Exploring US State Legislature, Sexual Orientation and Gender Identity Based Discrimination in Employment (2015-2017)

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Table of Contents

Data

This report is based on data collected from mainly two sources - the Williams School Institute - UCLA School of Law and the U.S. Equal Employment Opportunity Commission (EEOC). The Williams School Institute is dedicated to conducting rigorous, independent research on sexual orientation and gender identity law and public policy. A think tank at UCLA Law, the Williams Institute produces high-quality research with real-world relevance and disseminates it to judges, legislators, policymakers, the media and the public 1. The EEOC is responsible for enforcing federal laws that make it illegal to discriminate against a job applicant or an employee because of the person's race, color, religion, sex (including pregnancy, gender identity, and sexual orientation), national origin, age (40 or older), disability or genetic information 4.

The data collected by the Williams Institute contains the number of LGBT in each state in the United States, who are protected under nondiscrimination statutes as an LGBT worker (Age 16+), LGBT student (Age 15+), LGBT at public accommodations (Age 13+), LGBT in housing (Age 18+), LGBT adults for credits (Age 18+) 4. In addition, this data also contains a Yes/No identifier to distinguish which state has a statute for protection against discrimination in any of the 5 areas (education, employment, public accommodation, housing, and credit). A detailed methodology of how the data was collected and compiled by Williams Institute has been published and can be referred to in their original publication4.

We also conducted user research to determine what is most important to the people of the LGBT+ community. The details of the user research study are given below.

Based on the results from our User Research, we identified that we need to supplement the above data with the number of discrimination cases that occur in the workplace, educational institute, public accommodations, etc. Upon searching for potential data sources we found the number of discrimination incidents that happen in the workplace based on sex data from EEOC. Hence, we narrowed down our problem statement to analyze the un/protected statutes of LGBT+ in the workplace per state in the U.S. EEOC represents the number for total charges reflects the number of individual charge filings based on sex. The data are compiled by the Office of Enterprise Data and Analytics from data reported via the quarterly reconciled Data Summary Reports and compiled from EEOC's Charge Data System and, from FY 2004 forward, EEOC's Integrated Mission System. This does not include charges filed with state or local Fair Employment Practices Agencies 3.

Target Audience

The LGBT+ Community

Our target audience is the people who belong to the LGBT+ community. We have limited our scope of analysis just to the community and excluded the general population, as we believe the community can derive benefits from this analysis is affected by the laws and policies.

Prior Assumptions & Knowledge

Since this is a relatively larger group, it is our assumption that not everyone will not be aware of the laws and regulations that protect them. Despite the fact that some of the audience members might not be aware, but could be highly interested in knowing these statistics, as per the need. It is necessary to fulfill their requirements and make them aware of the statistics and policies that exist in different states.

Questions:

- What states legally protect me from SOGI (Sexual Orientation and Gender Identity) discrimination at work?
- Where can I find a bigger community?
- How do I select between states that don't offer any legal protection?

State and Federal policymakers

State and Federal policymakers who have introduced and passed the Equality Act bill and will be voting on in the Senate.

Prior Assumptions & Knowledge

They need to know how many people of different sexual and gender orientation are affected by unprotected nondiscrimination statutes in the different states of the United States. The audience is highly educated and has good years of experience in public policymaking. They will also be aware of the past, present and future policies involved in the context of providing protection against discrimination to LGBT+ community people.

Questions:

- How many people are vulnerable to SOGI* discrimination at work?

- How does my state compare to others?
- Does passing a law help historically?

Motivation

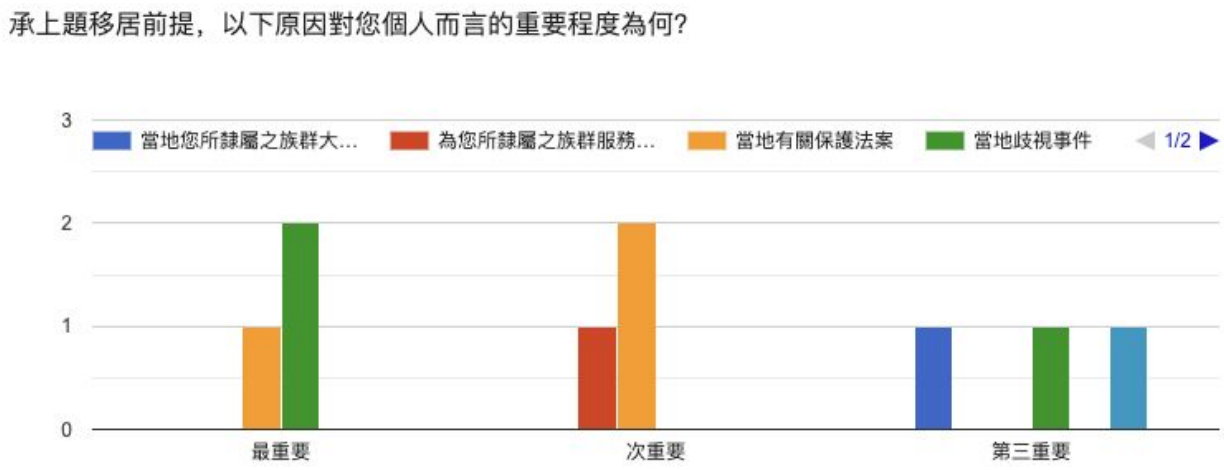
We wanted to understand the factors that affect the selection of a state for LGBT+ community members migrating from other countries to the USA, or members who are currently residing in the USA moving to another state for work. Our primary motivation was to help this audience decide based on factors that are most important to them.

For this, we conducted user research via a Google survey asking 3 students from Taiwan and 6 members of the workforce residing in the US. Since the population consisted of 2 different language speaking groups, we conducted our research via the same questions in our Google survey through 2 languages (Mandarin and English). We asked them about the factors that are most important to them while migrating or moving anywhere across a locality, region, state, or country.

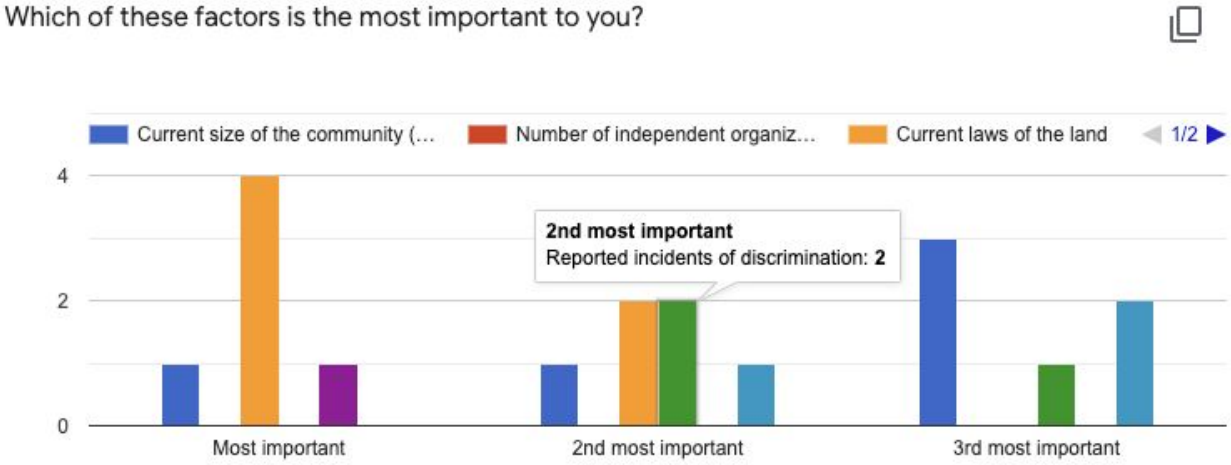
Below is a snapshot from the results of our survey in both languages, answering the question “Which of these factors is the most important to you?”. Based on the responses we identified three factors that are important to most members:

1. **the current size of the community in a particular state,**
2. **the number of reported incidents of discrimination,**
3. **and the current laws of land in the particular state.**

User research survey, Mandarin Version



User research survey, English Version



Ethical Concerns

Data

Data for the size of communities in each state is collected via various forums (Gallup Poll) and is self-reported by members of the community. This means that any errors in collecting this data such as biased usage of channels (e.g. online vs telephone) might lead to exclusion or over-inclusion of demographics. However, we have come to trust the data as it is collected by experts at credible organizations which we believe has a low error rate.

The way data was organized by Williams Institute might also lead to skewed analysis. For e.g. extrapolation techniques used for States with very low population and reporting channels. The complete methodology is explained in published report [4].

Since we had to combine data from 2 datasets (i.e. community size and discrimination incidents) in a meaningful way, we decided to narrow the community size to only represent the 'Employment' area. This decision was based on the availability of a dataset and hence the size might not be reflective of the actual size of the community. For e.g. if a state has far more young community members than members in the workforce, the state community size will be misrepresented.

Context

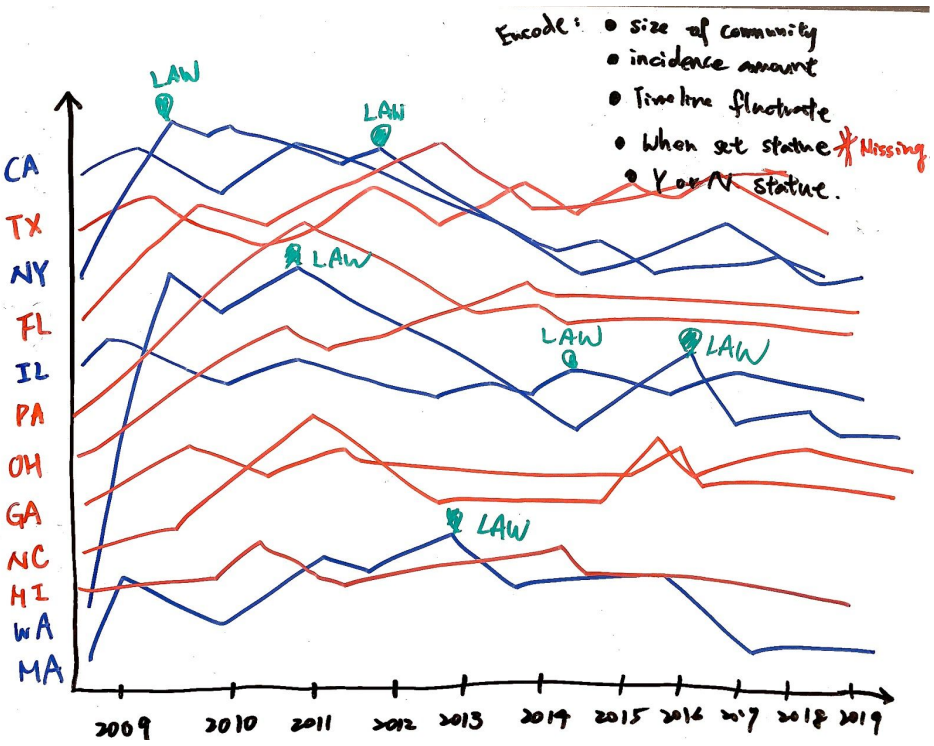
The subject that we are analyzing is very sensitive in nature. The inferences and insights that the different target audiences draw from our visualization could have an impact on the policies and laws that are formed in different states and nationally. It is imperative that unbiased and clear results are presented. A potential mitigation for this concern could be clearly providing a framework to read the visualization and draw conclusions about the data being represented. We have tried to incorporate this in our visualization by laying out the meaning and representation of each visual encoding (color, size & text).
Also, since we are using two different data sources, it is important to note that in the context of the study, any correlation drawn between the variables being represented may be incorrect unless a statistical test has been performed. For the scope of our work, we have not performed any such statistical tests and hence, we will not be deriving any conclusions of correlations in our visualization.

Audience

Since we are working with the members of the community that is susceptible to discrimination and risks, we tried to ensure during our user research and user testing that we do not pose any kind of risk or harm to any of our respondents by exposing their personal information. We also tried not to hurt the sentiments and feelings of our community by using any kind of offensive language. It was also important that while conducting our research we don't invade their privacy or breach the confidentiality of information the users provided us.

Iterations (3 sketches)

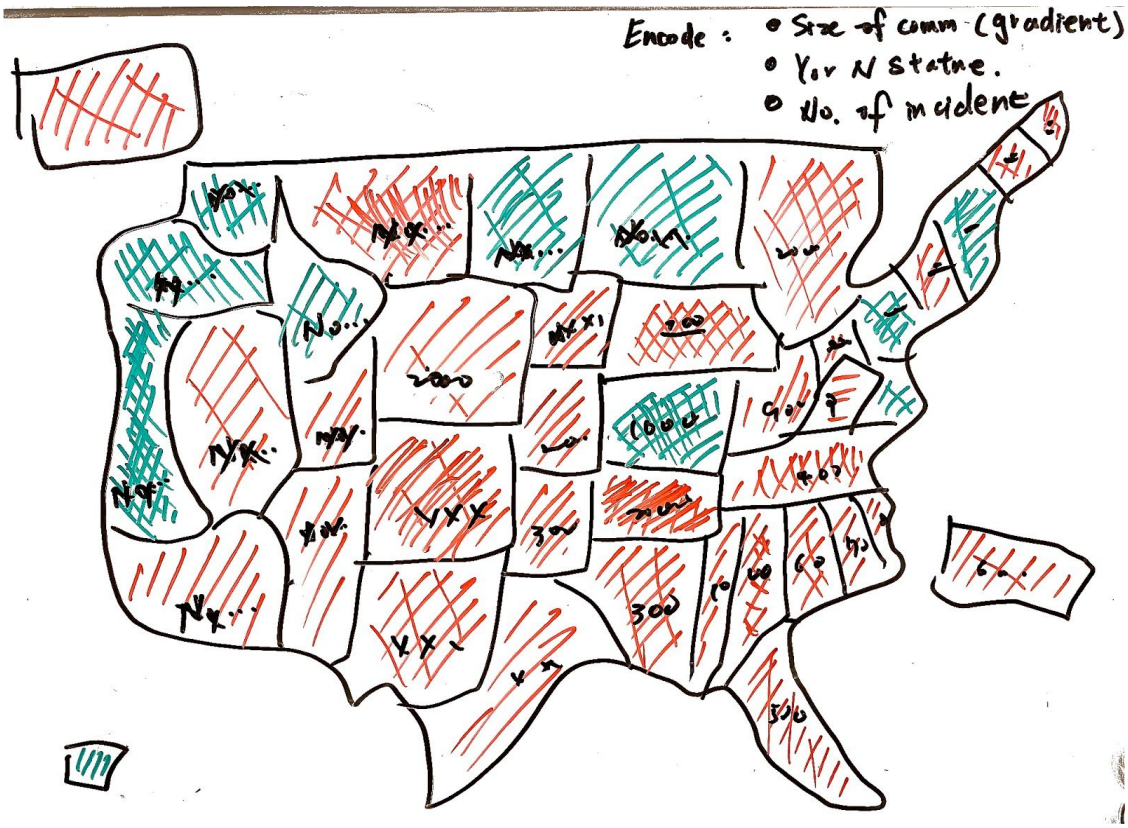
Iteration I (Time-series - Effects of Law)



Design Rationale:

The visual encoding in this visualization includes the timeline fluctuation of the reported incident presented by the lines, the size of the community presented by a top-down order, whether the states have an explicit statute to protect the community or not presented by the color green as yes and red as no, and the year when the statute was legislated by the highlighting green dots. We thought this would be a good way to not only show the basic information of whether a community member in the state is protected or not, and how big of the community, it also infers an important message of the effect of the statute by seeing if the numbers of incidents dropped or not after the statutes were legislated. However, we faced several issues with this particular visualization. First and most important of all, we do not have the data of the exact years when the statutes are legislated, secondly, we were crowding the graphs by showing all 50 states. While we could clean up the graphs easily by reducing the states shown, we failed to come up with a valid reason to not show every state. Hence we quickly moved on from this iteration.

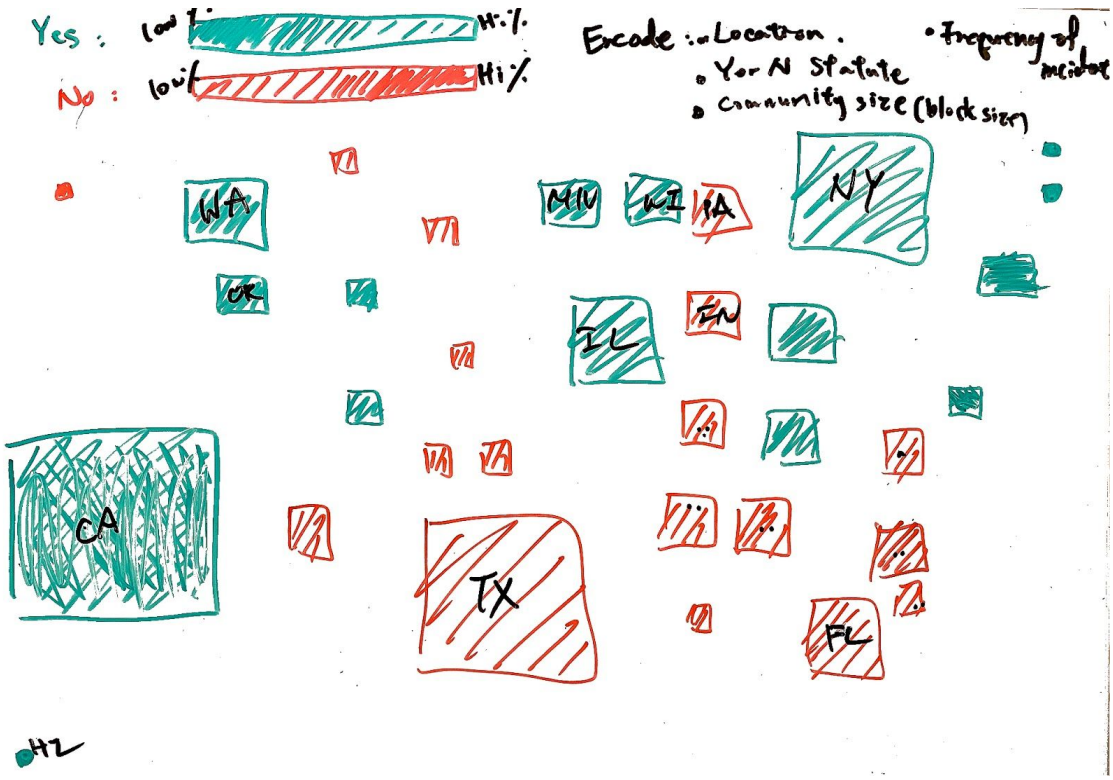
Iteration II (Choropleth Heatmap)



Design Rationale:

This is our second iteration process. We adopted an entirely different route with the second iteration and opted for cartography instead. After realizing that without the exact year of when the statutes were legislated, the timeline element no longer answers the questions our audience might have, so we decided to forgo encoding the time element entirely. With this visualization, the visual encoding included are the location of each state presented by the cartographic mapping, the comparison of size of community presented by the gradient of colors, whether the states have statute to protect the community or not presented by the color green as yes and red as no, and finally the number of reported incident presented directly and numerically. After sketching out this visualization, we realized a huge pitfall by showing the “exact number of reported incidents”: We failed to consider the population of each state. The bigger the population the state has, the higher the number of incidents is bound to be, which makes comparing the exact number of each state biased and false. Hence we decided to conduct another round of iteration for the visualization.

Iteration III (Sized Grid Cartogram)



Design Rationale:

This is the final iteration for the visualization, and is what we eventually decided to go with for the final visualization. For this visualization we stepped a step further from the map and adopted a grid cartogram. We were inspired by a set of visualizations done by Sylvain Lesage, a fellow user on Observable. The final visual encodings we decided to include in this visualization are the relative geographical location of each state presented by the grid blocks, whether the states have statute to protect the community or not presented by the color green as yes and red as no, the compared community size presented by showing different size of the grid blocks, the comparisons of frequency of reported incident per member (calculated by dividing the number of incidents by the size of community) presented by the gradient of colors. In order to avoid bias and false information the actual reported number might have, we decided to calculate the frequency per member in the community instead.

Visualization before User Testing (web version)

Visualizing LGBTQIA+ communities in USA, their explicit protection by law, discrimination charges in the employment sector for the years 2015-2017

Size

Each tile in the visualization represents the size of the LGBTQIA+ community in that state in the "Employment" sector aggregated over 2015-2017. Methological notes on how this was calculated can be found in the original report published by Williams Institue.

Color

Red shaded are for states that **DO NOT** explicitly protect communities in their legislature.

Green shades are for states that explicitly protect communities in their legislature.

Color Gradient

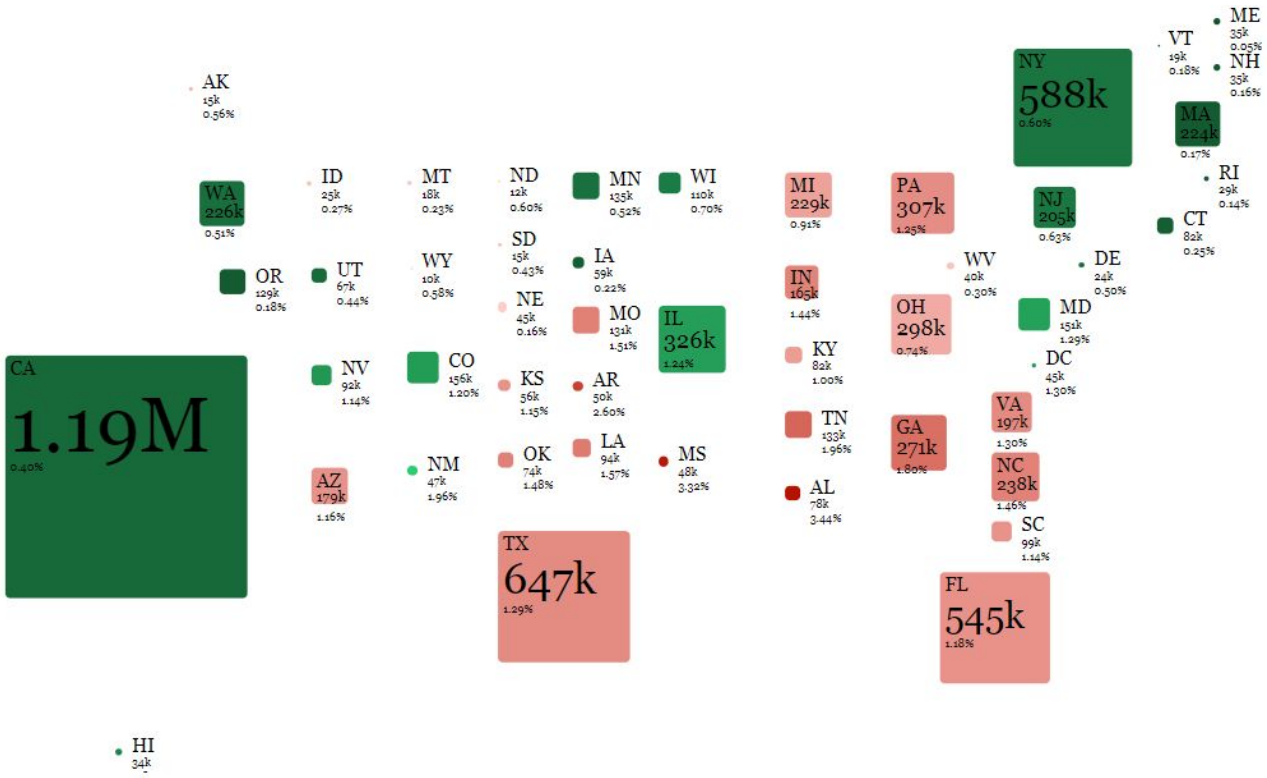
The gradient represents the total cases of descrimination filed in 2015-2017 as percent of the aggregated size of the community for that state, in employment.

Darker green shades represent a **lower** incident rate.

Darker red shades represent a **higher** incident rate.

Text

States abbriviation.
Aggregated size of Community (2015-2017).
Aggregated decrimination charges as percent of community size (2015-2017). size of the community for that state, in employment.



User Testing Details

Protocol

With the visualizations we want our audience to gain insights into 3 things:

- What is the size of LGBT+ population in a particular state in the United States?

  We want our users to understand which states have what sized LGBT+ communities. This information will also help them understand the percent of incidents in the state, as it is relative to the size of the total LGBT+ population.

- How many incidents of discrimination based on sexual orientation in the workplace are reported in a particular state in the United States?
  We want to test whether the percent of reported incidents is an understandable measure for our target audience, in relation to the total population of the community. This measure helps understand how many incidents are reported per the community size.

- Which state has laws that protect LGBT+ community from discrimination in workplace?
  This is a relatively simpler measure, showing whether a state has a law to protect the people of the community or not against discrimination in workplace. We want to understand if the visual encoding used to represent this information was easy to understand for the target audience, and they were able to derive the insights.

We have sent out emails to participants asking them to spend time with the visualization and participate in a web-based survey. Below are the questions asked in the survey:

Questions

1. Which states house some of the biggest LGBT+ communities in employment?
2. Could you spot some of the smallest communities on the map?
3. How difficult is it to understand and compare the sizes of these communities?
4. Would you be able to calculate the number of discrimination charges for any given state only on the basis of the above visualization?
5. Can you easily understand which states have explicit legal protection for diverse sexual orientations and gender identities and which ones don’t?

6. Which states, in terms of the size of the unprotected community, need action and would benefit the most from the passing of the Equity Act bill? Think like a volunteer/activist
7. Can you find states with a decent sized community with a low discrimination rate?
8. Can you find states with a decent sized community with a high discrimination rate?
9. Do you have any feedback, concerns, thoughts, suggestions that we may use to improve this visualization?

Participants

Our study participants are our Target audience 1 - i.e. people belonging to the LGBT+ community. In our user research we asked for emails from persons willing to take part in user testing. Participants include members of the community already in the workforce and also aspiring graduate school students who will be entering the workforce in the near future or international students turned employees of different occupations.

We made sure to screen out participants that are not of the target audience so that we do not need to collect participants' profiles. We chose not to collect detailed participants profiles for privacy concerns, hence no user profile will be specified here. 5 responses were collected.

Outcomes

Survey Results

While the participants have no problem identifying the states that have some of the biggest LGBT+ community sizes, due to the small pixel sizes of the states with smaller community sizes, the participants express various levels of difficulty in identifying the smaller ones.

The participants have no problem comparing the sizes of the community of different states since the size differences are drastic, however, one of the participants mentioned that the smaller ones are, once again, hard to compare.

The green and red contrast of showing whether the states have statutes regulated to protect the LGBT+ is very apparent according to the participants' survey answers.

The gradient design to indicate the rate of discrimination, however, seems to be confusing for the users for some of them failed to identify which states have lower discrimination rate when having statute. The darker hue of a green seems to give a false indication of having a higher density/rate, which in the case of our design is of opposite concept.

Participant Feedback

Participant 1

The participant managed to answer all questions without too many mistakes, but they mentioned that the color of the states with smaller pixels were really hard to identify at first glance because they are far too small for human eyes. He also suggested adding texture to the visualization to help color blind users read the visualizations.

Participant 2

The participant managed to answer all questions, however, as they were not able to provide the most accurate answers to the questions since the gradients are hard to compare, they decided to provide multiple answers for each question. They mentioned that the visualization contains too much information in one single view, and suggested that they would have an easier time consuming different types of information if the visualization provided ways to cut the data different ways. They also expressed not noticing the cartogram was scattered based on the USA map.

Participant 3

The participant was not able to answer questions specifically ones about the states that have no statute. They complained that all different hues of red somehow looked way too similar for them to identify the differences, pick out the darkest, and sort out comparison orders. They also mentioned once the hover effect was triggered, the dark green hue provided too little of color contrast and made it hard to read the textual contents. Finally, they also suggested cutting the data instead of stuffing all the information in one view.

Participant 4

The participant managed to answer some of the questions correctly but mistook the states with darker green as states with higher discrimination rates, which is the exact opposite of what we designed, despite reading the legend first. The participants also missed out on the states with the smaller pixels, indicating that 1px is too small to be noticed. The participants suggested that even though they realized early on that the

cartogram tiles are positions based on the geographical locations of each state, they still think an outline of the USA could be layered underneath the cartogram.

Participant 5

The participant managed to answer all answers correctly without any specific issues, however, they did suggest that the red/green color palette design is not friendly towards color-blind users.

Insight Highlight

- The sizes of some states with smaller communities were too small (1px) to notice.
- The hover effect of the darker hues makes it difficult to read the text due to too little color contrast.
- The different gradients are confusing for some users:
    - Gradient is not the best design choice when it comes to sorting out the exact comparison orders.
    - Some participants had mistakenly chosen the ones with darker green as the states with higher discrimination rate.
- The red/green color palette is not friendly toward color blind users.
- Multiple participants expressed that they had a hard time identifying the scattered cartogram tiles as the USA map.

Plan of Changes

After compiling all the response we gathered from the users in the usability testings, we came up with a couple of improvement ideas:

- Simplify the color scheme to accommodate color-blind users.
- Add state names and whether or not the state has a statute or not on hover to compensate for pixels too small to read.
- Layer a USA map outline underneath the tiles to provide better orientation and indication of geographical position.
- Simplify the encoding and data ink ratio to lessen the cognitive load needed for one view, reduce textual information on the cartogram, and enable easy comparison for discrimination rates by splitting the visualization down to two graphs.

Final Visualization (web version)

Visualizing LGBT+ communities in the USA, their explicit protection by law, discrimination charges in the employment sector for the years 2015-2017

Size

Each tile in the visualization represents the size of the LGBTQIA+ community in that state in the "Employment" sector aggregated over 2015-2017. Methological notes on how this was calculated can be found in the original report published by Williams Institue.

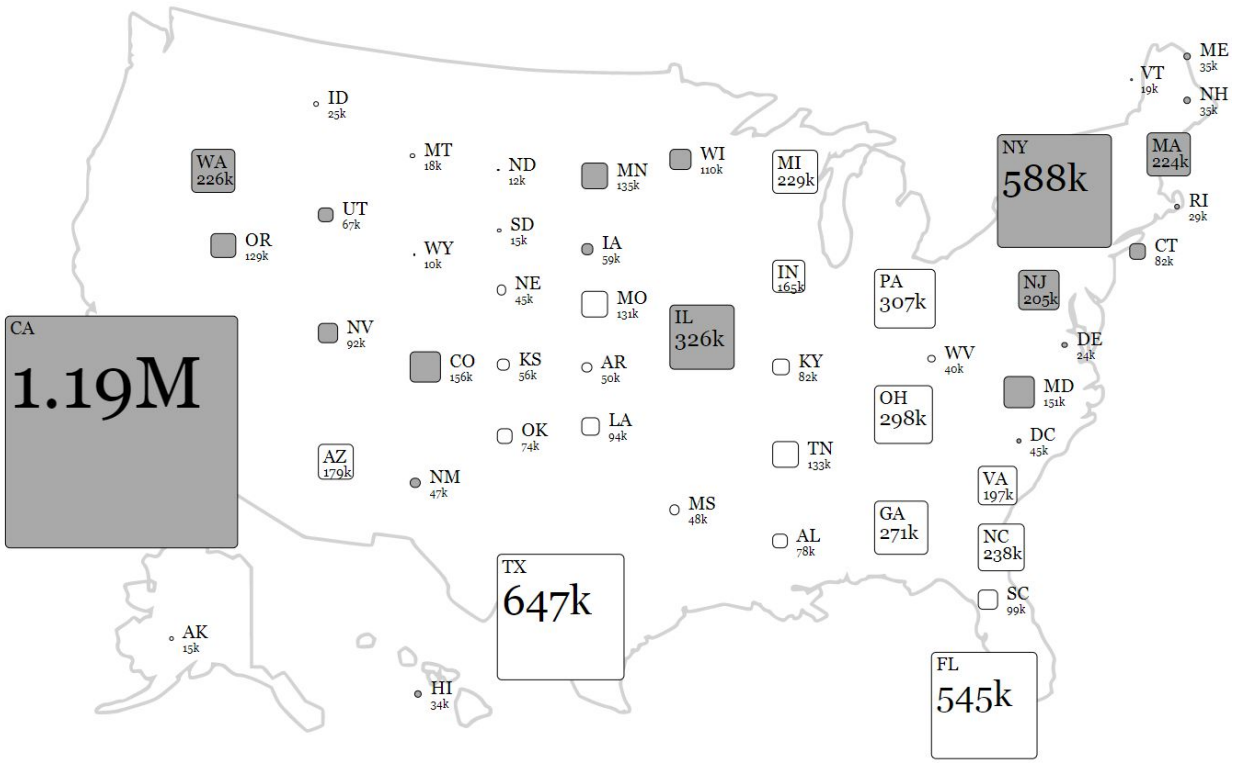
Color

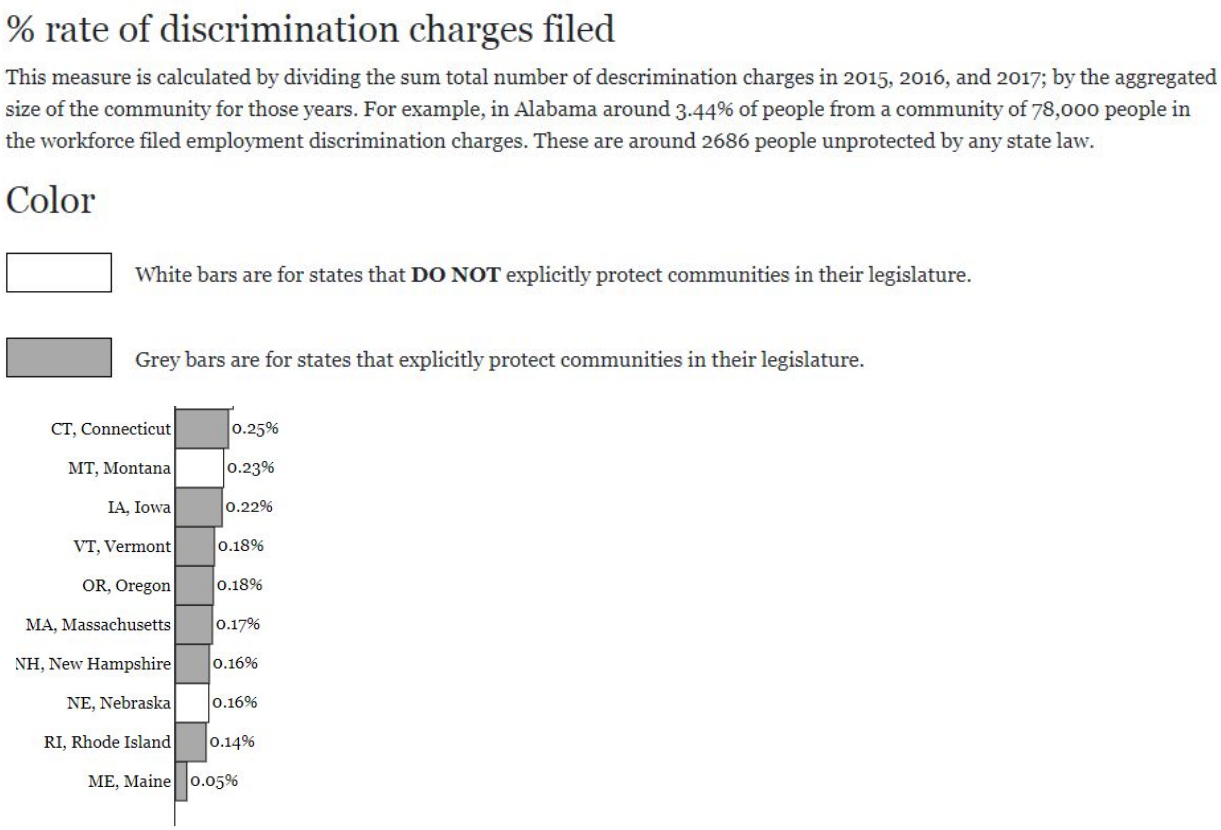
White squares are for states that **DO NOT** explicitly protect communities in their legislature.

Grey squares are for states that explicitly protect communities in their legislature.

Text

States abbriviation.
Aggregated size of Community (2015-2017).





For the final visualization a custom SVG for the size grid cartogram was created using Figma. The size of each grid cell was calculated based on community size and manually set in Figma. Visual encoding was then added using D3. Since the data retrieved from sources was a single attribute column and clean, we did not perform any additional data cleaning or manipulations.

References

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4. LGBT People in the U.S. Not Protected by State Nondiscrimination Statutes https://williamsinstitute.law.ucla.edu/wp-content/uploads/Equality-Act-April-2019.pdf
5. Cover page image source: https://www.artiiseo.com/best-colored-pencils/