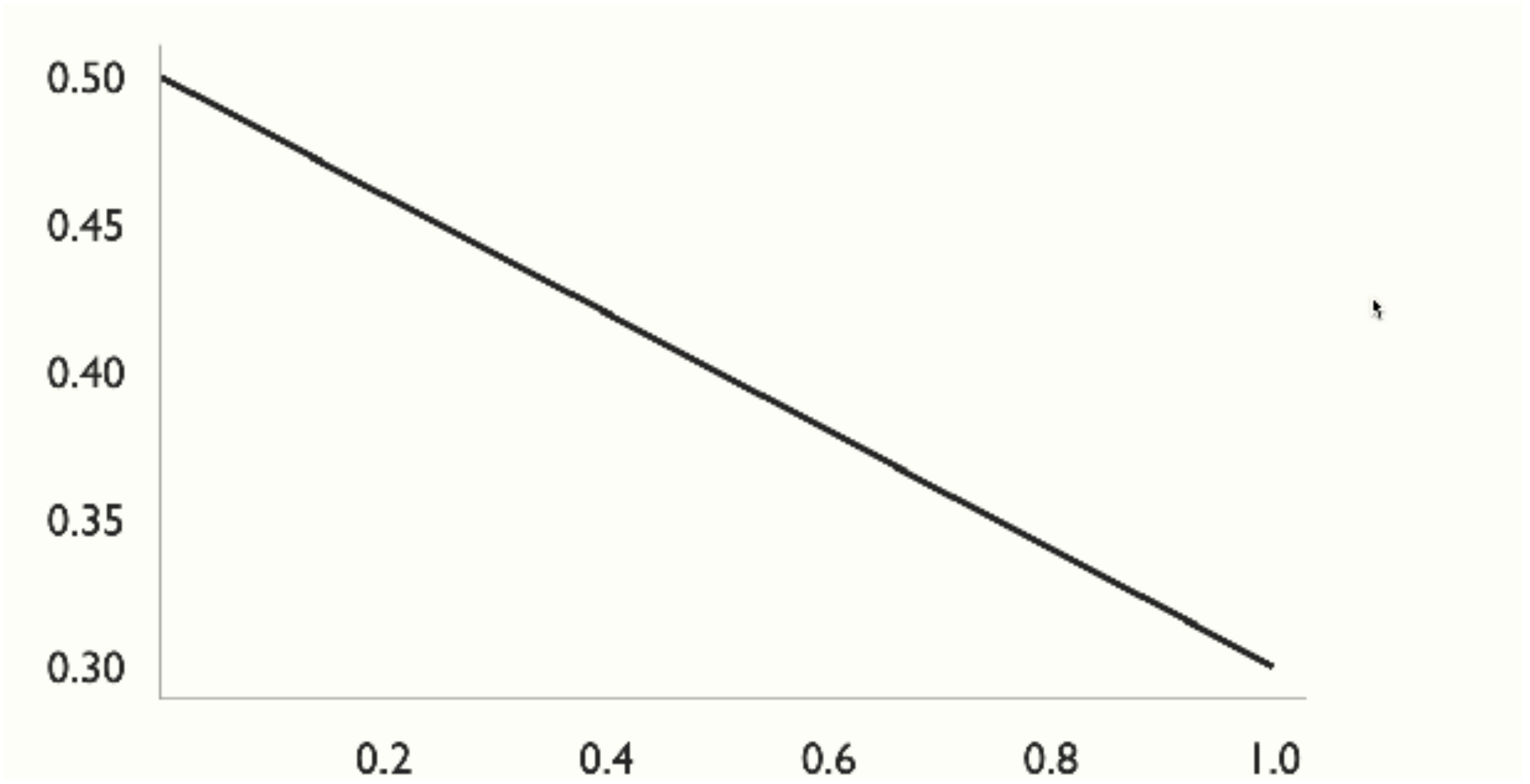
```
[Data
  name:”myCSVData”
  source:”my-file.csv” /]

[Table data:`myCSVData.slice(0, 10)` /]
```

making common tasks fast

```
[Data
  name:”myJSONData”
  source:”my-file.json” /]

[Chart type:line data:myJSONData /]
```

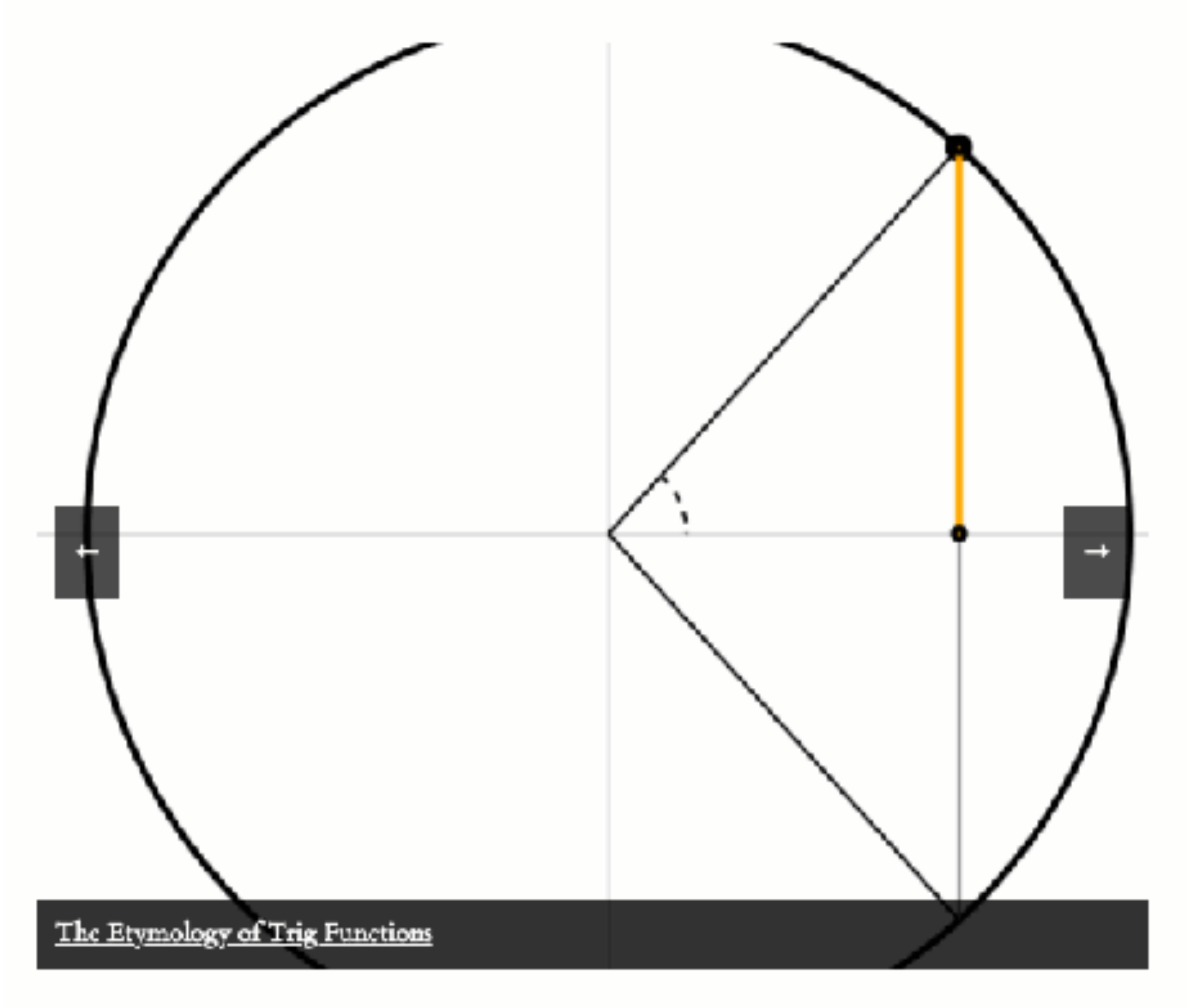
making common tasks fast

```
[Scroller … ]

  [Graphic]
    [Chart … /]
  [/Graphic]

  [Step]Step 1[/Step]
  [Step]Step 2[/Step]
  [Step]...[/Step]
  [Step]And so on[/Step]

[/Scroller]
```



making common tasks fast

```
[Stepper … ]

  [Graphic]
    [img … /]
  [/Graphic]

  [Step]Caption 1[/Step]
  [Step]Caption 1[/Step]
  [Step]...[/Step]

[/Stepper]
```



custom widgets

Generic components can only get you so far

Use React components from npm

Build your own React components

Guides to use other JS libs e.g. D3

custom widgets

Components are provided a special function `updateProps`

idyll markup

```
[SuperCoolComponent value:x /]
```

in component implementation

```
updateProps({ value: newValue })
```

custom widgets

```
class Range extends React.PureComponent {

  handleChange(event) {
    this.props.updateProps({
      value: +event.target.value
    });
  }

  render() {
    const { value, min, max, step } = this.props;
    return <input
     type=“range”
     onChange={this.handleChange.bind(this)}
     value={value} … />
   );
  }
}
```

custom widgets

```
class CustomD3Component extends D3Component {

  initialize(node, props) {

  }

  update(props, oldProps) {

  }

}
```

getting started

```
$ npm install -g idyll
```

workflow

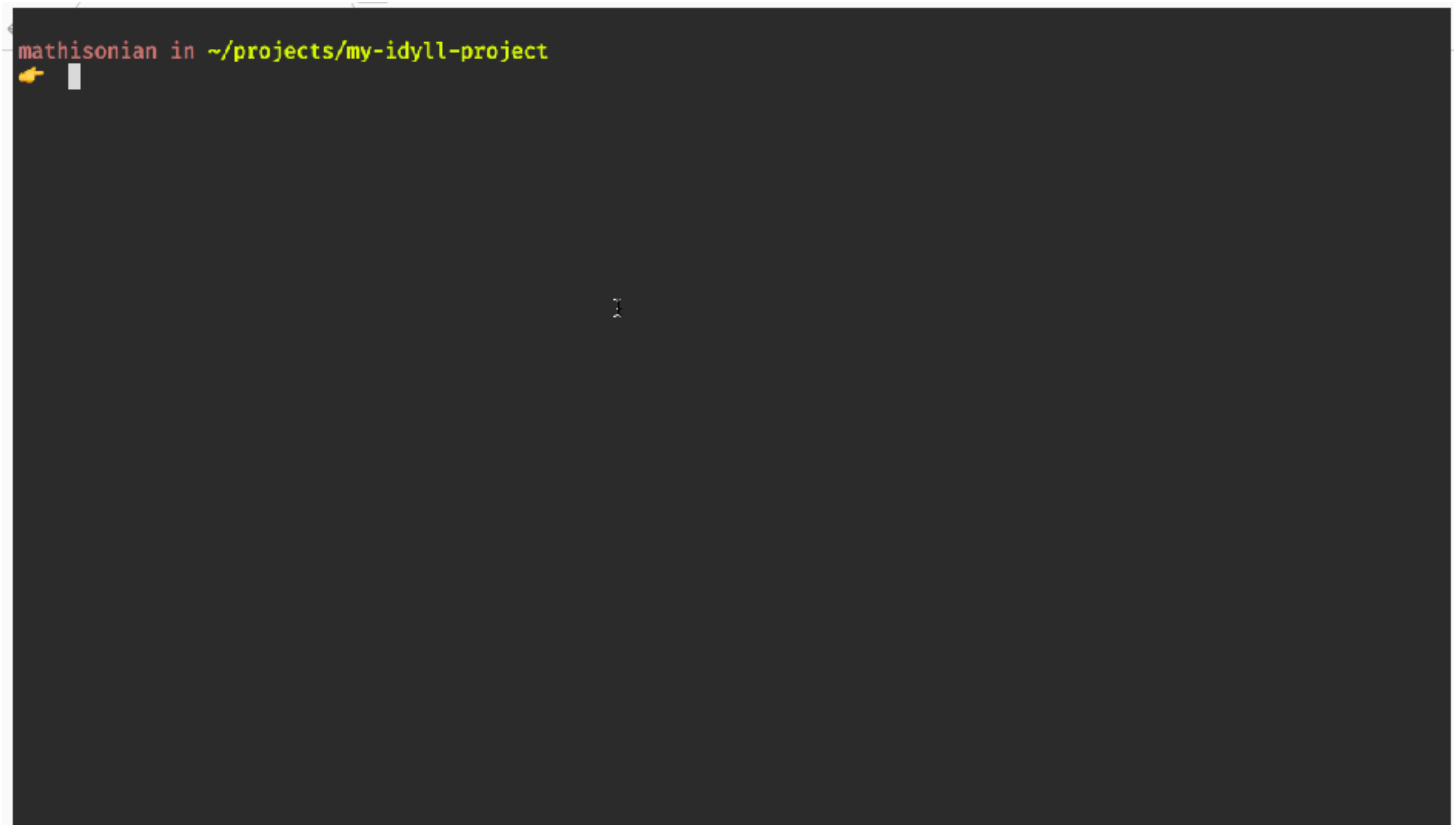
```
$ idyll create

$ cd <post-name>

$ idyll
```

```
mathisonian in ~/projects
👉 
```

publishing

https://idyll.pub/

```
$ idyll publish
```



```
mathisonian in ~/projects/my-idyll-project
👉
```

extending

Plugins!

Compile time or runtime

Possible to add, e.g. queries to the data import syntax

deployment

Idyll is 1.5 years old

Used in data visualization classes at UW, piloted with Folo Media

Suggested submission format for IEEE workshop on visualization + AI

Actively being used by developers and researchers

Examples and documentation pages viewed >100k times in the past year

thanks

Matthew Conlen
@mathisonian

@idyll_lang

https://idyll-lang.org

https://opencollective.com/idyll