

# Beyond The Peel

## Combining Art, Storytelling, and Visualization to Convey and Contextualize Map Projection Distortion

by **ESMÉ MIDDAUGH**



The public is increasingly familiar with the concept that “all maps lie.” Awareness of distortion, however, is only part of the equation. Cartographers must be able to demonstrate the specifics of map projection distortions, and do so in a way that is engaging and relevant to map readers. Specifically, cartographers must be able to show how distortion shapes the narratives consumed on a daily basis. To demonstrate this, cartographers must examine currently available techniques and consider others. This thesis presents the current research on map projection literacy before offering a thematic, artistic, storytelling-based alternative.

### FUNCTIONAL MAP PROJECTION LITERACY

While awareness may be greater, overall map projection literacy rates remain poor [1]. The need for functional map projection literacy is important now more than ever given the proliferation of viral maps and constant cries of “fake news.” Functional map projection literacy (FMPL) includes the ability to assess the fitness and effects of map projections in various instances [2], the cautiousness to view maps with a “healthy skepticism” [3], and the knowledge that there can be no perfect projection [3, 4].

Many effective methods exist to convey distortion [6]. However, these techniques are rarely used outside of textbooks. Map projections are often described through the metaphor of peeling and flattening an orange. While effective in explaining the concept of projections, this metaphor fails to convey the importance and impact of map projections on thematic maps. Furthermore, explanations using this analogy often do not dig deep enough to fully explain that distortion does not necessarily equal deception [5]. If the goal is a public that is literate in map projections, then cartographers must move “beyond the peel” in map projection education.

### RESEARCH QUESTIONS

**RQ1** In which ways could the general public benefit from a better understanding of map projections and their distortions?

**RQ2** What key methods are currently used to convey the effect of distortion?

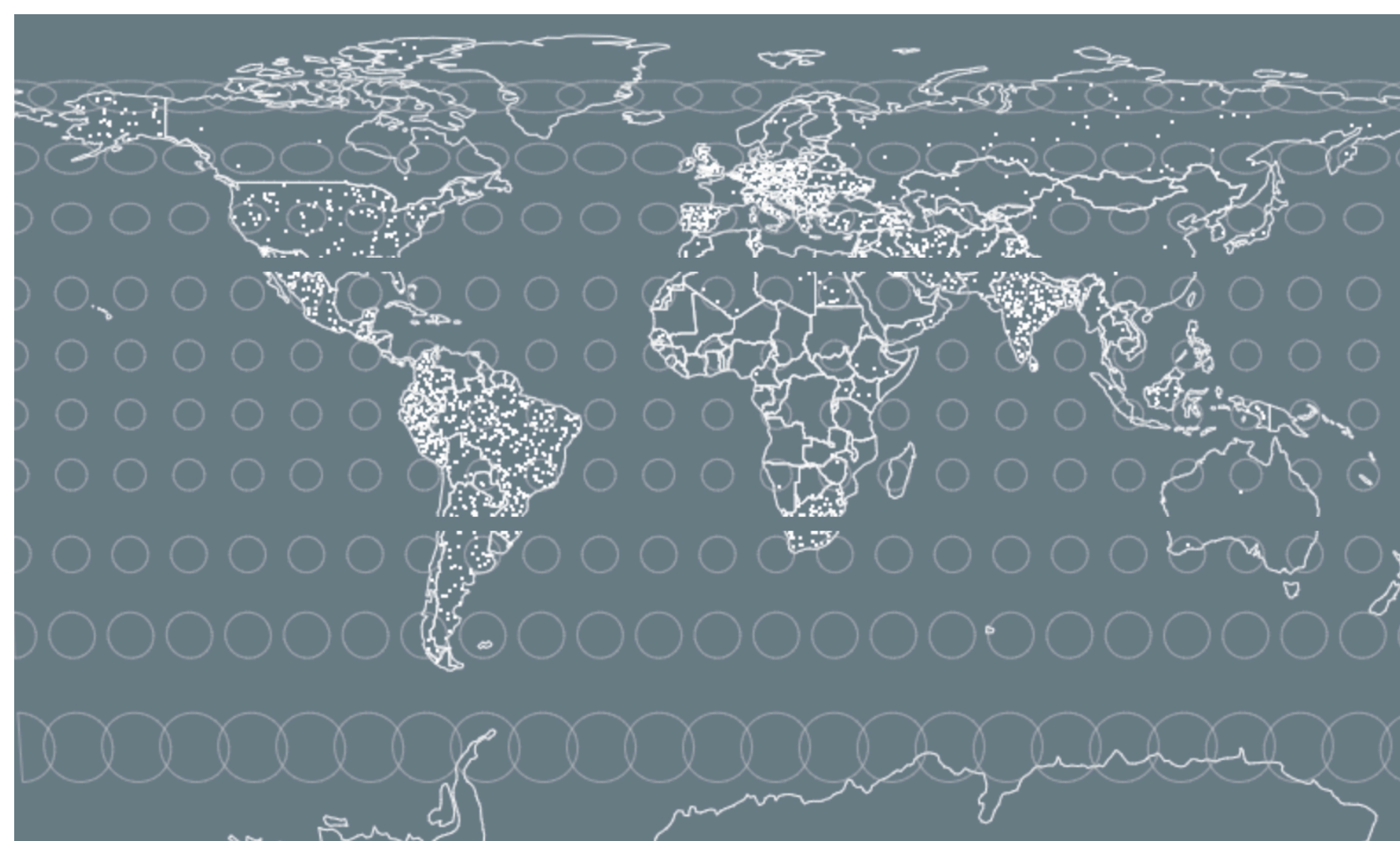


Fig. 1 The Projection Flipbook showing COVID-19 mortality data. This flipbook page is a combination of Baker, Equirectangular, and Mercator projections.

**RQ3** How might artistic and storytelling methods help to make distortion interesting, understandable, evocative, and relatable beyond the theoretical level?

**RQ4** What could an artistic, thematic, storytelling approach to conveying distortion look like?

**RQ5** What possible insights could be gleaned from the creation of such a project and how might one evaluate it?

### THE PROJECTION FLIPBOOK

The Projection Flipbook (TPF) website is an attempt to answer **RQ4**. TPF is a ‘flipbook’ of thematic (abortion rights and COVID-19 data) maps overlaid with Tissot's indicatrices that transition between different constellations of multiple projections. On the TPF website, the thematic maps and matching satirical titles appear as the user scrolls. An explanation of map projections follows the flipbook section. Data comes from the World Health Organization and the Center for Reproductive Rights. The project was created with D3.js and scrollama.js.

### RESULTS

Five participants were recruited and interviewed before, during, and after experiencing *The Projection Flipbook*. Participants were receptive and found the topic intriguing. While all participants had different takeaways, all had a better understanding than their baseline and some noted a more nuanced view of map projections.



Fig. 2 The Projection Flipbook showing the same abortion access data with two different constellations of the same projections.

### CONCLUSION

This thesis offers an exploration of new possibilities for map projection literacy education. It focuses on how to couple existing distortion visualization techniques with art and storytelling techniques to make map projections interesting, relatable, and understandable to those outside of cartography. Preliminary qualitative evaluation suggests that alternative techniques such as those used in TPF could be an effective way to move “beyond the peel” in conveying and contextualizing map projection distortion.

[HTTPS://MIDDAUGH.GITHUB.IO/PROJECTION-FLIPBOOK/](https://middaugh.github.io/projection-flipbook/)

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### KEYWORDS

map projections, visualization, art, distortion

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