

Reading Between the (Party) Lines

by

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Submitted to the MIT Media Lab,
School of Architecture and Planning
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Abstract

TO-DO

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Acknowledgments

[FILL IT WITH GRATITUDE]

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Chapter 1

Introduction

Does anyone trust the news anymore? Not according to the latest Gallup Poll, which showed that only 4 in 10 Americans believe that mass media does a good job of reporting the news “fully, fairly, and accurately.” It’s a major decline since the poll was first taken in 1999, back when more than half (55%) of Americans believed the news was trustworthy [22].

And the trend has been steadily downward: in short, the majority of Americans have had little to no trust in mass media news coverage since 2007: a discouraging view for a tumultuous time in journalism.

But beyond frustrated readers and reporters, why does distrust in the news matter? For one, media bias—or at the very least, the *belief of* a biased media bias—may have a significant impact on the practice of democracy. A 2006 study from Georgetown University shows that those with more negative attitudes towards the news tend to be more highly influenced by their partisan prior beliefs and less by contemporary issues and messages when voting [15]. This implies that distrust of media plays a large role in the polarization of American politics.

In light of the upcoming 2016 elections, this thesis explores perceptions of media

trust and fairness in coverage of the presidential candidates. Claims of media bias and favoritism are especially high-stakes in election years, where trust has been shown to plummet [22]. And in this election cycle, cries of bias have been especially loud: Analysis at the New York Times showed that the news media gave Republican candidate Donald Trump a \$1.9 billion advantage in free publicity, an amount 190 times as much as paid advertising [3].

In this thesis, we examine some of the factors that contribute to the perception of media bias. In particular, how does the *content* of a story (reading level and vocabulary) affect the reader versus the *context* (publication and author)?

We break down the larger question of media bias in two dimensions: trust and fairness in reporting, and examine the role of language in influencing the reader. Although studies have been conducted to both examine the psychological effect of wording on believability and the impact of media brands and bias, separating and comparing these two factors remains largely unexamined [27, 8]

To test our hypotheses on news trust, we perform a study on the crowdsourcing platform CrowdFlower. We manipulate the source of the story to examine effects of media brands on the reader, and also compare trust and fairness rankings between high and low reading level stories.

Although the general consensus of mistrust is clear, perception of media bias is a complex phenomenon to dissect, as it combines social and psychological effects with the traits of the story itself. This thesis hopes to shed new light on understanding what motivates readers' trust and distrust of news media, and pave pathways for positive intervention.

Chapter 2

In Media We ... Trust?

Despite the news media ecosystem’s rapid evolution in the past decade, the question of fairness in reporting remains a valued one. Although counterarguments for subjective reporting exist (Glenn Greenwald, most famous for his coverage of whistleblower Edward Snowden’s leaks, said that “All journalism is a form of activism. Every journalistic choice necessarily embraces highly subjective assumptions—cultural, political or nationalistic—and serves the interests of one faction or another”), fair treatment of subjects and sources remain a central tenant to most publications [2].

But an attempt at fairness on the side the reporter is not always perceived in equal effect under the eyes of the reader. Presenting contradictory facts to a reader’s beliefs can even sometimes *strengthen* their oppositions to it, a concept known as “motivated skepticism” [24].

In this section, we examine the impact of distrust in media, and explore the theories behind three main potential sources of media distrust: the characteristics of the reader, the source of the story and its use of language.

2.1 Why Does Media Trust Matter?

The idea that mass media has a large influence on the ramifications of democracy is nothing new. In 1922, political commentator, reporter, and writer Walter Lippman wrote about its central role in shaping public opinion:

Each of us lives and works on a small part of the earth's surface, moves in a small circle, and of these acquaintances knows only a few intimately. Of any public event that has wide effects we see at best only a phase and an aspect. This is as true of the eminent insiders who draft treaties, make laws, and issue orders, as it is of those who have treaties framed for them, laws promulgated to them, orders given at them. Inevitably our opinions cover a bigger space, a longer reach of time, a greater number of things, than we can directly observe. They have, therefore, to be pieced together out of what others have reported and what we can imagine. Yet even the eyewitness does not bring back a naive picture of the scene. [18]

Many of the worries that Lippman had about the effects of poorly disseminated truth have been later confirmed in experimental studies. In short, when faced with a large and mistrusted news environment, we tend to rely on *confirmation bias* when searching for information. This term, first coined in 1988, describes the psychological phenomenon of seeking or analyzing new information in ways that align with one's existing beliefs, expectations or prior hypotheses [20].

Using a Bayesian voting model, a study from Georgetown University in 2005 was able to show that voters with low trust and a high dislike for the news media are significantly more influenced by their existing party identifications in casting ballots than current economic factors [15]. The study attributes increasing polarization in the American political sphere with increasing lack of trust in the news, a serious implication for the highly polarized 2016 presidential elections. Moreover, distrust of media implies a large information loss in the public, whose avoidance of diverse ideas

means a narrowing of information flow [14].

2.2 How is Media Trust Formed?

2.2.1 The Role of the Reader

The perception of media bias is a cornerstone component of distrust in the news. After all, most Americans claim that they want to read news that's unbiased. A survey from Pew Research in 2012 showed that more than two-thirds (68%) of readers want to read political articles with a neutral stance, compared to just a little less than a quarter (23%) of those who want to read those stories that share their point of view [5]. But what exactly does that entail?

It comes as no surprise that our own political stances have a significant effect in our perceptions of bias in the media. On whole, conservative readers tend to view media as more biased than both Democrats and Independents (49% to 32% and 35%, respectively)[5]. Partisans have also been shown to view the news as antagonistic to their beliefs, a phenomenon known as the “hostile media effect”.

The effect, first studied in the 1980s, showed that when faced with the same piece of news media about the Sabra and Shatila massacre in Beirut, pro-Israeli and pro-Palestinian students both claimed the news clip was biased in favor of the other side [25]. It has since been repeated in a variety of contexts to the same effect.

What the story is reporting does not matter so much as the individual's attitude *towards* that issue. In 1988, Albert Gunther found a curvilinear effect between the viewer's polarization towards an issue and their trust in the media to fairly cover it [12]. In doing so, he suggests two models of persuasion to help understand media processing: first, the cognitive response theory, which predicts more portential for attitude change when the reader is highly involved in the content, as they are pro-

cessing information more deeply [9]. Social judgement theory, on the other hand, expects less change in attitude when the reader is highly involved or polarized about a subject, as they will simply reject the new information [23]. These two opposing theories help explain the presence of a curvilinear relationship to exposure to news media and resulting media trust.

2.2.2 The Role of Media Brands

The media, of course, is not just one unified mass, and in an increasingly fragmented ecosystem, the role of brands is a crucial factor in media trust. With the rise of the internet, the past decade has seen an explosion of new media platforms and publications, as well as significant transformations in style and audience in existing outlets.

Although the studies above present the media as one unified mass, there is a significant amplifying effect of hostility and bias perception depending on the reader’s prior connotations of a news outlet. In 2008, researchers Matthew Baum and Phil Gussin showed significant differences in the evaluation of a piece of news content depending on whether it was labeled to be from CNN, Fox, or a fictional news outlet [8]. They concluded that media bias is very much “in the eye of the beholder,” as viewers make information shortcuts dependent on media brand to jump to conclusions beyond their own partisanship and the content of the story.

2.2.3 The Role of Language

Finally, the role of language—in media as well as politics—cannot be overlooked. A recent article in the Boston Globe analyzed the language of presidential candidate Donald Trump to be at a fourth grade level— and more successfully appealing to voters [26]. (Those who have been speaking at lower grade levels in the 2016 election cycle have also been winning more votes.)

Analysis by media outlet Vocativ showed a negative correlation between presidential speech level over time [11].

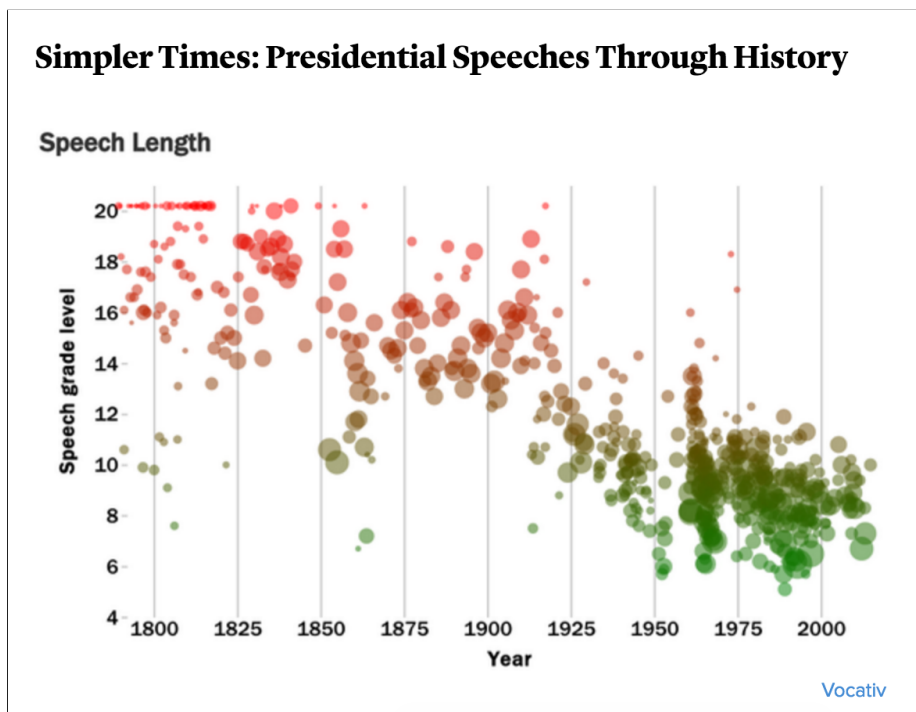


Figure 2-1: Language of Presidential Speech Decline

Yet political news *coverage* occupies a different space of language and purpose, often with the intent of reporting statistics and facts in a scientific nature using a specified technical vocabulary. And when the reader processes information of a scientific nature, a funny effect has been shown: that more complex language, with more technical jargon and sophisticated construction, might actually *increase* appeal and the likelihood of trust. In 2008, Weisberg et. al showed that the addition of “neuroscience” significantly increased the likelihood of believability in explaining how the brain works, versus the same explanation in simple, everyday language [27]. These two factors are both at play when considering the impact of the language in political news and its perceived truthworthiness, for the articles are often *both* a reflection of a political candidate as well as its analysis of her or him.

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Chapter 3

Tools for Dissecting Trust

3.1 Computing Reading Level

3.1.1 Flesch-Kincaid Readability Tests

In this study, we focus primarily on the Flesch-Kincaid (F-K) tests for estimating text readability. Originally developed for the U.S. Navy in 1975 for assessing the difficulty of technical manuals, the F-K reading level corresponds roughly to U.S. grade level and the reading ease score is inversely proportional to the grade level on a scale from 0 to approximately 120 [13].

We chose the F-K tests over other comparable ones due to its popularity in educational assessment and other applications, including in legislation. For example, it is required by law in Florida that life insurance policies have a Flesch reading ease of 45 or greater (less than 12th grade in reading level) [17]. The F-K tests are also bundled in many common word processing services, including Microsoft Office Word. As a comparison, basic article analysis is also computed using the Gunning fog index (see Section 5.2.1).

The formula for Flesch reading ease is as follows:

$$206.835 - 1.015 \left(\frac{\text{total words}}{\text{total sentences}} \right) - 84.6 \left(\frac{\text{total syllables}}{\text{total words}} \right)$$

And for reading grade level:

$$0.39 \left(\frac{\text{total words}}{\text{total sentences}} \right) + 11.8 \left(\frac{\text{total syllables}}{\text{total words}} \right) - 15.59$$

The two formulas are not directly comparable due to the difference in weighting factors. For ease of metaphor, we use the grade level tests in our analysis. Syllable length is highly weighted in this formula, so it is possible to generate a story of very high reading level that consists of a single word in a single sentence (the longest English word, *pneumonoultramicroscopicsilicovolcanoconiosi*, a type of lung disease, has a reading grade level of 197.2), which is a limitation of the method, since texts with polysyllabic words are not always necessarily more difficult to read.

3.1.2 Comparison to Other Reading Tests

3.2 Crowdsourcing Science

Along with an explosion of media outlets and new media platforms, the rise of the internet has also introduced alternative methods to traditional ways of conducting behavioral studies. In this thesis, we focus on crowdsourcing as our primary method of collecting data.

In addition to low cost, we chose crowdsourcing due to its: A) democratizing effect in research and B) subject pool diversity. Crowdsourcing has the benefit of creating a lower barrier for experimentation and replication, allowing researchers to have access to subject pools they would not have otherwise in equal opportunity [19]. Moreover, as our study involves political attitudes, using a crowdsourcing platform allows

us to collect geographically diverse data that is more representative than if it were performed locally.

3.2.1 CrowdFlower

We perform the following studies on the platform CrowdFlower, a popular crowdsourcing platform and marketplace. We chose this platform due to its focus on higher quality data over volume and the ability to filter contributors by level of skill [6]. Results have been found comparable to those on Amazon Mechanical Turk (the most commonly used platform) in prior studies of annotation tasks [10].

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Chapter 4

Exploratory Study

I am not positive I will include the results of my first study in the thesis, but this is a placeholder. Also, I might include a chapter about “Patterns and Trends” at large with reading level and topic on the Electome dataset, for the analysis I did on that.

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Chapter 5

Study

5.1 Motivations

This study sets out to tackle the question of reading level’s effect in perceptions of news bias. In particular, how does it compare to factors associated with latent biases of the reader, such as media brand?

Although the body of literature in Chapter 2 examines the theories behind partisanship and media branding, little work has been done to compare those contextual effects with the effects of *content* within a story, such as language use.

This thesis tests six hypothesis.

We explore two novel hypotheses testing reading level effects:

- **H1:** High reading level stories increase trust in the story.
- **H2:** However, they decrease perceptions of fairness.

As well as two comparing the role of *content* versus *context*:

- **H3:** Media brand has a stronger role in determining story trust than the con-

tent.

- **H4:** Media brand has a stronger role in determining story fairness than the content.

And two verifying former theories:

- **H5:** Stories shown to be from outlets of aligned political party score significantly higher on both trust and fairness than those of the opposite.
- **H6:** Stories about candidates opposite to the readers preferred candidate score significantly lower in fairness, regardless of outlet.

We hypothesis **H1:** that high reading level of stories increase trust based off the work from Weisberg et. al showing that neuroscience explanations sway believability of scientific explanations, due to the field-specific nature of political reporting [27].

Conversely, we predict **H2** that it creates a decrease in the perception of fairness in the story, due to the polarizing nature of political news and the fact that more complex stories could cause a partisan individual to more quickly reject what appears as an onslaught of conflicting information [9].

We hypothesize **H3** and **H4** that media brand effects outweigh content in determining both trust and fairness.

Finally, we expect to see hostile media effects (**H5** and **H6**) to emerge.

5.2 Experimental Design

Our experiment has a 4 x 2 mixed-factorial design.

	Source: None	Source: AP	Source: Fox	Source: CNN
High Reading Level	Clinton, Cruz, Sanders, Trump	Clinton, Cruz, Sanders, Trump	Clinton, Cruz, Sanders, Trump	Clinton, Cruz, Sanders, Trump
Low Reading Level	Clinton, Cruz, Sanders, Trump	Clinton, Cruz, Sanders, Trump	Clinton, Cruz, Sanders, Trump	Clinton, Cruz, Sanders, Trump

Table 5.1: Main Study Design

In this study, reading level of articles and candidates featured in the articles were treated as within-subject variables, and the source of the story between-subjects.

Each participant reads eight stories, two each of high and low reading level per candidate. However, to examine effects of media brands and reader bias, we manipulate the source attributed to the story, building off Baum’s research in media brands and television reporting [8].

All eight stories in Study 2 were in fact written by the Associated Press, however, readers are divided into four groups receiving different labels. In group A, readers were shown the headline and text of the story with no other context. In group B, readers were additionally shown that the story was from the Associated Press (true label). In groups C and D, readers were shown that the story was from CNN and Fox News, respectively.

This setup was created to eliminate some of the confounding effects from using stories from different sources (writing style, focus of content, slant, etc.), while directly observing the effect of revealing a specific source to the reader. The Associated Press was chosen as the source of the stories as it is the highest circulation newswire service in the United States, and has 14,000 members that use its content [21]. Notably, both CNN and Fox News publish content in full or part from the Associated Press, although the specific stories chosen had not been published in full by either to avoid bias.

After each article, we ask the reader to rank the fairness of the story on a 5-point

Likert scale as well as its truthworthiness.

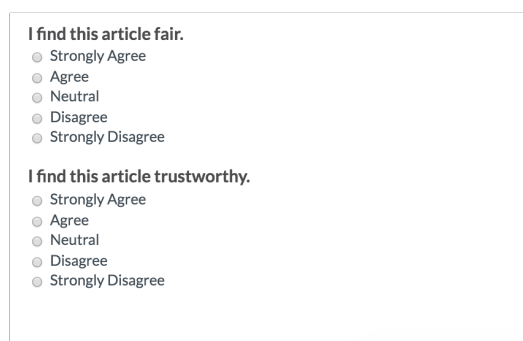
5.2.1 Dataset

Eight stories were chosen for this study: two (high and low reading level) per candidate. All eight stories were written by reporters from the Associated Press (although they may have been republished elsewhere).

Reading level cutoffs were made by taking the bottom and top 25% percentile of Flesch-Kincaid scores for each candidate. From stories written by the Associated Press that made the cutoff, we formed pairs of high and low reading level stories from each topic. The topic with the highest distance between reading level in the pair was chosen for each candidate.

5.2.2 Survey Design

We designed four surveys (1 per group) on the platform CrowdFlower. Each participant was randomly assigned to a group and could not take the survey more than once. The eight stories were shown (in a randomized order), and each story was followed up by two scoring questions pertaining to fairness and trustworthiness.



The image shows a screenshot of a survey interface. It contains two questions, each followed by a five-point Likert scale. The first question is "I find this article fair." and the second is "I find this article trustworthy." Both questions have the same set of response options: "Strongly Agree", "Agree", "Neutral", "Disagree", and "Strongly Disagree". Each option is preceded by a small grey circle.

I find this article fair.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

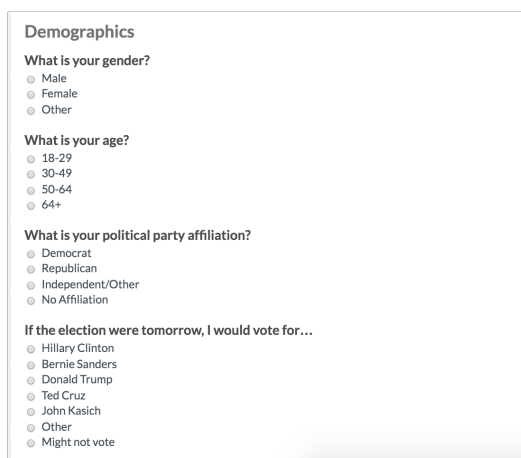
I find this article trustworthy.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Figure 5-1: Scoring Questions for Survey

The survey concluded with an abbreviated standard demographic survey as well as a

political affiliation survey adapted from Pew’s standard polling survey [4]. These more personal questions were placed at the end to prevent priming readers beforehand.



Demographics

What is your gender?

- ☐ Male
- ☐ Female
- ☐ Other

What is your age?

- ☐ 18-29
- ☐ 30-49
- ☐ 50-64
- ☐ 64+

What is your political party affiliation?

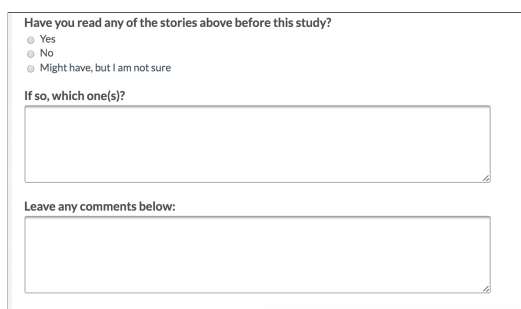
- ☐ Democrat
- ☐ Republican
- ☐ Independent/Other
- ☐ No Affiliation

If the election were tomorrow, I would vote for...

- ☐ Hillary Clinton
- ☐ Bernie Sanders
- ☐ Donald Trump
- ☐ Ted Cruz
- ☐ John Kasich
- ☐ Other
- ☐ Might not vote

Figure 5-2: Demographic Questions for Survey

Finally, we asked readers to report whether or not they might have read the stories before.



Have you read any of the stories above before this study?

- ☐ Yes
- ☐ No
- ☐ Might have, but I am not sure

If so, which one(s)?

Leave any comments below:

Figure 5-3: Comments for Survey

We ran the survey of a duration of hours and had 40 participants sign up per group, for a total of 160 participants.

5.2.3 Quality Control

CrowdFlower has a built-in “Test Question” feature that allows for the rejection of a annotator whose answers to specific questions do not lie within a threshold (default

70%) of the “correct” answer or whose answers lay outside the standard variation compared to others.

However, since the questions we asked were by nature subjective and therefore outliers and disagreements in answers could imply signal rather than noise, we chose to monitor for quality using other metrics instead. CrowdFlower was not designed explicitly for survey-like tasks, and therefore there were no options for different screening methods or questions. Gold Questions on the platform are selected by the creator within the set of all questions being recorded.

Because of this, we monitored quality of results in two ways:

First, by setting a minimum of time of 360 seconds to complete the task of reading 5 stories for a task to be accepted.

Second, by selecting only Level 3 contributors on CrowdFlower as suggested on their website for handling survey-like tasks [1].

Level 3 contributors are described as those who “have completed over a hundred Test Questions across hundreds of different Job types, and have a near perfect overall Accuracy” [6]. This is the highest category of contributor.

Users were also only allowed to answer the set of questions once.

\$0.80 was given per survey, as suggested by MIT Committee on the Use of Humans as Experimental Subjects. The average response time per survey was 09:20 min.

5.3 Basic Analysis

5.3.1 Demographics

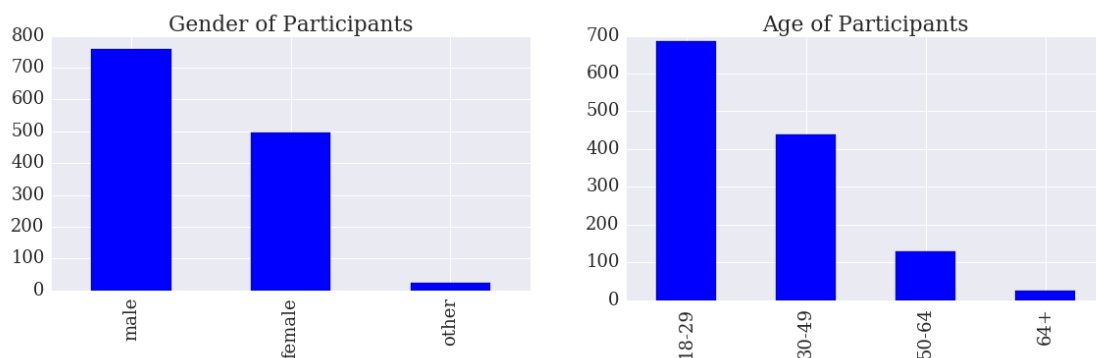


Figure 5-4: Demographics of Participants

Gender of participants were majority male. We had 758 male participants, 496 female participants and 24 signed up as “other” (it is possible that those who did not wish to identify chose the “other” category).

Majority of participants were also in age group 18-29.

In our analyses, we balance for gender and age disparities.

5.3.2 Location

Our participants represented a wide variety of geographic locations in the US.

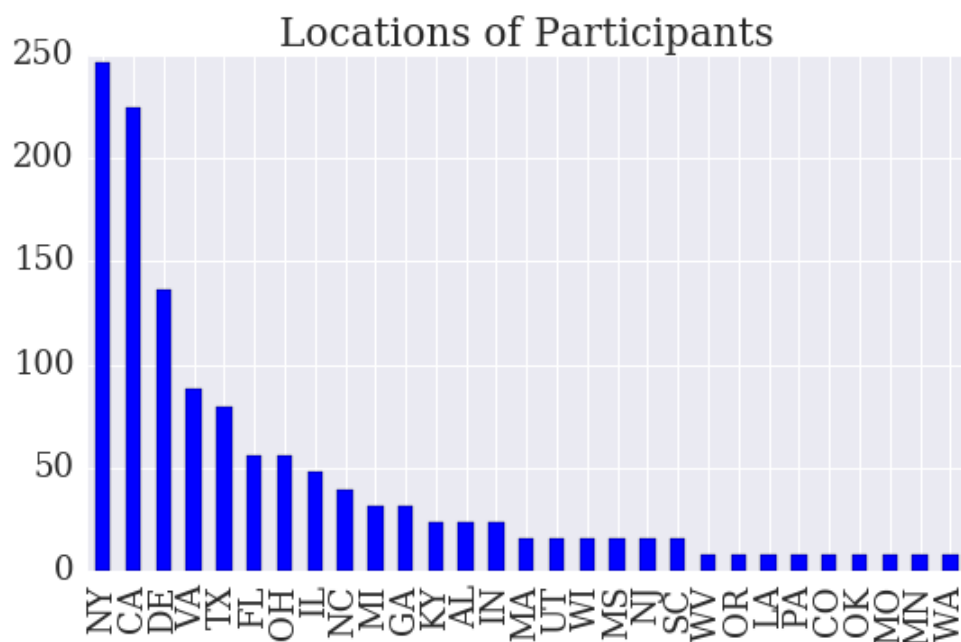


Figure 5-5: Locations of Participants

5.3.3 Political Affiliation

More than twice as many democrats than republicans participated in our study, which also was reflected in candidate preference disparities. These effects are taken into account in our modeling.

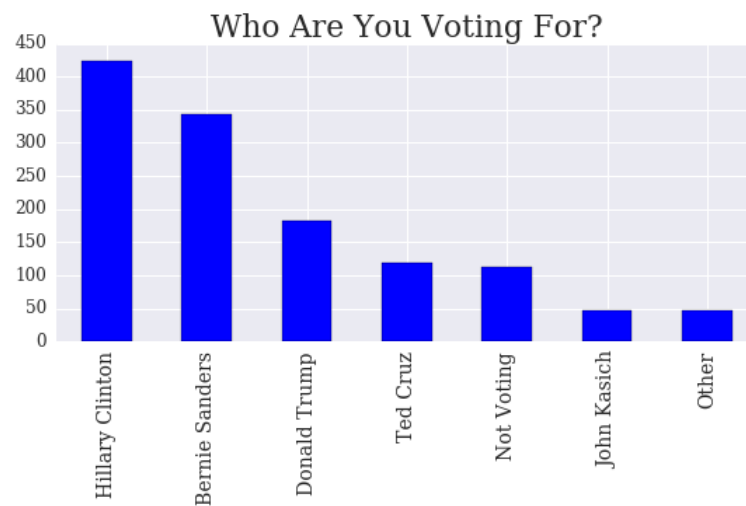
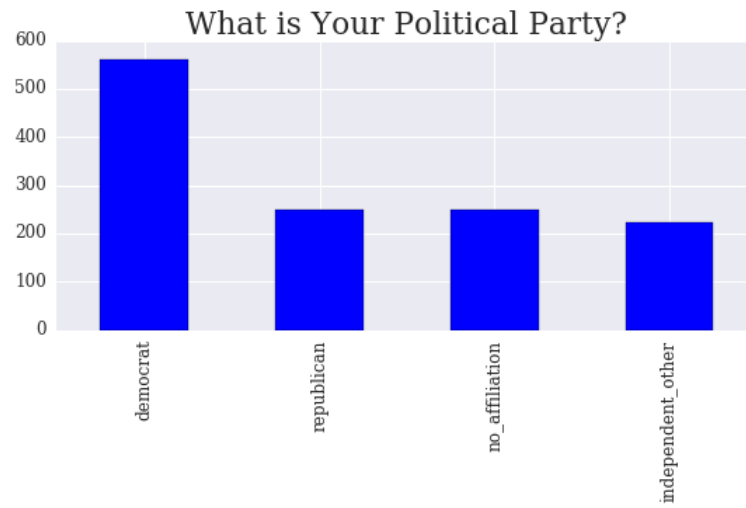


Figure 5-6: Political Affiliations of Participants

5.3.4 Trust

From a scale of -2 (Strongly Disagree) to 2 (Strongly Agree), on average, most stories were deemed trustworthy for all groups with a mean score of 0.55 (between Neutral and Agree). For distribution of all scores, see figure 9-1 on page 42.

However, the distributions for candidates varied. Stories about Sanders were seen as most trustworthy across all participants with a mean score of 0.66, followed by Cruz (0.63), Clinton (0.53), and Trump (0.40).

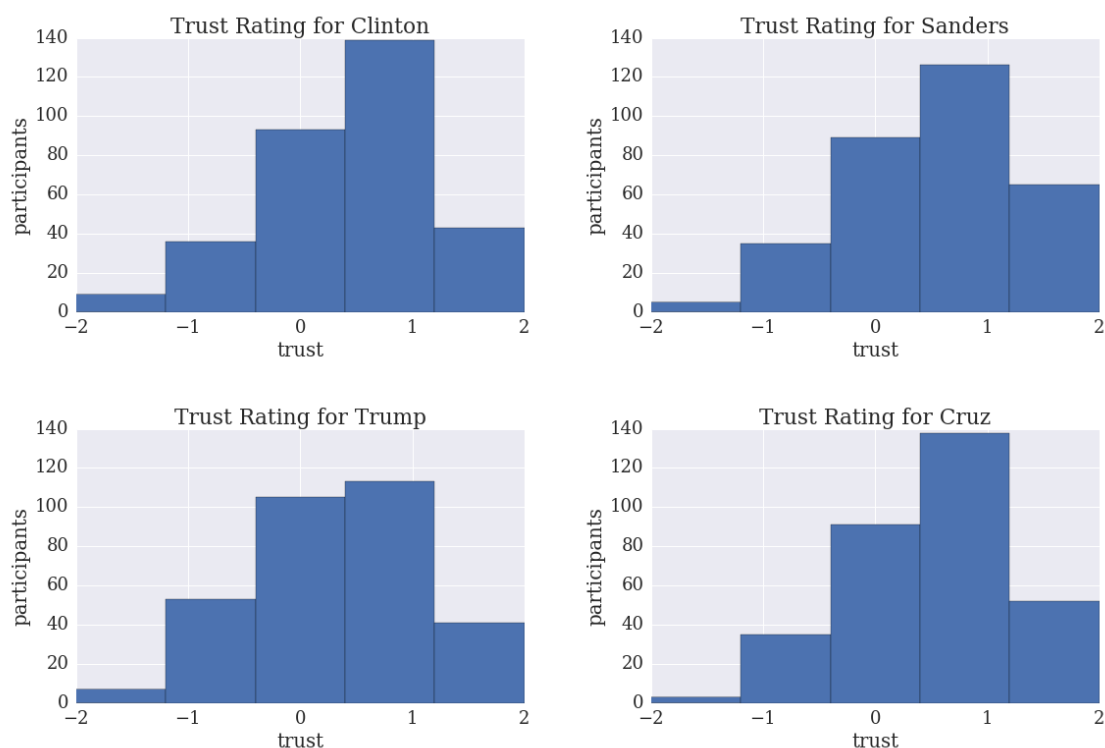


Figure 5-7: Trust Ratings for Stories About Candidate

On average, men were slightly less likely to trust stories (average of 0.54) than women (0.60) and others.

Those in age group 30-49 were most likely to find stories trustworthy (average 0.675), followed by those in age group 50-64 (average 0.083), then those 18-29 (0.49), then

those 64+ (0.083).

For distributions of trust by age group, see figure 9-2 on page 43.

On average, stories were more trusted by democrats (0.69 mean).

For distributions of trust by party affiliation, see figure ?? on page ??.

5.3.5 Fairness

From a scale of -2 (Strongly Disagree) to 2 (Strongly Agree), on average, most stories were deemed fair for all groups with a mean score of 0.57 (between Neutral and Agree). For distribution of all scores, see figure 9-3 on page 44.

Perceptions of fair treatment of candidates in stories diverged from the trust ratings above. Whereas stories about Sanders were most trusted, those about Clinton were seen as most fair (0.67 average).

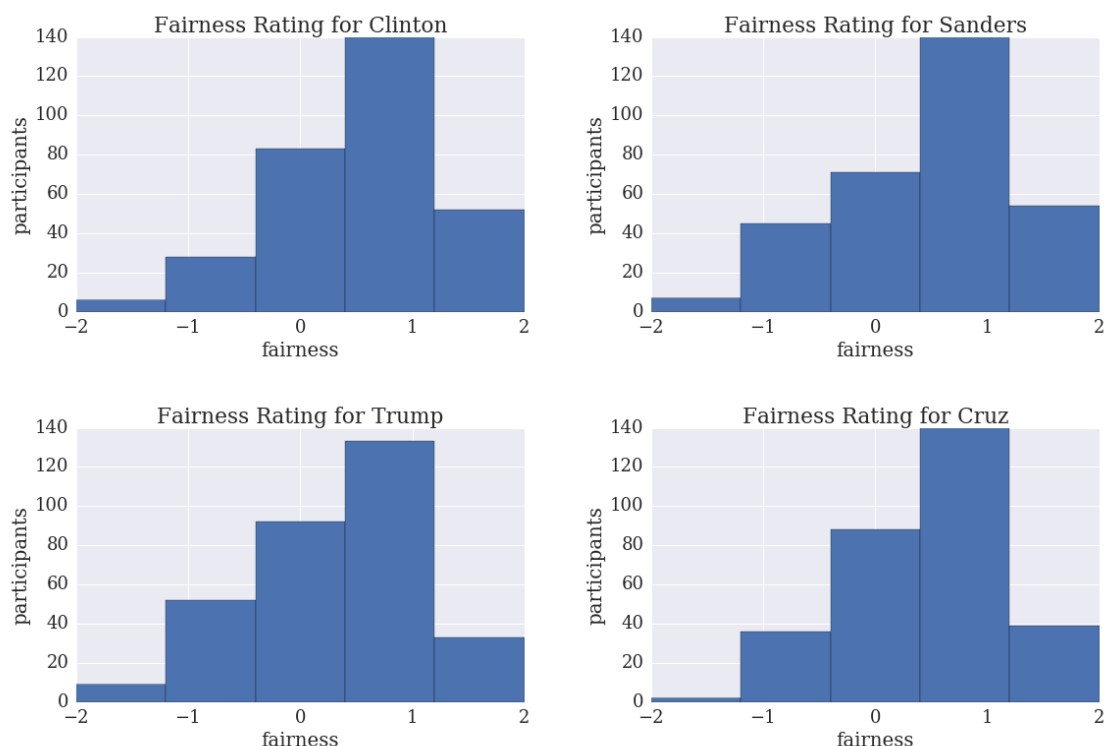


Figure 5-8: Fairness Ratings for Stories About Candidate

Women were more likely to see articles as fair on average (0.67) than men (0.51 mean). Again, those in age group 30-49 were also most likely to find stories fair (average .70), this time followed by Millenials (0.51 average), then those 50-64 (0.48) and 64+ (0.20).

Democrats and Independents were far more likely to view stories as fair on average (0.68, 0.67) than Republicans (0.375), although all averages were between neutral and fair.

This finding about low perceptions of fairness in media is aligned with prior research findings. In “The Liberal Media Myth Revisited,” T.T. Lee hypothesized (and verified) that “the more conservative (versus liberal) media consumers are, the more likely they are to perceive a media bias” and similarly “the more consumers lean toward the Republican (versus Democratic) party, the more likely they are to perceive a media

bias” [16].

5.4 Reading Level Effects

Note: this part is still brewing. I am working with one of Iyad’s students to verify my statistical analysis and also trying to meet with Iyad next week just to make sure my experiment is correctly interpreted.

As of now, H1 and H2 are both not proved (looks like reading level has no significant effect). That also defaults H3 + H4 to be true.

5.5 Media Brand Effects

Preliminary results:

Using factorial ANOVA, when we model fairness as a function of story reading level \times source of story \times party of the candidate, we see that the source of the story has a high effect on the level of fairness perceived (F value 6.598, Pr ($>F$) 0.000201). Reading level has no significant effect. The same holds true for trust scores (F values 10.978, Pr($>F$) 4.06e-07).

One interesting observation is that showing *no source at all* has a negative effect on both trust and fairness. I am still analyzing that effect to see what it is.

Confirming hostile media effects, we see a significant effect of the reader’s political affiliation aligning with the sources. We also so a significant effect if your candidate is being written about.

I’m working to try to see those two effects in comparison, which would have interesting implications for this election cycle. Would be neat to see that party loyalty is officially

(significantly) broken.

5.6 Qualitative

In our surveys, we left a space for people to leave comments about the task. Although most people did not fill out the question, here are some analyses of their responses.

To-do

5.7 Conclusions

To-do

5.8 Limitations

Our study shows significant effects that open potential new areas of experimentation while confirming past theories of how media bias is formed. In the interest of focus, our study centered around four candidates and a narrowed dataset of eight stories, but in the future could be replicated on a larger set of more diverse stories and outlets.

Furthermore, although the contributor market on CrowdFlower is not representative of any specific region or demographic, it is also not representative of the nation at large.

Chapter 6

Future Work

We found these effects, so what?

6.1 Designing Interventions

This section I plan to create suggestions for interventions (i.e. now that we know what makes people not trust news... so what?) on how to get people to read a diverse set of news media with high trust.

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Chapter 7

Conclusion

Media distrust, which has intensified over the last two decades, is a phenomenon with serious implications in the practice of democracy and a well-informed public.

In an election year prefaced by deep cynicism towards American institutions (a 2015 survey showed that just 19% of the population trusts the federal government), attitudes towards the news media fare no better. Almost two-thirds of Americans think that the national news media is a negative influence on the country [7].

Our results confirm previous hypotheses about the importance of the role of the reader in determining news trust and bias *over* the role of the content itself. We show that drastically different use of language complexity has little effect on the reader in comparison to the presence of media brands.

Interestingly, although showing media from outlets of opposing political orientations decreases trust and fairness perceptions in the reader, when no outlet is attributed to the story, trust in the story also decreases. This suggests that interventions designed to *level* news stories by aggregating them without attribution to source might not be effective in creating a balanced news diet for sustaining informed voters.

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Chapter 8

Tables

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Chapter 9

Figures

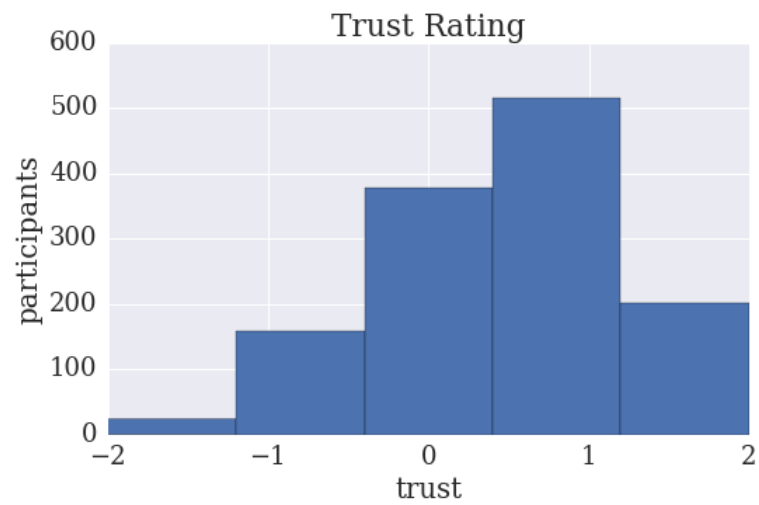
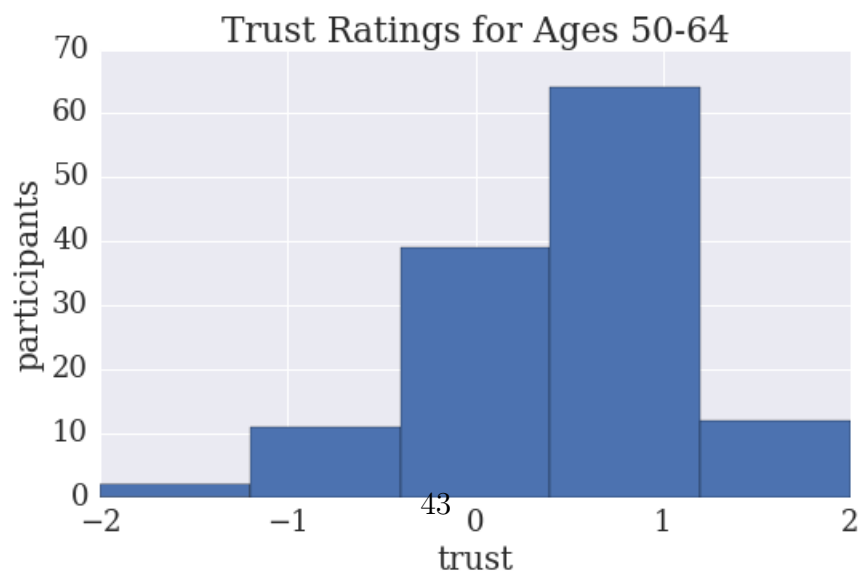
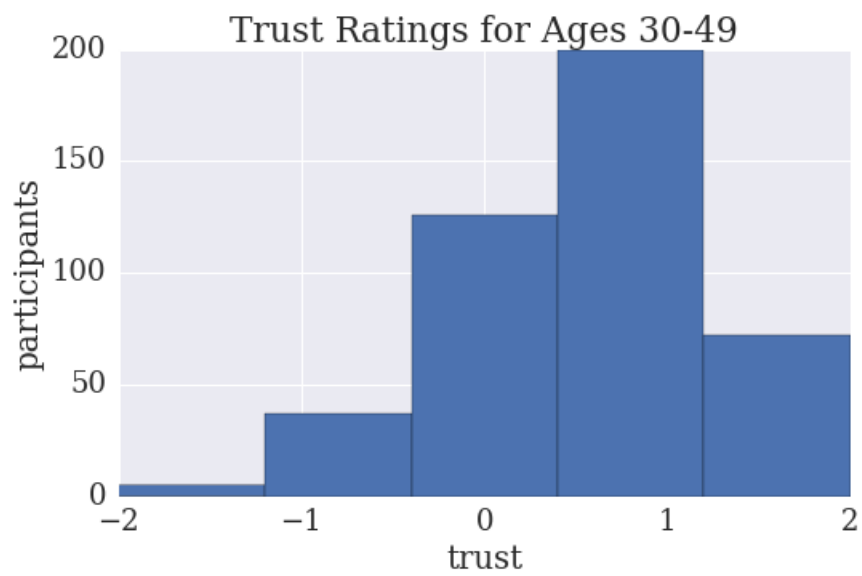
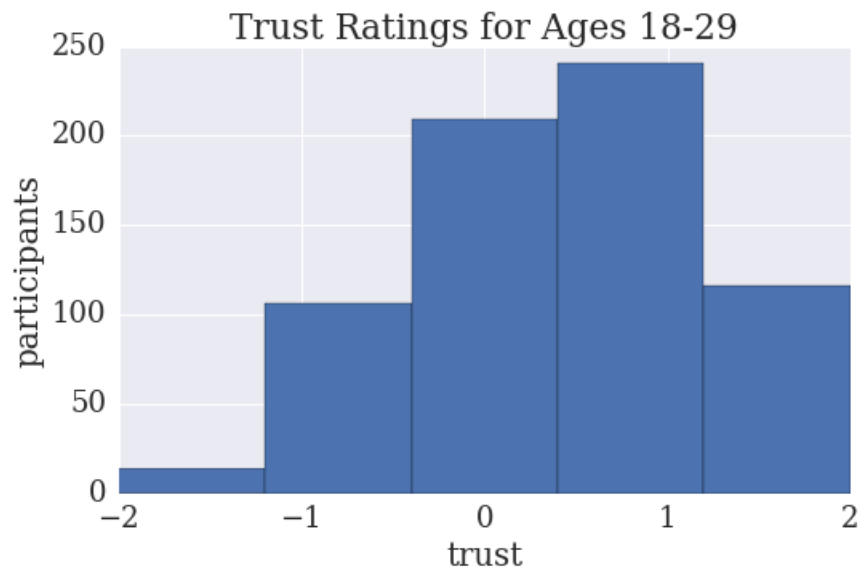


Figure 9-1: Overall Trust Ratings



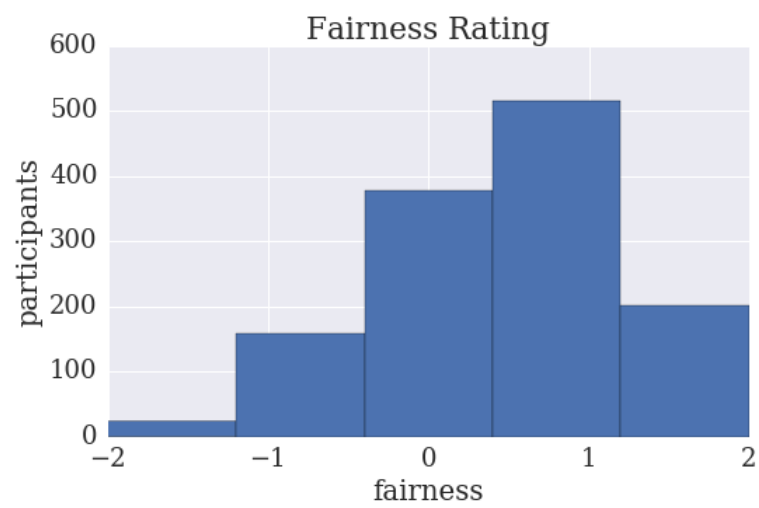


Figure 9-3: Overall Fairness Ratings

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