Ideological Warheads: Mapmaking and its Geopolitical Consequences Among High School Students

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Introduction

In the year 2021, politics have entered the global scale to a degree not seen until now. It's next to impossible to discuss a topic or issue that affects one country without noting how it affects another nation. Even more so, students have taken the initiative on many world issues, using their own resources to attempt to make change. With tensions increasing worldwide, maps become weapons as powerful as any knife or gun -- ideological warheads used to change hearts and minds on countless international issues, both major and minor. In the modern era, it's increasingly important to become conscious of the data being consumed, especially so in times of misinformation about important issues. Maps have always been considered a form of data visualization, however the use of maps as persuasion came to fruition during the first and second World Wars, dating back to Nazi party propagandist Arnold Ziegfeld declaring before World War 2 that

> "the suggestive map shall have its function in creating the abstract expression of a slogan[...]inescapable psychological effect [gives] the suggestive map its importance as a political weapon and educational instrument." (Herb)

If research is not taken into the usage of these persuasive or 'suggestive' maps, nations could be unprepared in the event that maps, a medium that is supposedly airtight in it's scientific backing, are used by a foreign actor to influence ideology

among the youth, resulting in an entire generation of decision and policy makers dealing with the effects of an ideological shift. While research has been done within the scholarly community regarding the elements of persuasive maps and how they function, little research has been done with live data regarding the youth. As a result, this paper will attempt to qualify the extent to which persuasive maps affect the geopolitical worldviews of high school students.

Literature Review

Persuasive Cartography & The Language of Maps

While the concept of persuasive cartography has been studied since World War 2, the term "persuasive cartography" was first coined by California State University Professor of Geography Judith A. Tyner in 1982. In 2015, Tyner returned to the topic of persuasive cartography with "Maps as Language/the Language of Maps" and asserted that maps as a medium were best used as languages to communicate information through. However, an important caveat of the communication model was the so-called 'noise' -- a form of design choices from the cartographer that could result in the data being difficult to understand or 'corrupted', which culminated in the mid to late 20th century, namely the 1960s and 1970s. As a result, the model was phased out and eventually dismissed among many cartographic experts. Despite the dismissal of the communication model, Tyner argues that the concept of communication information via a cartographic medium is still a valid one, even if not paralleled through the concept of a telephone or radio, and proposes that communicative maps be modeled around the question of "How do I say what to whom with what effect?" (Tyner 1982)

In the same piece, Tyner strengthens the analogy of cartography as a language by extending the rhetorical composition structures of exposition, narration, description, and persuasion to cartography as well. Through this extension, Tyner categorizes maps into:

- Expository maps, that seek to explain information, such as a textbook map
- Narrative maps, that seek to tell a story, such as a map in a history book
- Descriptive maps, that seek to describe or show information, such as a map of a shopping mall
- Persuasive maps, that are designed to convince the reader of something, be it to purchase a product or to believe in an idea.

In addition, these categories can be (and often are) combined, much like the linguistic concepts they were modelled after. (Tyner 2018) Through this analogy of cartography as a language and method of communication, we can begin to understand the framework that persuasive mapmaking uses in order to influence people, as well as the ideas of the scholarly community regarding persuasive maps.

Political Significance of Data Visualization

In University of Bergen professor Torgeir Uberg Nærland's "Political Significance of Data Visualization", the broader practice of data visualization in a political context is reviewed and analyzed. More directly, this ties into not only the persuasive mapmaking examples laid out in Tyner's analysis, but also into the question of geopolitical worldview and its influences. Nærland begins by asserting

that in order the effects of data visualization to be considered 'significant', the effects must have real-world contexts and demonstrate a connection to either the uprooting of current political structures, or the maintenance of those same structures (the status quo). . Nærland also makes the important distinction between two different classes of the individuals who are exposed to and influenced by data visualizations; the 'weak' publics and the 'strong' publics. 'Weak' publics are classified as individuals whose exposure to visualized data will result in exclusively the forming of personal opinions, whereas 'strong' publics are individuals whose exposure to visualized data will result in both the forming of personal opinions and political decision making. (Nærland) As a result, it becomes important to differentiate between these two groups when qualifying both the effect of persuasive maps on the geopolitical worldview of individuals, as the 'effect' could vary based on which group the individual falls under.

Seeing from Above

"Seeing from Above: The Geopolitics of Satellite Vision and North Korea" by Dr. David Shim, a senior fellow of the German Institute for Global and Area Studies and expert on the relationship between visuality and world politics is most important I found documents because it actually analyzes information regarding maps. Shim took a look at statements from American officials as well as the American public regarding satellite maps of the Democratic People's Republic of Korea (commonly known as North Korea), an American diplomatic adversary. During a discussion of a quote from former American general and Secretary of State Colin Powell regarding the topic of satellite imagery and the complexity of the

subject matter, Shim stated:

> "Since satellite images do not inherently indicate how they should be read, the interweaving of such photographs into a larger context of other signs tell the viewer how they have to be interpreted. Similarly to a visual manual or a set of visual instructions, the accompanying marks direct the viewer to see what the presenter wishes to make visible, thereby reducing the number of possible meanings." (Shim)

In this quote, Shim is essentially stating when viewing this information , the context of the information being presented and how the information is presented largely affects the way persuasive elements or information influence the viewer or reader. Even though the maps discussed by Tyner and other experts within the scholarly community are not the same as satellite images, they both nonetheless represent a visualization of data in a geographic manner, and in the case of the North Korean satellite image, represent that data through a political lense. However, Shim's analysis of data visualization offers a slightly different viewpoint to that of Tyner's theory of maps as a language. Whereas Tyner believes that maps are a language that can on the forefront of spreading influence, evident from her analysis of persuasive maps as a way to convince the reader alone of an idea, Shim paints a picture of data visualization (and by extensions maps) as a tool to guide information into a larger subject. This is especially evident from the above quote, where Shim notes that the viewer has to be told how exactly to interpret something, in contrast

with the suggestion and fluidity of a language.

Hypothesis

Based on information found during my literature review, namely Tyner's analysis of maps as language and Shim's statements regarding imagery being used to direct the viewer to interpret data in a specific way, I hypothesize that persuasive maps, and by extension persuasion-oriented cartographers, will be effective in manipulating the geopolitical understandings of high schoolers.

Methodology

In order to conduct research, I utilized an online survey consisting of 14 questions. In this survey, respondents were asked to first and foremost provide their age in years, and their year in high school, if any. Afterwards, the respondent would be presented with a map that was identified by myself or experts using evidence from scholarly research to exhibit persuasive strategies or elements in order to sell a viewpoint. After having been presented with this map, respondents would answer on a scale of one to five how the map made them feel about the subject matter depicted. After answering this question, I then revealed to the respondent via another question of information that could make the map biased or persuasive in some way and asked if knowing this information changed the trust of the respondent in the contents of the map presented, with options of "yes", "no", or "maybe". This process was repeated for a total of 6 maps. The survey was distributed largely via social media outlets, namely Instagram, Snapchat, Reddit, and Discord, and sent into communities within these platforms whose target audience was high school students.

In crafting my survey, I noted two significant influences in crafting my survey First and foremost, I utilized Cornell University's P.J. Mode Collection of Persuasive Maps as a source for many of the maps that I would go through whilst crafting my survey. This collection houses a number of maps throughout history that utilize persuasive or suggestive methods in order to convey information, in line with the theories provided by Tyner and other members of the scholarly community. (Mode) Using this collection, I was able to find specific maps to be used for research based off of the persuasive elements pictured. Secondly, one of the first pieces of media I looked at whilst exploring the conversation regarding my topic was the Pew Research Center's 2016 report on fake news. After having explored the scholarly conversation regarding persuasive maps, I returned to the 2016 Pew report and examined its structure; the survey had only 7 questions, and utilized a small number of answer choices. (Pew) From these two publications, I was able to begin blueprinting what my survey would look like

In Frank K. Wright's 1942 piece "Map Makers are Human", a number of misleading or 'subjective' elements within maps are laid out in order to better understand ways that map makers make mistakes so that these mistakes can be remedied in further expository maps. (Wright)Mark Monmonier's "How to Lie with Maps" expands on these elements by laying out how these misleading elements could be used intentionally as persuasive maps in order to influence ideology and opinion. Wright and Monmonier laid out a number of these elements. Misuse of generalization and geometric functions, meaning the changing of shape, size, or

presentation of information, was a common element, as well as the misuse of comparative scaling, meaning either the relation of one object's size to another, or of the size of a significant object to the map. Equally as notably was the use of colour to persuade,as colour theory remains relevant in both the marketing and cartographic worlds. Less frequently, yet still notable, the uses of numerousness of objects and the usage of disputed national borders to persuade were also found to be elements that could be used to mislead in cartography. (Wright, Monmonier)

Based on these elements, I put together a group of 6 maps to be included within the survey. I utilized the P.J. Mode Collection of Persuasive Cartography to source the first four maps that would be used in my survey, largely because the maps featured in the collection were clear cut examples of the elements that Frank and Monmonier had identified as persuasive. First and foremost was British teacher and author Arthur Mee's "Flags of a Free Empire", a 1910 world map that depicts the British Empire, but the flags of British territories are placed at an inflated scale and display numerousness, making the map persuasive based on the previously mentioned factors. Next was Australian cartographer A.C. McDonald's "Australia Compared with Europe", a 1907 map that compares Australia's geographic size with that of Europe. This map utilizes the generalization of geometric functions as well as scale in order to make the conclusion that Australia is larger than Europe. For example, borders of the Russian Empire, despite being a country with territory within Europe, was not included in the map so as to ensure that Australia would be bigger than Europe. After this was the 1979 TIME Magazine map of World Refugees, which was nearly 60-70 years more modern than the previous two maps, but still

represented a significant usage of numerousness in order to make the number of refugees seem overwhelming. In addition, the numbers remain static in scale or size no matter the amount of refugees present; for example a group 5,000 refugees in the Philippines are represented as equally as another group of 600,000 in Ethiopia. The final map I sourced from the P.J. Mode Collection was a propaganda map from British cartographic firm Roberts and Leete created at some point during World War 1. This map used the element of disputed borders and colour theory in order to make Germany seem overwhelmingly aggressive. In addition, there are a number of sources listed on the top right of the map, however the validity and facts of these sources are largely disputed, as some of the people cited have no credibility, such as one person labeled 'Son of a former German colonial governor'. (Mode)

In sourcing my final two maps, I broke from the P.J. Mode Collection in order to delve into territory that had not been analyzed as persuasive within the scholarly community so as to ensure that a new understanding of the topic would be formed. I first utilized the Mercator Projection, an age-old geographic map projection created in the mid 1500s by Flemish cartographer Gerardus Mercator. The Mercator Projection is unique because it was created to standardize the directions that appeared on maps; As a side effect, however, the Equator line is extensively reduced in scale compared to other areas of the map, resulting in locations like Greenland appearing larger than almost the entirety of the continent of Africa, in what is a form of geometric generalization. My final map was a geographic visualization of the 2019 Global Democracy Index released by the Economist Magazine's Intelligence Unit. This map utilizes extensive colour theory, portraying nations that have a high

placement on the democracy index in a calm blue and nations that have a low placement on the democracy index in an angry orange-red. Because the map covered information from within the past 5 years (Intelligence) without depicting a specific incident or topic that could cause offense, I utilized it for my survey.

Results

The online survey yielded a total of seventy-six responses. Of these seventy-six responses, only sixty-seven were eligible for use within the study. The nine responses expunged from the studied data consisted of one response that failed to agree to the consent form, seven responses from individuals between the ages of eighteen and twenty that indicated that they were not in high school, and one response from an individual aged fourteen who also indicated that they were not in high school. In expunging data, I removed respondents exclusively on a response that indicated that the respondent was not in high school. As a result, nearly 11.8% of the raw data collected was expunged from being analyzed.

Of the remaining sixty-seven responses, the ages given ranged from thirteen to eighteen years old. 37.3% of respondents, or twenty-five respondents, gave their age as sixteen years old, 29.9% or twenty respondents gave their age as seventeen years old, 20.9% or fourteen respondents gave their age as fifteen years old and 9% or six respondents gave their age as eighteen years old. The ages of thirteen and fourteen were represented by only one respondent each, making up 1.5% individually or 3% between both of those individuals. Indicating a majority, 58.2% of respondents, or thirty-nine respondents, indicated that they were in their 11th, or

Junior year, more than any other group combined. 23.9%, or sixteen respondents, indicated that they were in their 10th, or Sophomore year, 13.4%, or nine respondents, indicated that they were in their 12th, or Senior year, and finally 4.5%, or three respondents, indicated that they were in their 9th, or Freshman year.

As seen in Figure 1, when presented with British author and teacher Arthur Mee's 1910 map "Flags of a Free Empire", the majority (85%, or fifty-seven respondents) of respondents answered 4 or 5, indicating that, based on the map, the British Empire is either very large or somewhat large, with a minority of 15% of total respondents, or ten respondents, being either neutral about the subject, or believing the Empire to be small. After having been exposed to the origins and the

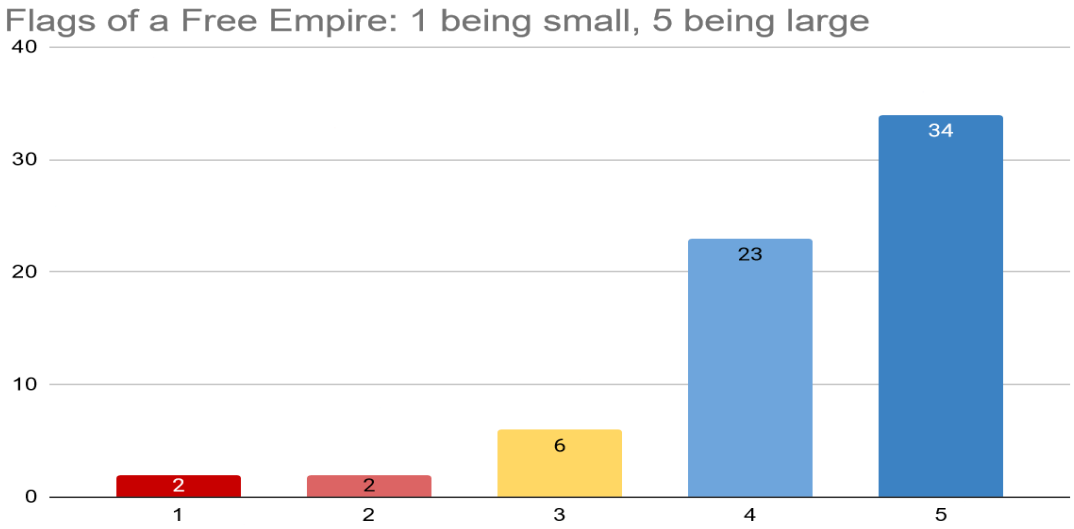

Figure 1. Responses to question "On a scale of one to five, how large does this map make you feel the British Empire was?"

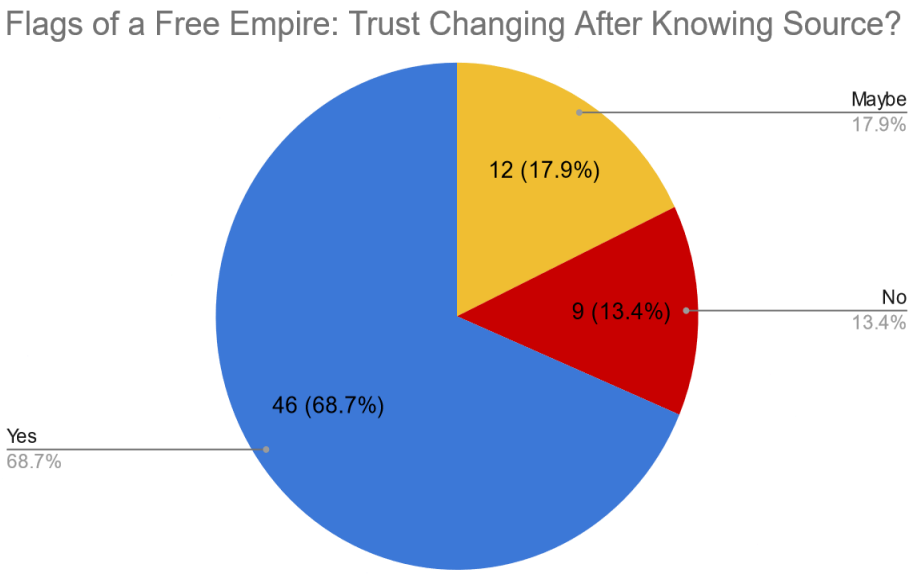

Figure 2. Responses to question "This map was made by British author and teacher Arthur Mee in 1910 for a children's book, and was intentionally designed to make the British Empire look larger. Does knowing this change your trust in the map's contents?"

connections of the mapmaker and asked whether or not knowing this information made the respondent change their opinion, the majority (68.7%, or forty-six respondents) answered that they would, as seen in Figure 2. 17.9%, or twelve respondents, indicated that knowing this information might make them change their opinion, and 13.4%, or nine respondents, indicated that they would not change their opinion based on this information. Of the respondents who indicated that they would not change their opinion, 100% answered either 4 (somewhat large) or 5 (very large) to the previous question. Because the map was designed to make the British

Empire look large, a response of 4 or 5 would indicate that the respondent was persuaded by the persuasive elements on the map.

When presented with Australian cartographer A.C. McDonald's 1907 map "Australia Compared with Europe", 76% of respondents, or 51 respondents (as seen in Figure 3) answered 5 or 4 and in doing so indicated that, based on the map provided, Australia was either very large or somewhat large. The remaining 16 participants indicated that, based on the map provided, either answered 3, indicating a neutral stance (11.9% of total respondents, or 8 respondents) on the size of Australia, or answered 2, indicating that based on the map, Australia was somewhat small (11.9% of total respondents, or 8 respondents).

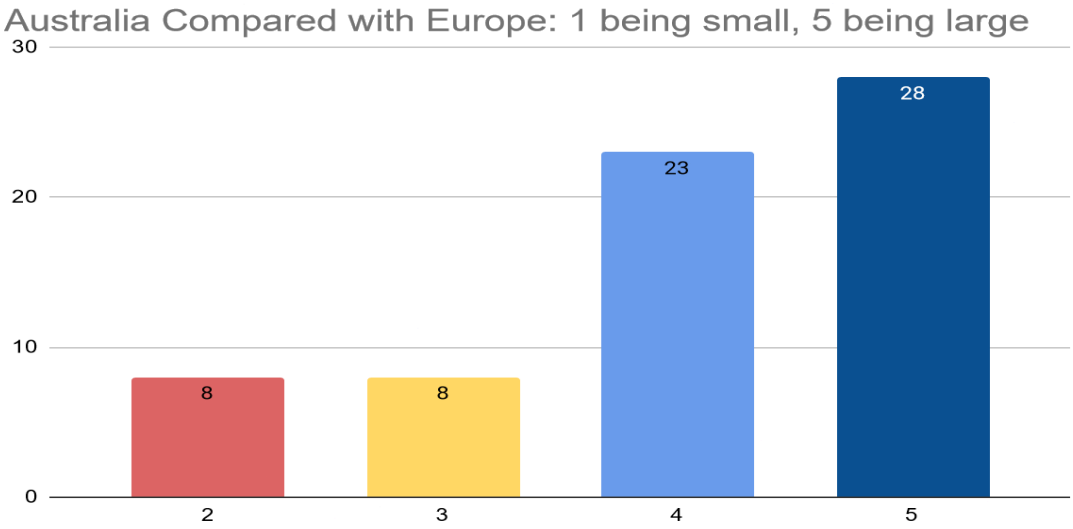

Figure 3. Response to question "On a scale of one to five, how does this map make you feel about the size of Australia?"

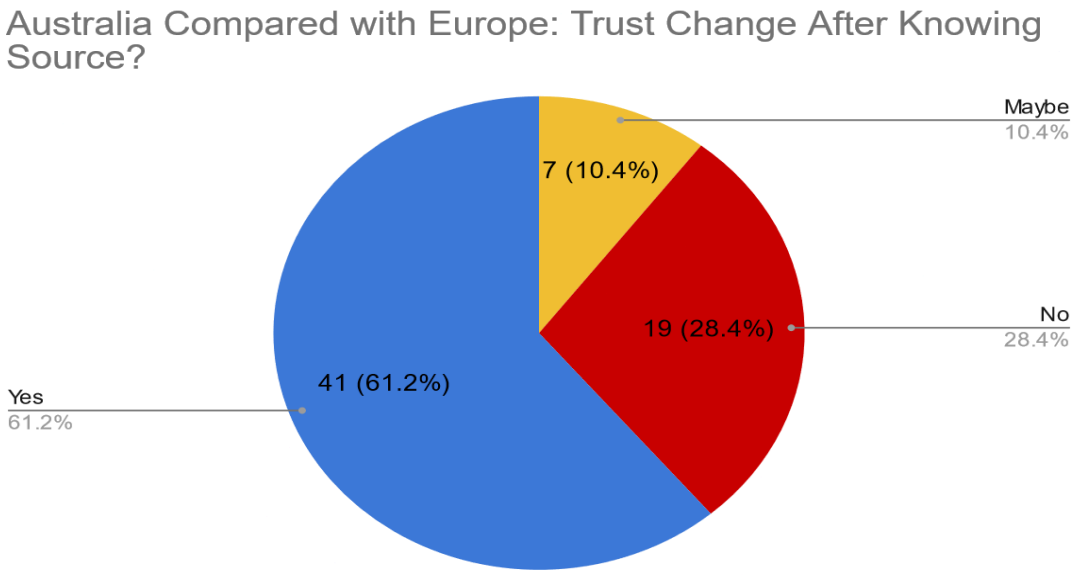

Figure 4. Responses to question "This map was made by A.C. Macdonald, an Australian geographer, to make Australia look larger. Does knowing this change your trust in the map's contents?"

After having been exposed to the origins and the connections of the mapmaker and asked whether or not knowing this information made the respondent change their opinion, the majority of respondents (61.2%, or 41 respondents, see Figure 4) answered that they would. 10.4% of respondents, or 7 respondents, indicated that they would consider changing their mind on the map after learning this information. 28.4% of respondents, or 19 respondents, answered that they would not change their mind, even after learning this information. Because the map was designed to make Australia look large, a response of 4 or 5 would indicate that the respondent was persuaded by the persuasive elements depicted on the map.

When presented with the TIME Magazine Educational Program's 1979 map of refugees in 1979, 74.6% of the respondents, or 50 respondents (see Figure 5), answered a 5 or a 4, showing that, based on the map, they felt that the amount of refugees worldwide in 1979 was either overwhelming or significant. Respondents who answered a 4, indicating that the amount of refugees based on the map was significant but not overwhelming, made up 53.7% of the total respondents, or 36 respondents, while respondents who answered a 5, indicating the amount based on the map was overwhelming, only made up 20.9%, or 14 respondents. Another 20.9%

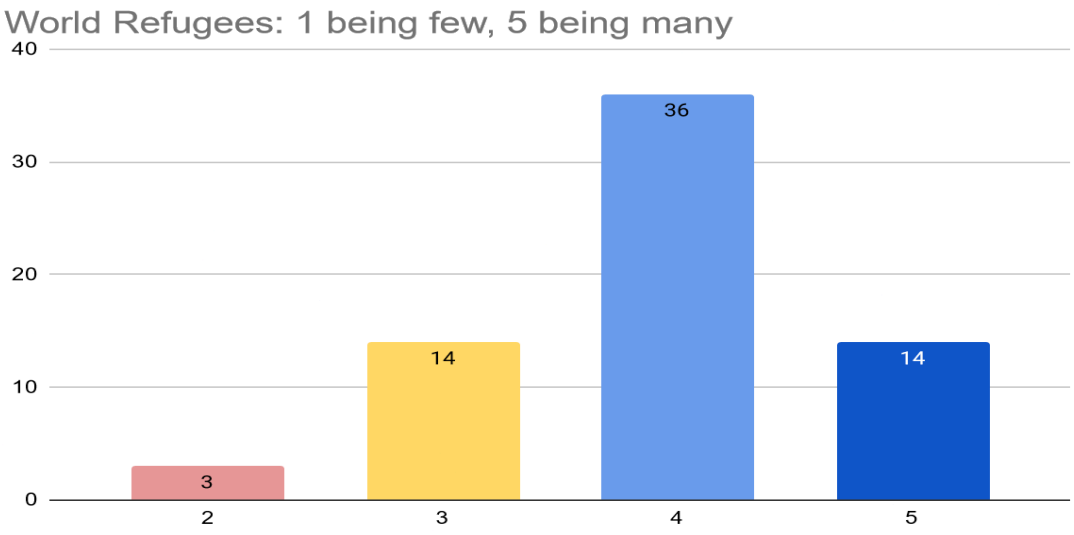

Figure 5. Responses to question "On a scale of one to five, how does this map make you feel about the number of refugees in 1979?"

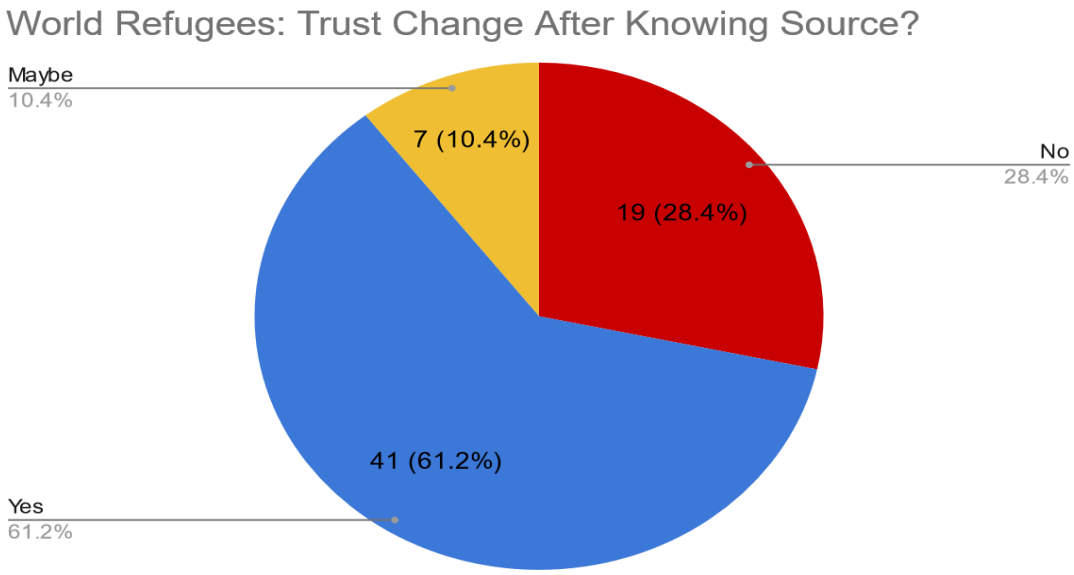

Figure 6. Responses to question "This map was made by the TIME Education Program and uses graphic design elements to make the number of refugees look larger. Does knowing this change your trust in the map's contents?"

of total respondents, or 14 respondents, answered with 3, demonstrating a neutral stance on the state of refugees in 1979 based on the map. Only 4.5% of total respondents, or 3 respondents, answered with a 2, indicating that they felt that based on the map, the number of refugees in 1979 was largely under control. Because the map utilized numerousness and scale to persuade, an answer of 4 or 5 would indicate that the respondent was persuaded by the persuasive elements depicted.

After having been exposed to the source of the map and what made it persuasive, the majority of respondents (see Figure 6), 61.2% or 41 respondents, again answered that their opinion changed or that they would change their opinion based on the source and elements. 10.4% of total respondents, or 7 respondents,

indicated that they might change their opinion on the map's contents based on revealed information. Finally, 28.4% of respondents, or 19 respondents, indicated that they would not change their mind on the subject of the map even after the information was revealed.

The last of 4 maps from the P.J. Mode Collection shown to respondents, when presented with British cartographic company Robert and Leete Limited's WW1-era propaganda map "What Germany Wants: Her Claims as Set Forth by Leaders of German Thought", 86% of total respondents or 58 respondents (see Figure 7) answered with a 4 or a 5, indicating that they thought that, based on the map, the German Empire was either a belligerent power, or a warmongering empire, respectively. Of the 58 respondents who answered a 4 or a 5, 37 respondents (55.2%

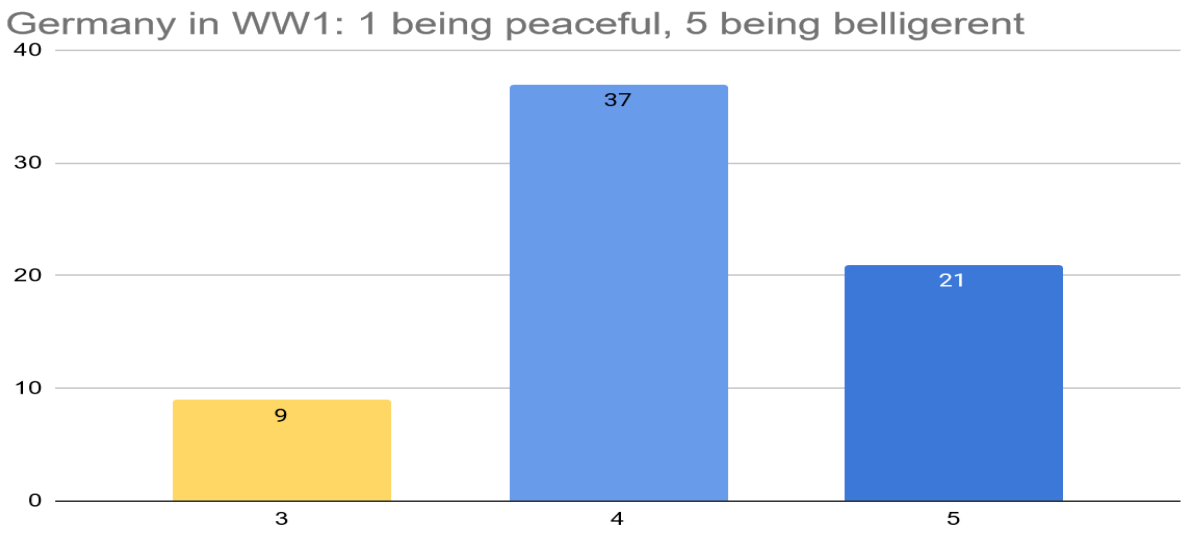

Figure 7. Responses to question "On a scale of one to five, how does this map make you feel about Germany and its claims during World War 1?"

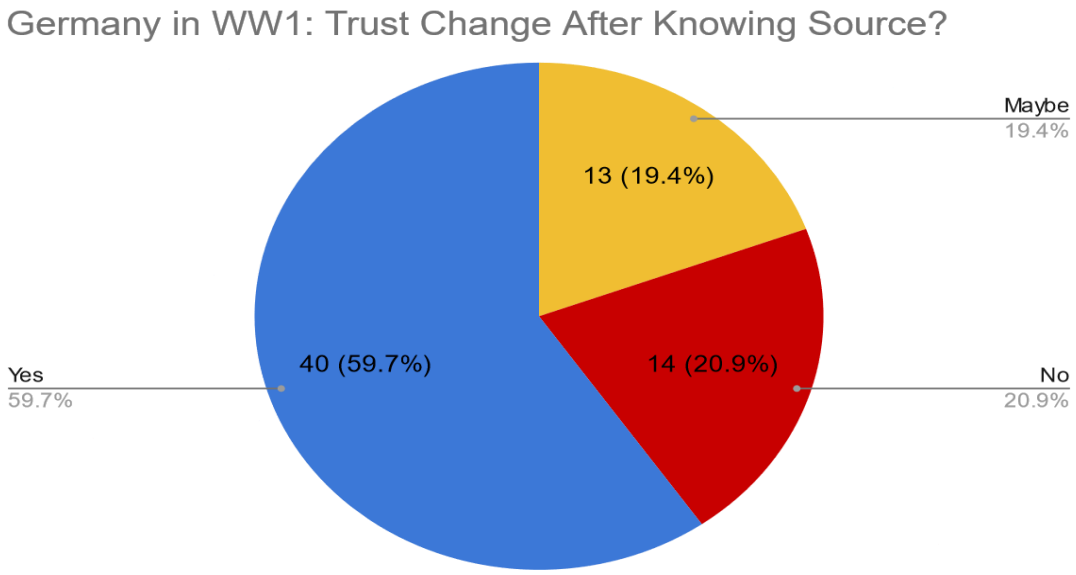

Figure 8. Responses to question "This map was made by Roberts and Leete Limited, a British cartography company, to make Germany look threatening. Does knowing this change your trust in the map's contents?"

of total respondents) answered with a 4, and 21 respondents(31.3% of total respondents) answered with a 5. The remaining 9 respondents, making up 13.4% of total respondents, answered with a 3, signifying a neutral stance on the topic as was presented in the map.

However, when presented with the source of the map and asked if knowing this information would cause them to change their mind on the subject, 59.7% of total respondents, or 40 respondents (see Figure 8) responded affirmatively, 19.4% of total respondents, or 13 respondents, indicated that they might change their opinion, and 20.9% of total respondents, or 14 respondents, stated that they would

not. Of the 37 respondents who answered the previous question with a 4, 26 answered that knowing the source made their opinion on the contents of the map change, and of the 21 respondents who answered the previous question with a 5, 10 answered the same. Because the map was made using persuasive elements and was made with the intention of antagonizing Germany, an answer of 4 or 5 would indicate that the respondent was persuaded by the persuasive elements depicted.

When presented with the controversial Mercator Projection, however, results became less uniform. A plurality of respondents (43.2% of total respondents, or twenty-nine respondents, see Figure 9) answered with a 1 or 2, indicating that they felt that, based off of the map, the equator region is geographically very small or small, respectively. Of these twenty-nine respondents, only nine respondents answered with a 1, while the other twenty respondents answered with a 2. On the other hand, 23.3% of total respondents, or twenty-three respondents, answered with

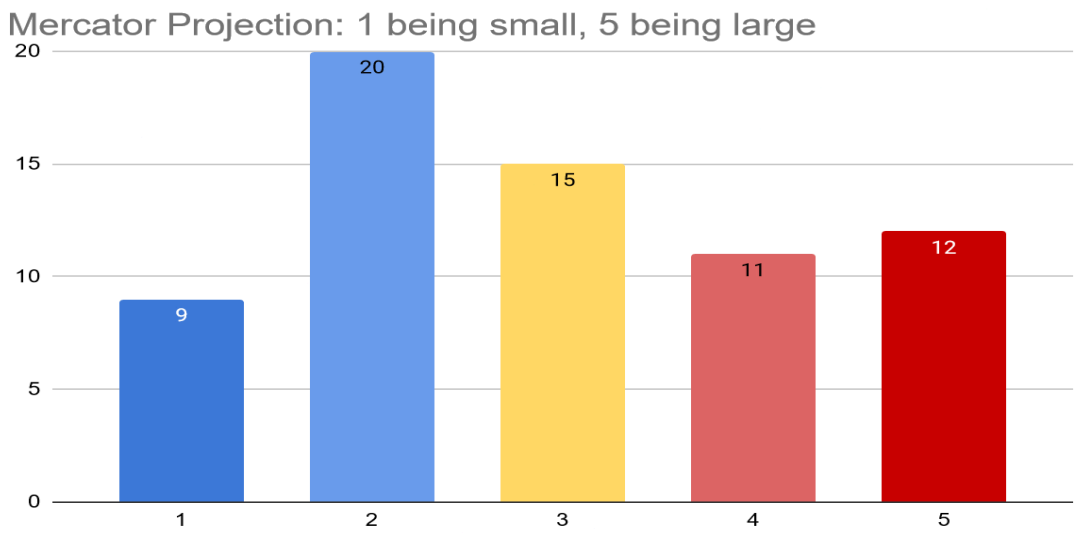

Figure 9. Responses to question "On a scale of one to five, how does this map make you feel about the size of the equator region? (i.e. Africa, Central America, Asia)"

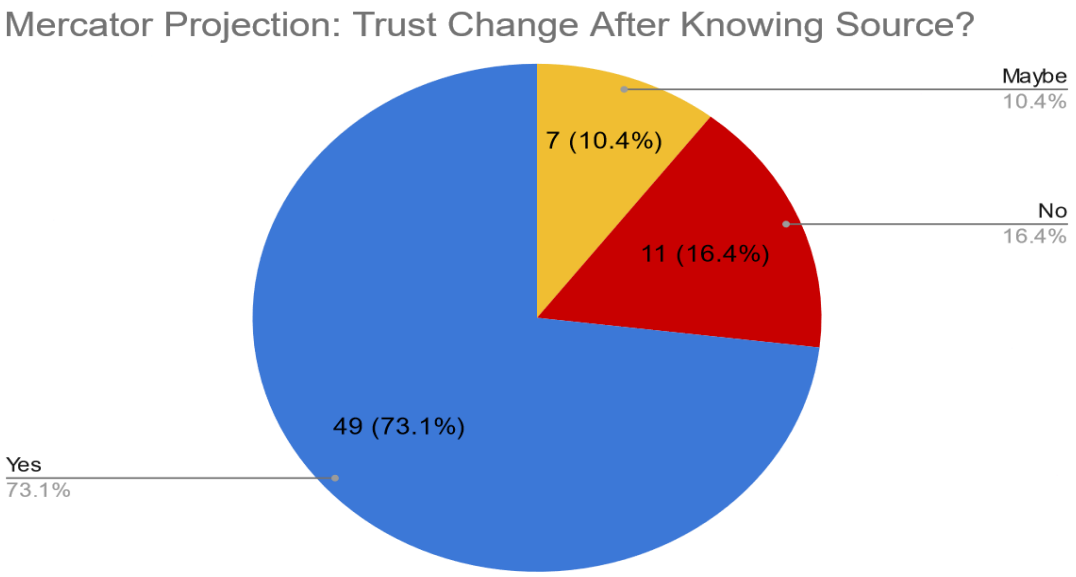

Figure 10. Responses to question "This map, made by French cartographer Geradus Mercator in 1569, makes these regions look smaller than they physically are. Does this change your trust in the map's contents?"

a 4 or a 5, indicating that they felt that the equator region is geographically large or very large, respectively. Of the twenty-three respondents who answered with a 4 or a 5, responses were distributed almost equally, with eleven respondents answering with a 4, and twelve respondents answering with a 5. 22.4% of total respondents, or fifteen respondents, answered with a 3, demonstrating a neutral stance on the subject as depicted in the map.

Despite this, after being shown the source of the map, what made it persuasive, and being asked if knowing this information changed the respondent's

opinion of the contents of the map, 73.1% of total respondents, or forty-nine respondents (see Figure 10), answered that the information did change their opinion on the map's contents. 16.4% of total respondents, or eleven respondents, answered that the information did not change their opinion, and 10.4% of total respondents, or seven respondents, answered that knowing the information might cause them to change their mind. Of the eleven respondents who answered that knowing the information did not change their opinion, seven of these respondents answered either a 4 or a 5 (6 respondents answered 4, 1 respondent answered 5). Because the map is regarded by the scholarly community to disproportionately scale down the Equator region, a response of 1 or 2 would indicate that the respondent was persuaded by the map's persuasive elements.

Finally, when presented with *The Economist*'s 2019 Global Democracy Index map, a plurality (47.7% of total respondents, or thirty-two respondents, see Figure 11) of respondents answered with a 3, indicating their views as neutral or that, based on

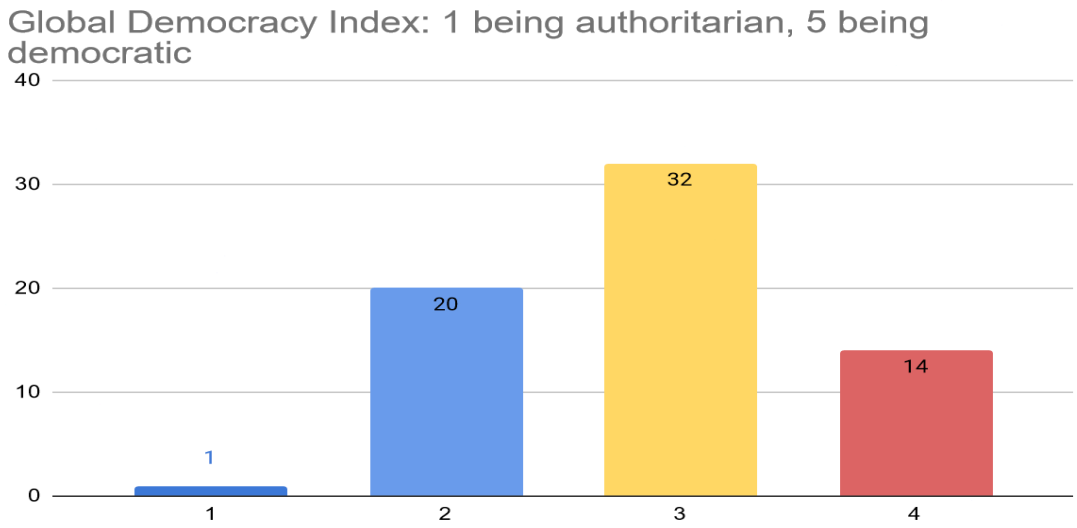

Figure 11. Responses to question "On a scale of one to five, rate your feeling about democracy in the world based on the map."

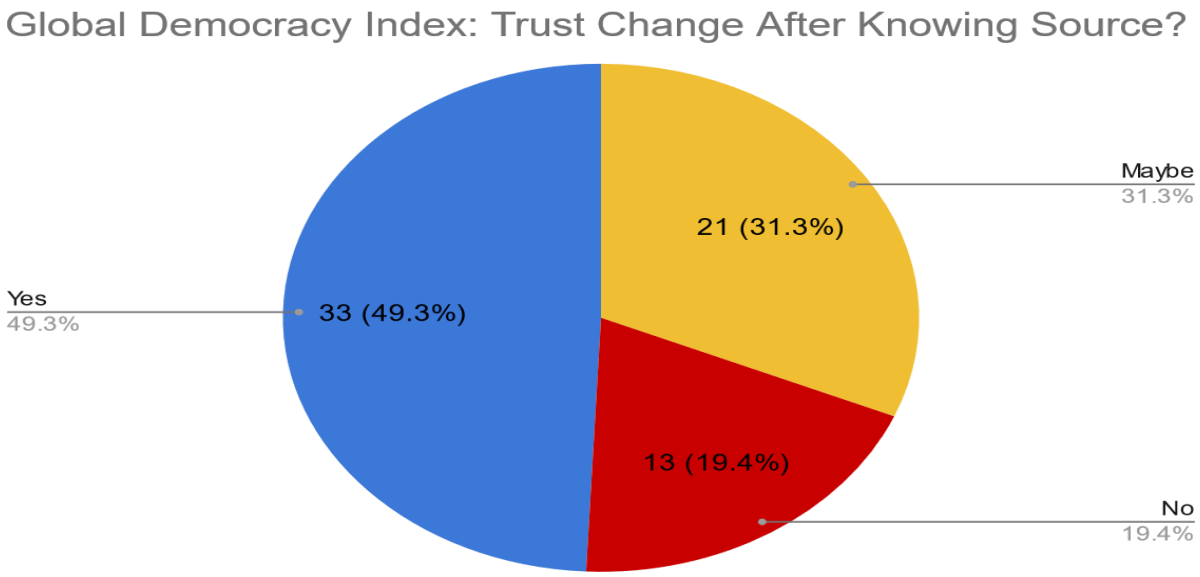

Figure 12. Responses to question "This map was made by the Economist magazine and is made from a western perspective of democracy. Does knowing this change your trust in the contents of the map?"

the map, they felt that the world was in a balance between democracy and authoritarianism. 31.3% of total respondents, or twenty-one respondents, answered with a 2 or 1, indicating that they, based on the map, felt that the world was significantly or very authoritarian, respectively. Only one respondent of the twenty-one respondents that answered that they believe the world was authoritarian answered with a 1. The final 20.9% of respondents, or fourteen respondents, answered with a 4, indicating that they, based off of the map, felt that the world was significantly democratic.

After the source of the map and the potential bias or persuasion was revealed, respondents were asked if knowing this information had changed their opinion on the map's contents. For the first time, answers that were not "yes" constituted the plurality of responses. While 49.3% of total respondents, or thirty-three respondents answered that knowing the information regarding the map's persuasion did change their opinion (see Figure 12), respondents who answered that knowing this information either maybe changed their opinion or did not changed their opinion formed 50.7% of total respondents, or thirty-four respondents. However, more respondents (31.3% of total respondents, or 21 respondents) answered that the information might have changed their opinion than respondents who had answered that the information had not changed their opinion (19.4% of total respondents, or 13 respondents). Because the study conducted by the Economist that produced the data depicted on the map concluded that the world was increasingly authoritarian(Intelligence), a response of 1 or 2 would indicate that the respondent had been persuaded by the persuasive elements depicted on the map.

According to Figure 13, maps sourced from the P.J. Mode Collection of Persuasive Cartography had an extensive success rate in persuading respondents to believe in the opinion being presented by the cartographer. However, maps that were not sourced from this collection and as such both: included information that related to topics that are relevant to the past 10 years, and were not extensively studied by the cartographic community for their persuasive natures shared little of this success. Specifically, the Economist's Democracy Index included information

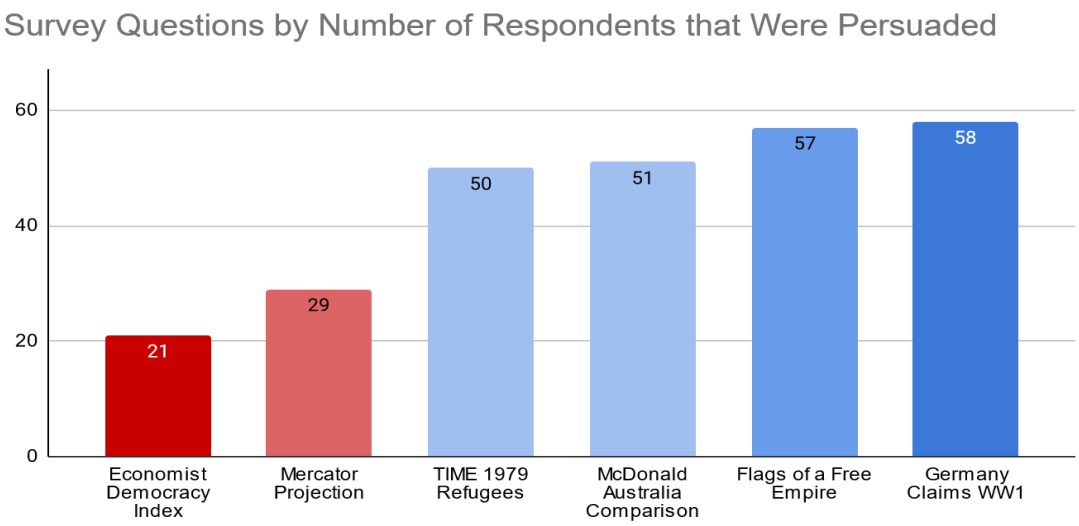

Figure 13. Visualization of number of respondents that were identified as 'persuaded' by a map's elements, per question.

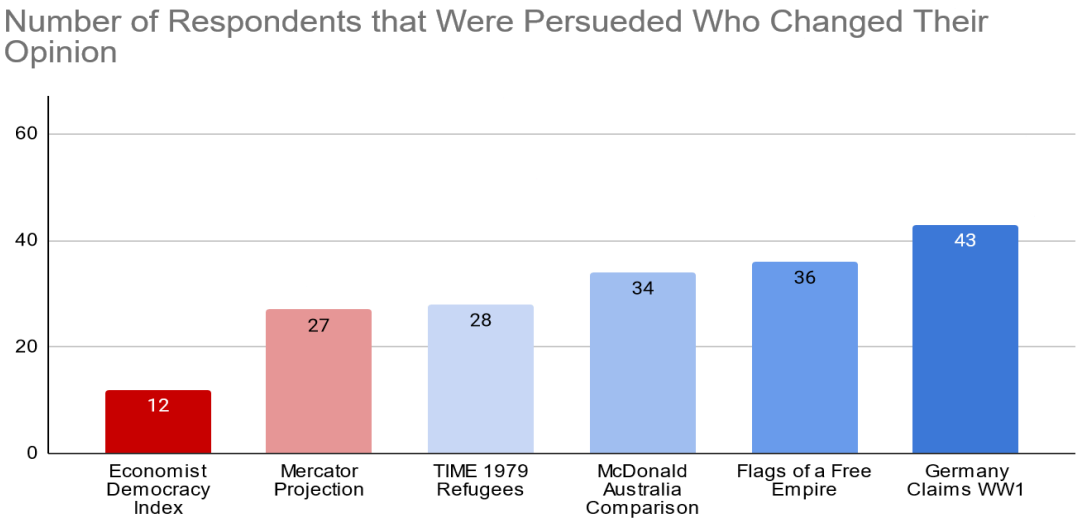

Figure 14. Visualization of number of respondents that were identified as 'persuaded by a map's elements, but then later changed their opinion after learning the source and persuasion of the map in question

about current geopolitics, and if a respondent already had knowledge that could have influenced their response, their data could have skewed the study. Similarly, in Figure 13, the Economist's Democracy Index had the lowest number of respondents who later changed their opinions after having the source and persuasiveness revealed to them -- likely because of already-existing knowledge on the subject matter.

Discussion and Conclusion

The data I collected and the results I found suggest that the use of persuasive maps do indeed affect the geopolitical understanding or worldview of my target demographic. However, this worldview was often confined to the 'world' as it was portrayed within the map, not as part of a broader understanding of geopolitics. Whereas respondents were easily persuaded and adherable to ideas about topics from over 30 years ago, that same finding was not carried over into the modern, relevant world portrayed within and outside of the Economist's Democracy Index. Additionally, because the Mercator Projection did not necessarily portray data that would constitute a development of a geopolitical worldview, the success of the P.J. Mode Collection's maps in persuading the respondents did not transfer over. Ultimately, the data that I gathered created a gateway to new questions that may need to be answered before the initial question of how persuasive maps affect high schoolers specifically can be explored further.

Some design flaws in the study included the mixed use of maps that had already been studied, namely the maps sourced from the P.J. Mode Collection and

maps that I sought to study. Because the methodology of utilizing a survey is largely unexplored within the cartographic scholarly community, the creation of the survey was not based on previous in-field research, as much of the theorization and data analysis within the scholarly conversation was sourced from other disciplines, such as the use of colour theory from visual arts or geometric generalisation from mathematics. Additionally, if the survey had focused more on current affairs content, fulfilling Nærland's theory regarding relevance, more information regarding the subject of persuasive maps within the current political context could likely be found.

One of my prominent delimitations was the confining of my data to only high school students. While the intention of this was to avoid reporting on existing knowledge regarding information that had been gathered from research that did not involve interaction with a demographic, I instead uncovered the gap that little research had been done in the scholarly community regarding live research in general. Regardless, the data that was collected not only confirmed that the persuasive elements of Frank and Monmonier work in persuading people in practice specific to the cartographic field, but developed a new understanding in the subject matter as well. Whereas the relationship between the relevance of the subject matter of a persuasive map and its effectiveness on the ideology of a respondent was previously unexplored within the cartographic community, my data has opened the doors regarding this connection.

I would recommend that future researchers attempting to delve into this topic explore the relationship between the already-existing political beliefs, opinions or

knowledge of subjects with the persuasive maps related to modern-day political topics. Additionally, insight into the general public's views on these maps and the effect that persuasive maps have on members of the public could be useful to the cartographic scholarly community in order to begin the development of analysis into newer methods or elements of persuasion could be incorporated into maps. Ultimately, the new scholarly question will become the relationship of the persuasive map within the greater context of a movement or idea, and I stress the need of live data collection to keep up to date on developing updates to the cartographic process.

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Appendix

Appendix A

Student Survey

Welcome to a brief survey/questionnaire for an AP Research class I'm currently enrolled in as a high school student. I appreciate your assistance, time, and honesty as you respond below.

This survey should only take a minimal amount of time to complete. Your responses will be anonymous. Unless otherwise prompted, please do not include any identifying information on your survey. Extensive efforts will be made to preserve your confidentiality.

Your participation in this study is voluntary. It is up to you to decide whether or not to take part. You are free to withdraw at any time and without giving a reason. Withdrawing from this study will not affect the relationship you have, if any, with me.

If you withdraw from the study before data collection is completed, your data will be returned to you or destroyed. Please note that as a Schools student with IRB approval to conduct this project, I am required to report any information I receive regarding suicidal idealization, abuse, or intent to commit violence. Thank you for participating.

Any responses will remain anonymous and only be tallied as part of descriptive research into the topic of geopolitics and cartography. Data and findings will be presented as part of the end-of-course assessment for AP Research in May 2021. Please click Yes in the below question to verify that you have spoken with your parent/guardian and that both you and your parent/guardian consent to have your data included in my study. Thank you again for participating.

I have read the above information and agree to take this survey.

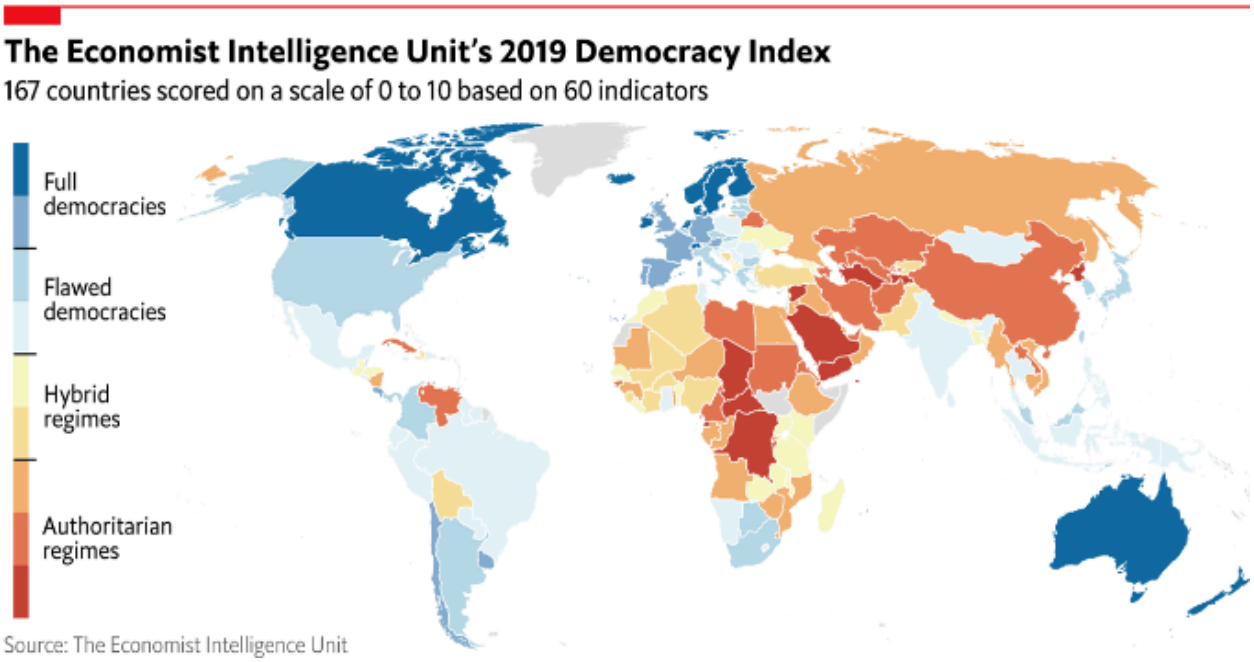
A. Yes

B. No

C.

1. How old are you?
    a. Respondents were prompted with a text box to enter their age in
2. Year in school
    a. 9th (Freshman)
    b. 10th (Sophomore)
    c. 11th (Junior)
    d. 12th (Senior)

3. One a scale of one to five, rate your feeling about democracy in the world based on this map. (Source: The Economist)



1 - The world is very authoritarian

2

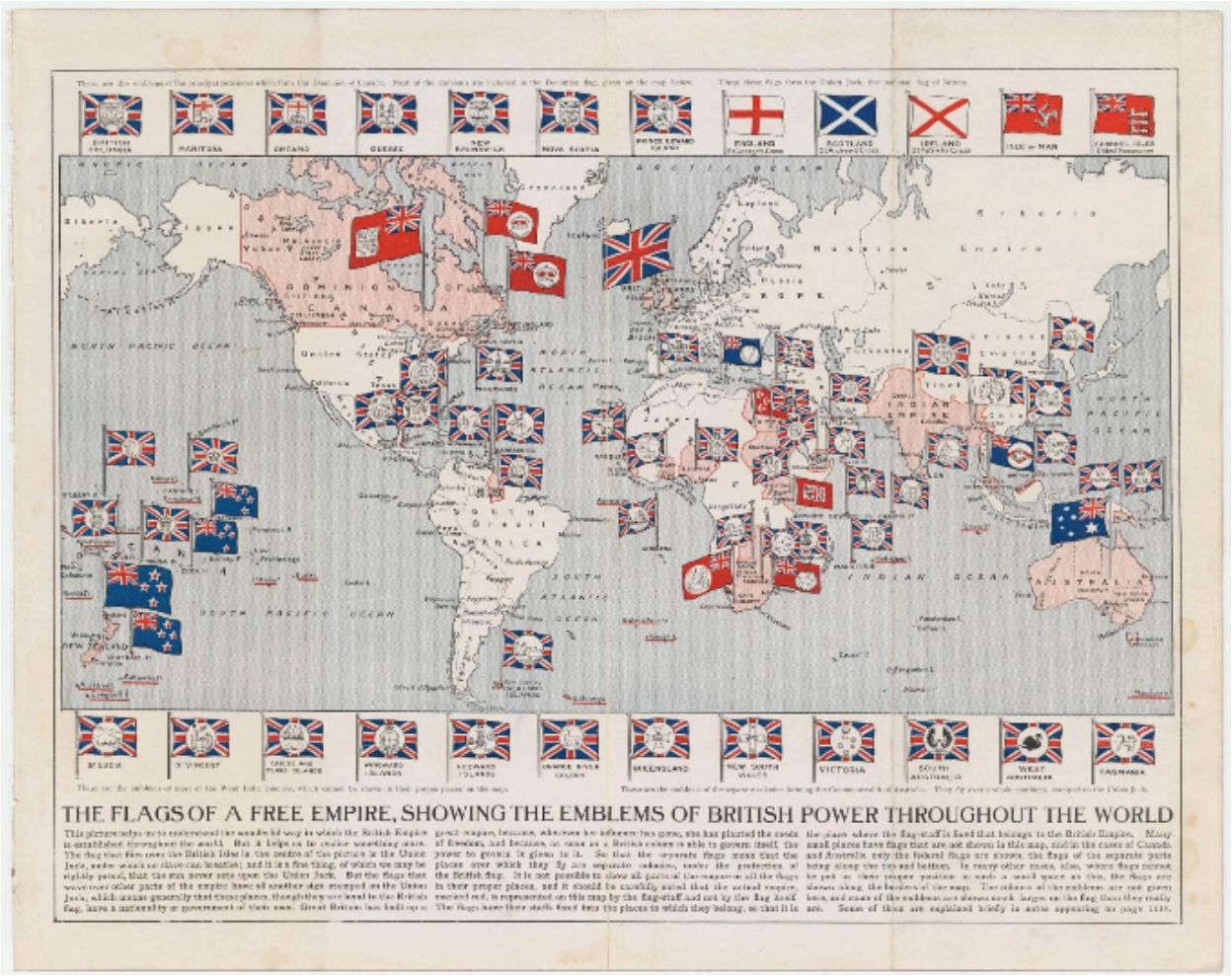
3

4

5-The world is very democratic

4. This map was made by the Economist magazine and is made from a western perspective of democracy. Does knowing this change your trust in the contents of the map?
    a. Yes
    b. No
    c. Maybe

5. One a scale of one to five, how large does this map make you feel the British Empire was?



1- The British Empire was small

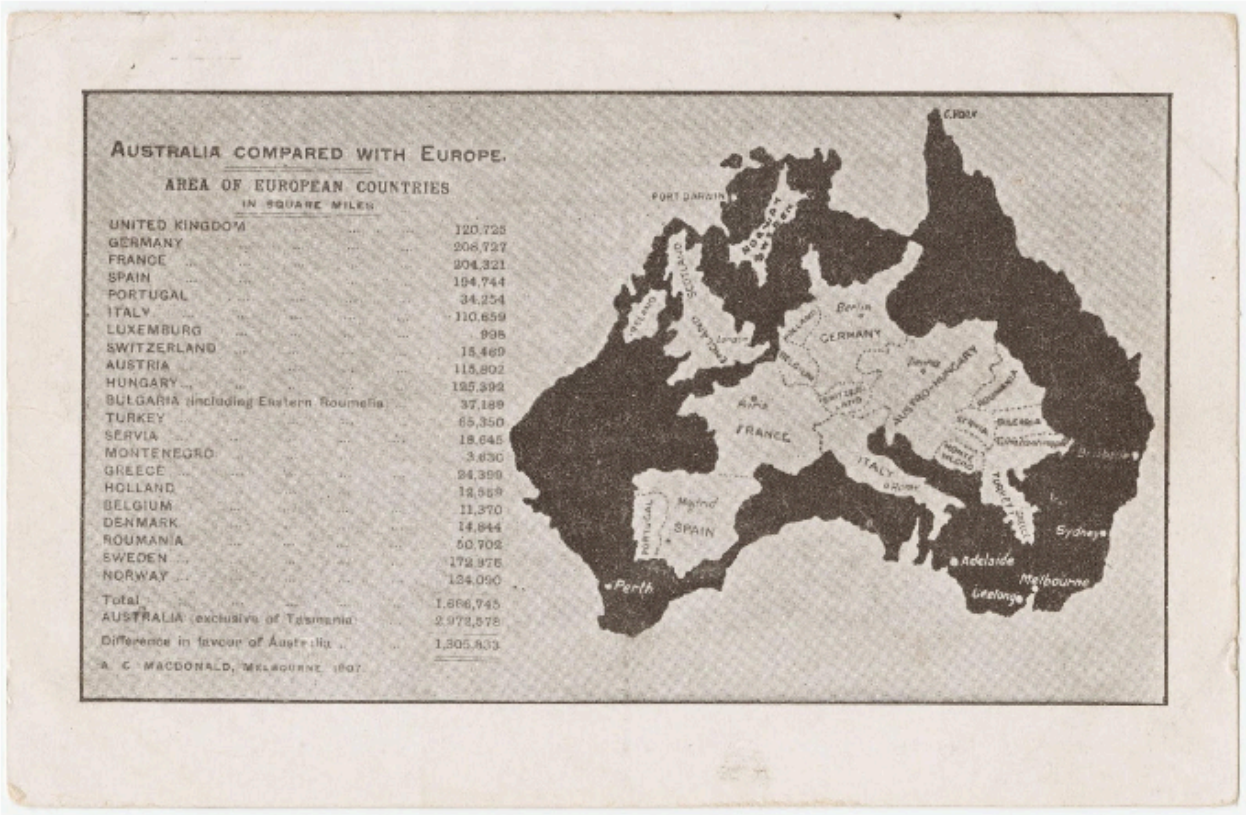
2-

3-

4-

5- The British Empire was very large

6. This map was made by British author and teacher Arthur Mee in 1910 for a children's book, and was intentionally designed to make the British Empire look larger. Does knowing this change your trust in the map's contents?
    a. Yes
    b. No
    c. Maybe
7. On a scale of one to five, how does this map make you feel about the size of Australia?



1- Australia is a small country

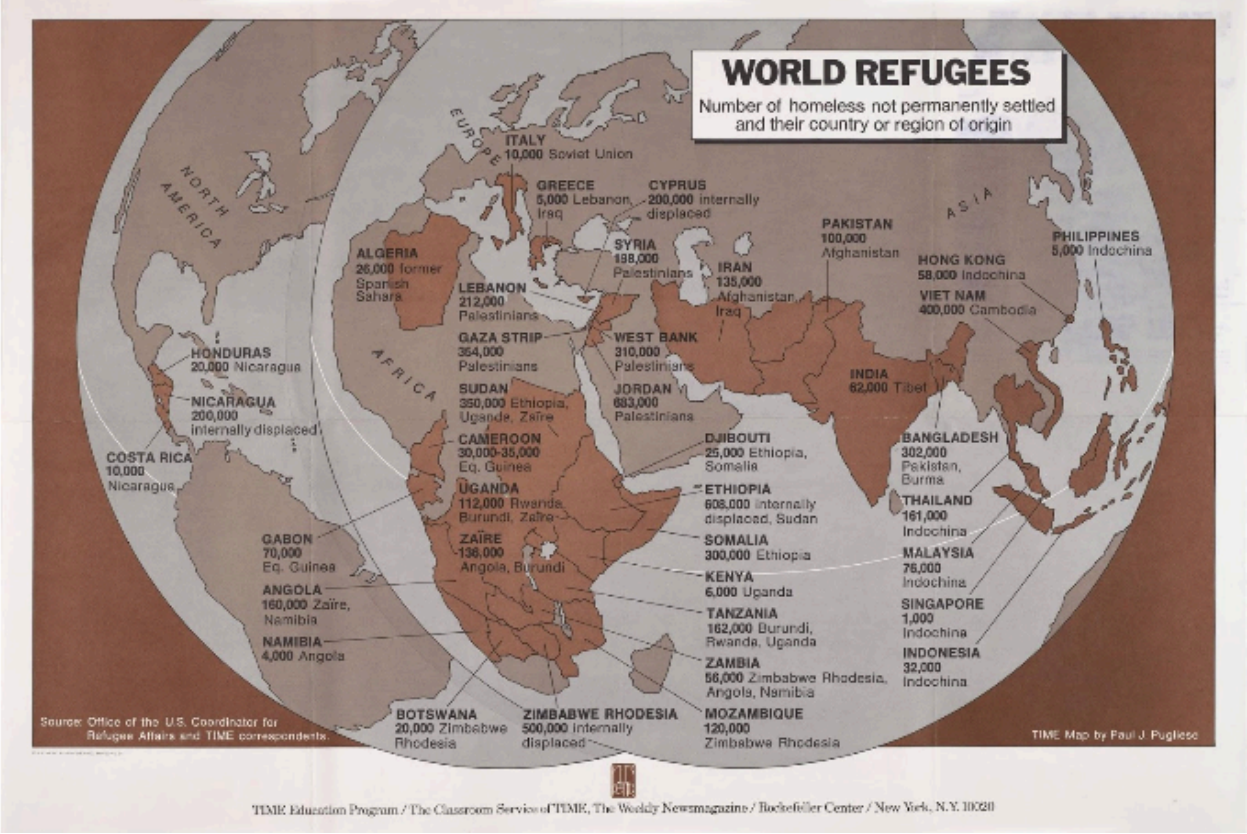
2-

3-

4-

5- Australia is very large

8. This map was made by A.C. MacDonald, an Australian geographer, to make Australia look larger. Does knowing this change your trust in the map's contents?
    a. Yes
    b. No
    c. Maybe
9. On a scale of one to five, how does this map make you feel about the number of refugees in 1979?



1-The issue of refugees was under control

2-

3-

4-

5-There were an overwhelming amount of refugees

10. This map was made by the TIME Education Program and uses graphic design elements to make the number of refugees look larger. Does knowing this change your trust in the map's contents?
    a. Yes
    b. No
    c. Maybe
11. On a scale of one to five, how does this map make you feel about Germany and its claims during World War 1?

1- Germany was a peaceful nation

2-

3-

4-

5-Germany was a warmongering empire

12. This map was made by Roberts and Leete Limited, a British cartography company, to make Germany look threatening. Does knowing this change your trust in the map's contents?

    a. Yes

    b. No

    c. Maybe

13. On a scale of one to five, how does this map make you feel about the size of the equator region? (i.e. Africa, Central America, Asia)

1- This region is very small

2-

3-

4-

5- This region is very large

14. This map, made by French cartographer Geradus Mercator in 1569, makes these regions look smaller than they physically are. Does this change your trust in the map's contents?
    a. Yes
    b. No
    c. Maybe