

Do Imageries Lend Credibility to News Articles?

Discover and Adjust for Latent Visual Treatments in Survey Experiments*

Keng-Chi Chang[†]

kechang@ucsd.edu

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Abstract

Consumption of online news generally comes with visual imagery. However, experimental evidence around news credibility perception almost universally takes images as given, leaving it unclear what it is about images that matter. This study designs a randomized survey experiment that varies the image treatment within each story while holding fixed other aspects of news articles to discover and estimate characteristics of images that can causally increase or decrease the perception of news credibility. By combining Large Vision Models and methods in NLP to discover latent treatments, I find that the general presence of an image does not uniformly change credibility perception, while images with some identified latent treatments (such as photos from press conferences, comics, or visuals of male suits) can alter credibility perception. Heterogeneous treatment effect analysis also reveals that preferences for some latent treatments are divided by gender, race, or age, suggesting paths for visual treatment targeting.

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[†]Ph.D. Candidate in Political Science and M.S. Student in Computer Science and Engineering, University of California San Diego. The author appreciates grant funding supports from NSF-APSA Doctoral Dissertation Research Improvement Grant and Rapoport Family Foundation Doctoral Dissertation Grant.

1 Introduction

In the past decade, the general public concerns over the spread of misinformation or partisan news has elevated, due to considerations of their potentials in shaping beliefs and perceptions. Scholars have responded to these concerns by estimating the prevalence of misinformation (Allcott and Gentzkow 2017; Berinsky 2017; Flynn, Nyhan and Reifler 2017; Guess, Nyhan and Reifler 2020), finding automated or crowdsourced detection algorithms (Kumar, West and Leskovec 2016; Wu et al. 2019), and inventing corrective interventions (Pennycook et al. 2021; Badrinathan 2021). However, most scholarly research have focused on textual misinformation. There are substantially less attention paid to *visual misinformation*, especially what *determines the perceived credibility of visual contents*.

More recent studies have started to document some facts about the prevalence of visual misinformation (Garimella and Eckles 2020; Yang, Davis and Hindman 2023) and provide **observational** evidence that images might have some advantages over text in driving engagements (Li and Xie 2020) or mobilizing protests (Casas and Williams 2019). Despite some **experimental** studies in testing credibility perception of visuals or videos (Wittenberg et al. 2021; Hameleers et al. 2020; Barari, Lucas and Munger 2021), their experimental design only treat image as a black box—it remains unclear what it is about the images that matters for the credibility of information.

In this paper, we address the question of when and why images impact the credibility of information. Does including an image with a statement lend to its credibility? What is it about an image that makes a fact more credible, and for whom?

To address this problem, we design an experiment that randomizes **different versions** of real-world news images **within** each experimental news stories. By leveraging recent advances in open source pretrained Large Image Models and new frameworks in causal inference (Egami et al. 2022; Fong and Grimmer 2023; Pugh and Torres 2023), we are able to discover and estimate aspects of images that changes credibility perception.

Contrary to findings in earlier experiments where there is no variation in visual treatments (although in other contexts such as social media posts (Hameleers et al. 2020) or videos (Wittenberg et al. 2021)), we do not find that the presence of visuals can always increase credibility perception of news. The **type** of image used as treatment matters—there are types of images that can increase perception and others can decrease perception.

We account for these **latent treatments**—aspects of image treatments that are indirectly manipulated by the researcher—in a principled manner.

2 Research Questions

Research on news credibility seeks to understand which characteristics of news articles make them more or less credible to individuals and how such perceived credibility affects communication outcomes. One understudied aspect of news articles are the images (**RQ1**).

RQ1: Do images change perceived credibility of news articles?

To our knowledge, there was no direct experimental evidence for this, but there are some suggestive evidences from related studies. [Wittenberg et al. \(2021\)](#) tested the effectiveness of political campaigns in videos vs. texts, showing respondents believe the event more if shown the video version. [Hameleers et al. \(2020\)](#) tested Tweets with and without images, showing images increased perceived credibility.

Even if we can answer **RQ1**, what exactly is about images that make them perceived more or less credible? We vary characteristics of visual images in treatments to answer this question (**RQ2**).

RQ2: What characteristics of images change perceived credibility of news articles?

This question (**RQ2**) cannot be answered with existing experimental designs ([Wittenberg et al. 2021](#); [Hameleers et al. 2020](#); [Barari, Lucas and Munger 2021](#)) where researchers assign one *fixed* version for each modality (image/text/video) in treatments and compare directly across modalities, leaving it unclear *what* it is about images that matter.

We have good evidence that predictors of misinformation dissemination include age and partisanship ([Guess, Nagler and Tucker 2019](#)). Other research also finds that the types of image individuals shared is correlated with demographic attributes ([Chang and Buntain 2023](#)). Since there are far less unified education for reading images, we conjecture (**RQ2**) there would be divergent responses to image treatments across known societal groups.

RQ3: Is there heterogeneity across gender, race, and age in the effects of image on perceived credibility?

Image treatments are high-dimensional, and simply randomize the images are not sufficient for valid causal inference ([Fong and Grimmer 2023](#)) since there will be confounding by unmeasured treatments. We use general-purpose vision embeddings and adapt method ad-

addressing this issue from Natural Language Processing (Fong and Grimmer 2016) to analyze image treatments (RQ3), without relying on human labeling or pre-defined categories.

RQ4: How do we discover and estimate the various latent aspects of visual treatments?

3 Experimental Design

3.1 Sample

Our sample consists of U.S. adults recruited on Cloud Research Prime Panels and Connect in June 2023. To identify heterogeneity in demographics, quotas were set for race and region. Table 1 presents the summary statistics and balance tests between treatment and control groups. The demographic characteristics are balanced between treatment conditions. Samples that did not pass the attention checks (e.g. “Please select ‘Disagree’ from the options below.”) are dropped from the analysis. Given the design, the attrition rate was neither asymmetric between treatments nor attributable to observed sociodemographic characteristics.

3.2 Experimental Procedure

After asking participants’ informed consent and measuring some pretreatment variables such as party affiliation and social media consumption, the respondents were asked to read four news stories. Two of the stories are false news (fact-checked by PolitiFact, a nonpartisan fact-checking website), and two of the stories are real news. The respondents were not provided with the veracity or the source of the news articles, nor were they primed to think about the accuracy of the stories.

We randomly assign respondents into treatment and control groups. Control group will read the story with the title and a two-paragraph excerpt of the story, while treatment group will read the story with the title, a randomly assigned image that fits the story, and the same two-paragraph excerpt of the story. In other words, the only difference between the treatment and control condition is the presence of image while reading news articles. Figure 1 presents an example screenshots for the treatment stimuli.

Figure 2 plots the flow of the survey experiment. We use block randomization so that each respondents are assigned to two treatment conditions (reading two stories with image)

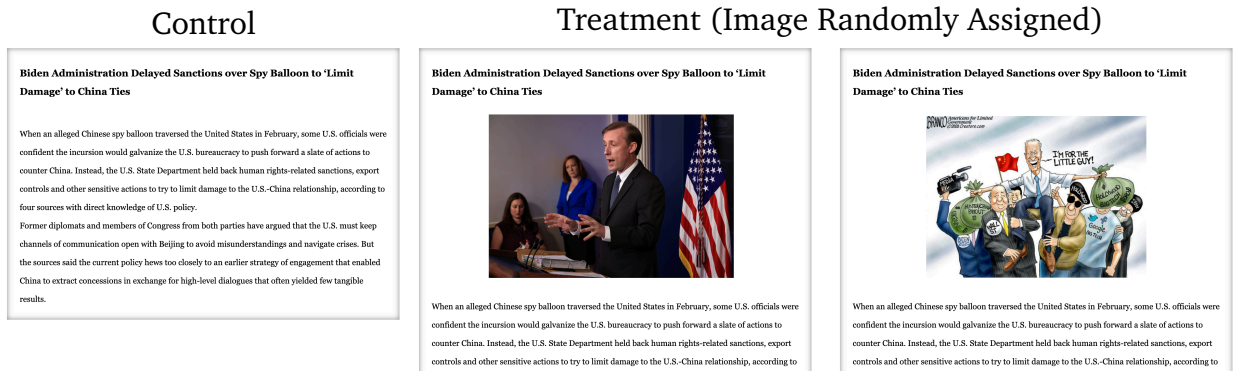


Figure 1: Screenshot of Example Treatment Stimuli

and two control conditions (reading two stories without image). After reading each article, the respondents were then asked to rate the credibility of the story on a 0-100 scale (“On a 0-100 scale, how likely this news is true?”). The stories and treatment conditions were also presented in randomized order so there will be no learning effect when averaging across respondents.

Table 1: Summary Statistics and Balance Table

Variable		Total	Control	Treatment	χ^2 p-val
Party Id	Democrat	523 (59.7%)	263 (50.3%)	260 (49.7%)	0.4906
	Independent	96 (11.0%)	50 (52.1%)	46 (47.9%)	
	Republican	257 (29.3%)	119 (46.3%)	138 (53.7%)	
Gender	Female	459 (52.4%)	217 (47.3%)	242 (52.7%)	0.2055
	Male	417 (47.6%)	215 (51.6%)	202 (48.4%)	
Race	Black	137 (15.6%)	72 (52.6%)	65 (47.4%)	0.8390
	Latino	100 (11.4%)	49 (49.0%)	51 (51.0%)	
	Others	99 (11.3%)	50 (50.5%)	49 (49.5%)	
	White	540 (61.6%)	261 (48.3%)	279 (51.7%)	
Age	Older than 40	402 (45.9%)	193 (48.0%)	209 (52.0%)	0.4768
	Younger than 40	474 (54.1%)	239 (50.4%)	235 (49.6%)	
Education	College Graduate	536 (61.2%)	256 (47.8%)	280 (52.2%)	0.2481
	Under College	340 (38.8%)	176 (51.8%)	164 (48.2%)	

3.3 Story and Image Selection

For this first part of a series of studies, we pick news related to our substantive interest in US public opinion towards China from [PolitiFact](#), the [Google Fact Check Tools API](#), and [Polygraph.info](#) (a fact-checking website produced by Voice of America) with the following

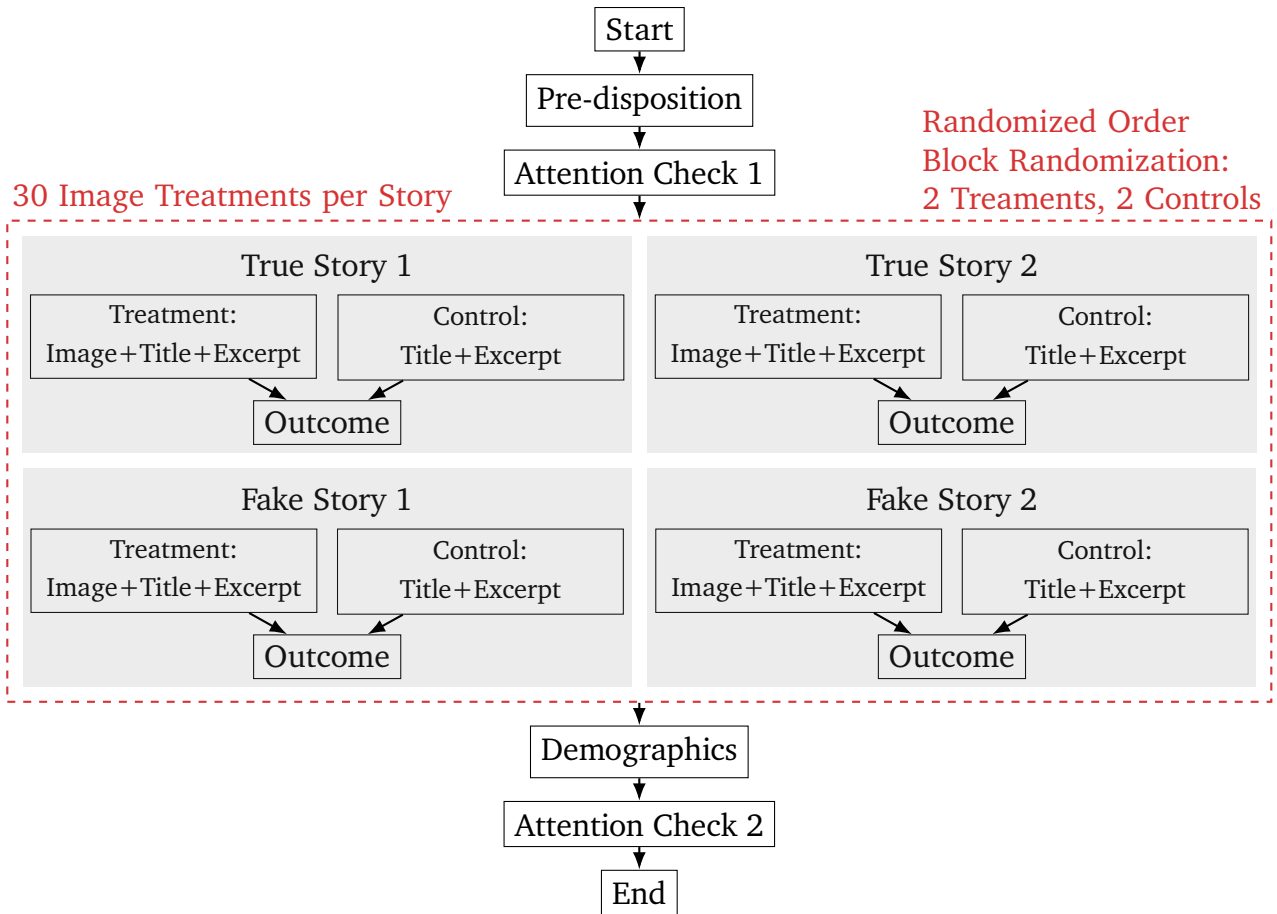


Figure 2: Flow of Survey Experiment

criteria: (1) Relevant to the general US population (not just stories about things happened in China); (2) Reported recently (up to one year). The frequency of fact-checked stories about China is quite low. Stories that satisfy both criteria is only a handful while designing the survey.

After selecting the stories, we feed the title of the stories into Google and Bing Image Search. We then pick 30 unique images for each stories that satisfy the following criteria as image treatments: (1) Images that are consistent with the textual content of news articles; (2) Covers distinct types of imagery among the universe of images that we sampled from.

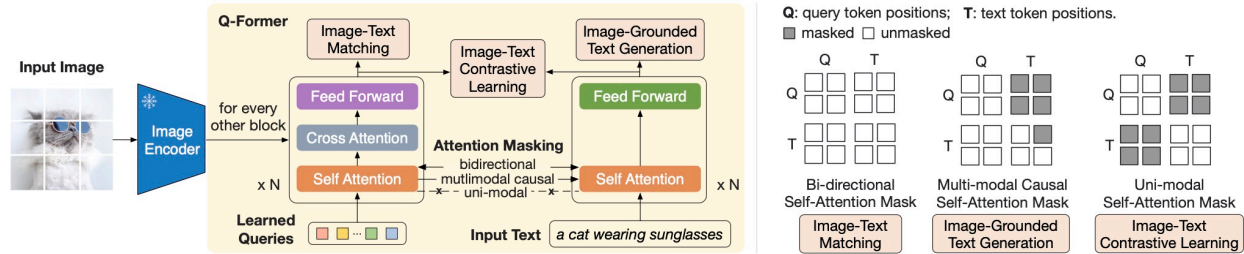


Figure 3: BLIP-2 Model Architecture (from Li et al. (2023)).

4 Inferring Latent Treatments from Treatment Images

4.1 Break the Dependency between Discovery and Estimation

Social scientists are generally interested in effects from low-dimensional interventions, while the interventions of text—as well as images—are almost always high-dimensional (Fong and Grimmer 2023). Additional care has to be taken for valid causal inference, since SUTVA violation is likely if the researcher does not break the dependency between discovery and estimation (Egami et al. 2022). To solve this problem, we follow the framework of Egami et al. (2022) to split the sample and use the training set (50% of the data) for treatment discovery and test set (50% of the data) for treatment effect estimation.

To be more specific, in the treatment discovery phase, we combine a pre-trained image model (Li et al. 2023) and the Supervised Indian Buffet Process (Fong and Grimmer 2016) to learn a model that maps high-dimensional visual features X_i into a low-dimensional binary representation of latent treatment Z_i , indicating whether an image $i \in \mathcal{T}$ conveys such a treatment, using training data \mathcal{T} .

In the treatment effect estimation phase, we use the learned model to predict latent treatment \hat{Z}_i on the test set, $i \notin \mathcal{T}$. We then use the predicted latent treatment \hat{Z}_i to estimate the treatment effects of the images. Fong and Grimmer (2023) shows that the ATE is identified using standard regression adjustments under suitable (while not generally testable) assumptions. This procedure is also consistent with the emerging design-based framework of using annotations from Large Language Models for valid downstream causal inference (Egami et al. 2023).

4.2 Overall Workflow in Analyzing Image Treatments

Analyzing visual images is a growing field in computational social science (Torres and Cantú 2021; Williams, Casas and Wilkerson 2020; Joo and Steinert-Threlkeld 2018). However, since there is no clear pre-defined categories, we take an unsupervised approach in the early steps and rely on large-scale pretrained image models.

We take the following several steps:

1. Split each image into 1×1 , 2×2 , and 3×3 blocks.
2. Map each block into a pre-trained multimodal deep learning model to get the embeddings of each block. Here, we use the new state-of-the-art multimodal model BLIP-2 (Li et al. 2023) developed by Salesforce Research. There are at least two novelties about BLIP-2 that make it more suitable for social science tasks than traditional CNN models such as ResNet-50:
 - Unlike ResNet-50, BLIP-2 is not pretrained just for object detection (classifying cats vs. dogs), but for **large-scale image captions** such as those on Flickr.
 - Unlike ResNet-50, BLIP-2 is not trained for classification loss, but for **contrastive loss** where predefined categories (e.g. cats and dogs) are not needed.
3. After getting the embeddings for each image blocks, we cluster (K-Means) on the embeddings to generate $K = 100$ image-block clusters. Figure SI 1 plots the evaluation metrics for the K-Means, and Figure SI 2 shows the empirical distribution of clusters. The clusters would assign visually similar blocks of images into the same cluster. Figure 4 plots the UMAP projection of the image embeddings of the image-blocks, where the colors and numbers indicates K-Means results. Similar methods have been used in other papers (Zhang and Peng 2022) and our earlier works (Chang 2022; Chang and Buntain 2023).
4. Build an image-by-cluster matrix where each row represents one image while each column represents one visual cluster and the elements indicates the presence of each cluster in each image:

$$[\mathbf{X}]_{i,j} = \mathbb{1}(\text{image } i \text{ has blocks from cluster } j).$$

5. Divide experimental data into training and test sets.
6. In the training set, learn SIBP model (Fong and Grimmer 2016) to identify latent

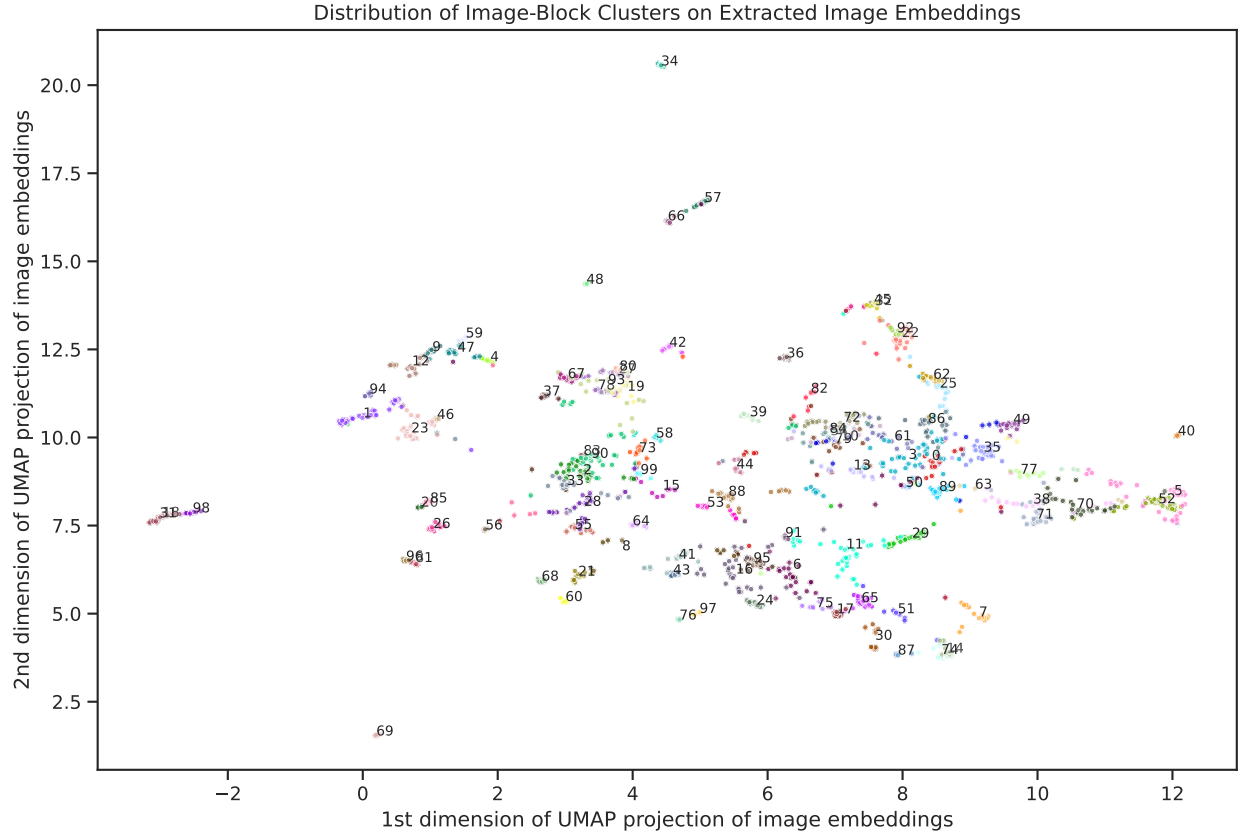


Figure 4: UMAP Projection of the Image-Block Embeddings. Colors and labels indicates K-means clustering results, where K-means successfully groups visually similar image-blocks to the same cluster.

treatments that maps image-cluster matrix to latent treatments: $g : \mathbf{X}_i \mapsto \mathbf{Z}_i, i \in \mathcal{T}$.

7. In the test set, infer latent treatments using learned SIBP model: $\hat{\mathbf{Z}}_i = \hat{g}(\mathbf{X}_i), i \notin \mathcal{T}$.
8. Estimate treatment effects using inferred latent treatments in the test set.

Figure 5 reports the discovered 10 latent treatments Z_1 to Z_{10} (in the rows) by image clusters (in the columns, 4 image blocks per cluster). The ids of the clusters are on the top left of each cluster. First, we can see that clusters group visually similar image blocks together. Second, the discovered latent treatments tend to be not so visually similar but still semantically related and interpretable. For example, Z_2 is a latent treatment about white male wearing suits; Z_6 is about female clothes or masks; Z_7 is about comics or symbols; Z_{10} is about photographs from press conferences.

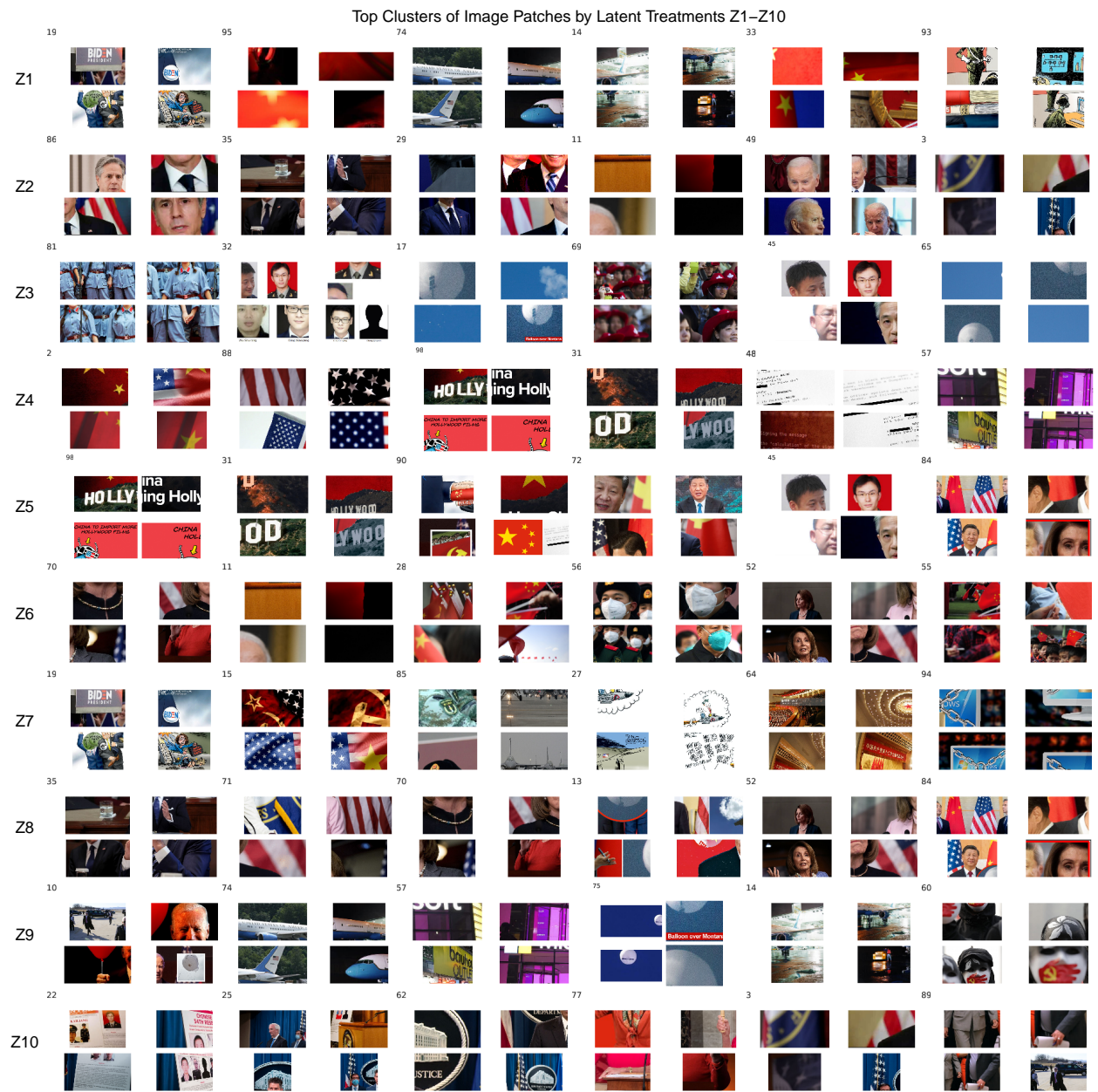


Figure 5: Top Clusters of Image Blocks by Latent Treatments Z₁–Z₁₀ Inferred by SIBP.

4.3 Low-dimensional Latent Treatment Discovery

Under the hood, the SIBP is a topic model that maps set of words to (non-prespecified) topics—the latent treatments. There are several advantages of SIBP over other more conventional topic models such as LDA (Blei, Ng and Jordan 2003) and STM (Roberts et al. 2013). First, it is a **supervised** method that incorporates information not just about the text, covariates, but also about the outcome. It is finding features that explain both the text and the response, not just about the relationship between texts. Second, unlike LDA or STM, but consistent with the design-based causal inference paradigm, its topic assignment Z_i is **binary**. Both LDA and STM assumes that the document topics Z_i lie on a multinomial simplex. In other words, with SIBP there is no inherent tradeoffs or interference between topic assignments—assigning document to topic A does not necessarily reduce the probability of assigning document to topic B . In this way, we are able to define potential outcomes $Y_i(Z_i = 1)$ and $Y_i(Z_i = 0)$.

5 Results

5.1 Average Treatment Effect

Since the treatment conditions are randomly assigned, we can estimate the ATE by simply regressing the outcome (perception of news being true) on treatment assignment (has image):

$$\text{NewsPerception} = \alpha + \beta \times \text{HasImage} + \epsilon \quad (1)$$

where β is the ATE. To quantify the treatment effect of each latent treatment, we can further interact the treatment assignment (has image) with indicators of latent treatment (Z_1 to Z_{10}):

$$\text{NewsPerception} = \alpha + \sum_{j=1}^{10} \beta_j \times \text{HasImage} \times \text{LatentTreatment } Z_j + \epsilon \quad (2)$$

where β_1 to β_{10} is the ATE by latent treatments Z_1 to Z_{10} .

Figure 6 reports the overall ATE and ATE by latent treatments. We find that, overall, reading news with images does not causally increase the truth perception of the news article. However, the **type of image treatment** in the news article actually matters.

Perception of News being True (0–100 Scale)

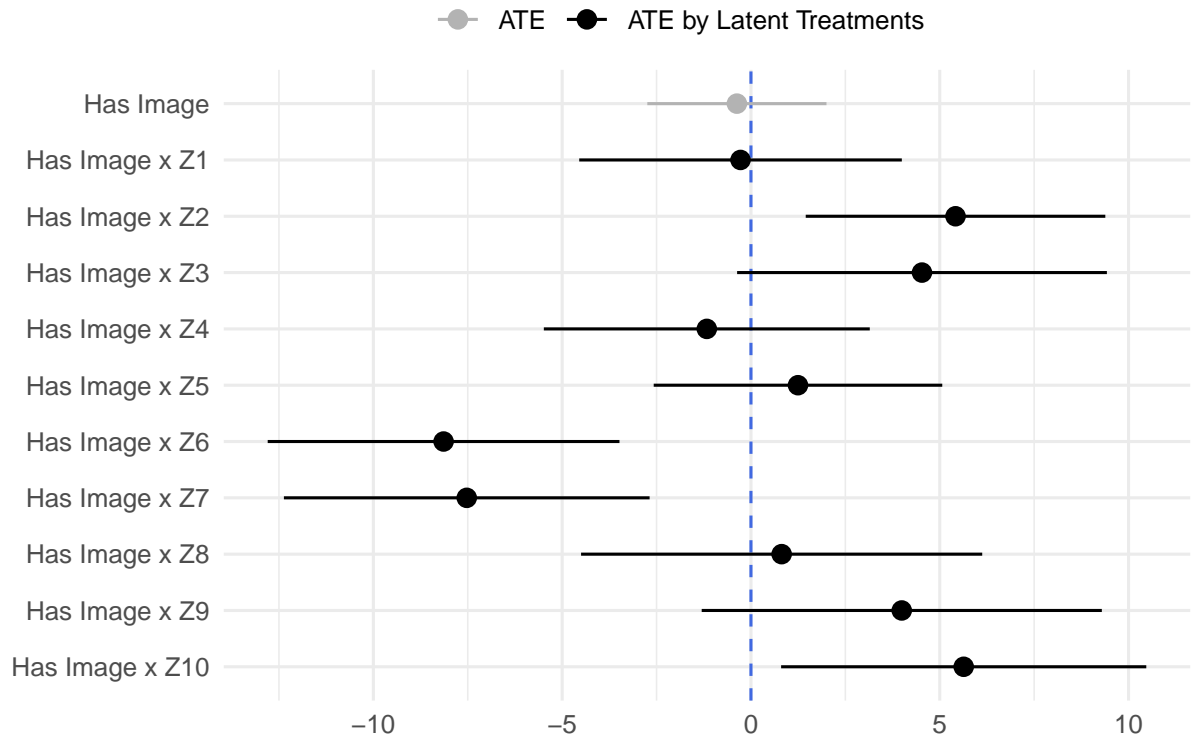


Figure 6: Average Treatment Effects of Latent Treatments.

When treated with images of white male wearing suits (Z_2) and images of photos from press conferences (Z_{10}), perceptions that news being true increases, relative to the text-only control group. On the other hand, when treated with images containing female clothes or masks (Z_6) and images with comics or symbols (Z_7), perceptions that news being true decreases.

In other words, the null effect of the overall ATE can be viewed as a weighted average of ATEs by latent treatments 1–10. The table version of Figure 6 is reported in Figure SI 1. We also included group-level covariates such as fixed effects of partisanship, gender, race, age, education, and region. The effect size does not change much while it costs statistical power.

Figure 7 further plots the raw outcome by treatment condition for each story. Red point indicates treated units; blue point indicates control units. Dark red bars indicate mean outcome by treatment image; dark blue bars indicate mean outcome in text-only control groups. One can see that the outcomes are distributed quite smoothly across treatment

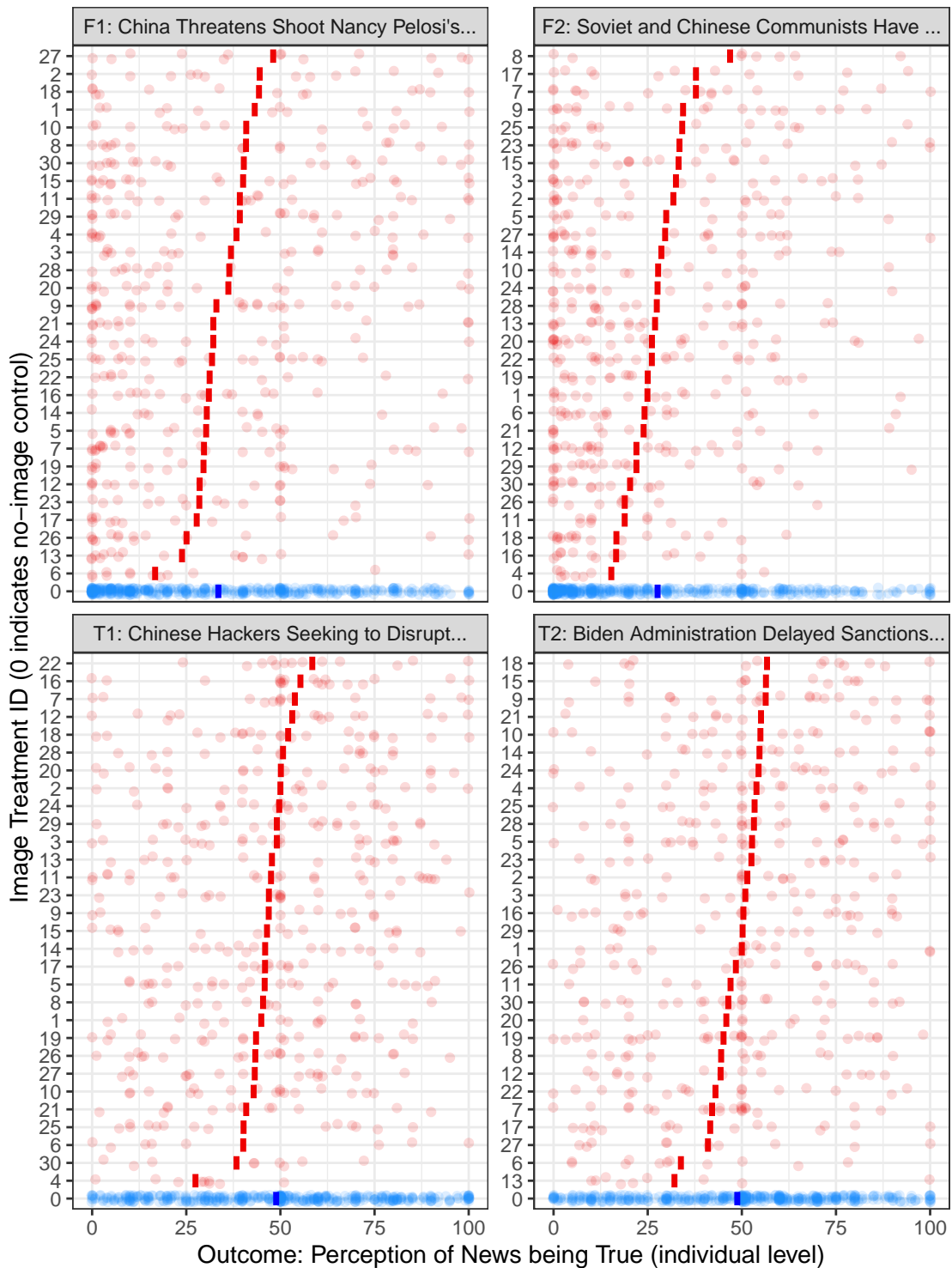


Figure 7: Individual-level and Mean Outcome by Treatment Image. Each panel presents the raw outcome data by story. Dark red bars indicate mean outcome by treatment image. Dark blue bars indicate mean outcome in control groups. No single image or small set of images are driving the observed difference in estimated ATE by latent treatment.

conditions. The observed ATE difference across latent treatment is not driven by a single image or a few outliers.

5.2 Heterogeneous Treatment Effect

Whether and how do the effect of latent treatments vary across demographic groups? To understand this, we estimate the Conditional Average Treatment Effect (CATE) of the latent treatments Z_1 to Z_{10} across demographic groups g :

$$\mathbb{E}[Y_i(Z_j = 1) - Y_i(Z_j = 0) \mid G_i = g], \quad \text{for } j = 1, \dots, 10.$$

The groups include party identification, gender, race, and age.

Figure 8 plots the regression estimated CATEs. Overall, we don't find substantial difference in group-level responses to image treatments as a whole on perception of news credibility. However, we do find differences in response to latent treatments across demographic groups. In the CATE by gender, we find that male respondents do view latent treatment with images containing female clothes or masks (Z_6) as less credible as that of female respondents. In the CATE by race, we find that white and latino respondents view latent image treatment with white male wearing suits (Z_2) as more credible than that of black respondents. In the CATE by age, we also find that respondents older than 40 do view latent treatment with image containing comics or symbols (Z_7) as less credible than that of younger respondents.

6 Evaluate Gains from Treatment Targeting

With the presence of some treatment effect heterogeneity, it is natural to ask whether there are benefits in targeting respondents with different treatments by known group-level variables such as demographics. As an example, using data from randomized field experiments, [Imai and Strauss \(2011\)](#) evaluated the benefits from targeting respondents in sending GOTV campaign messages. There is also societal concerns about targeting in political ads, in which scholarly research about targeting based on visual media is still limited.

To account for the multi-treatment nature of our experiment, we adopt the framework of [Sverdrup et al. \(2023\)](#) to evaluate the benefits of targeting using the Qini curve, which

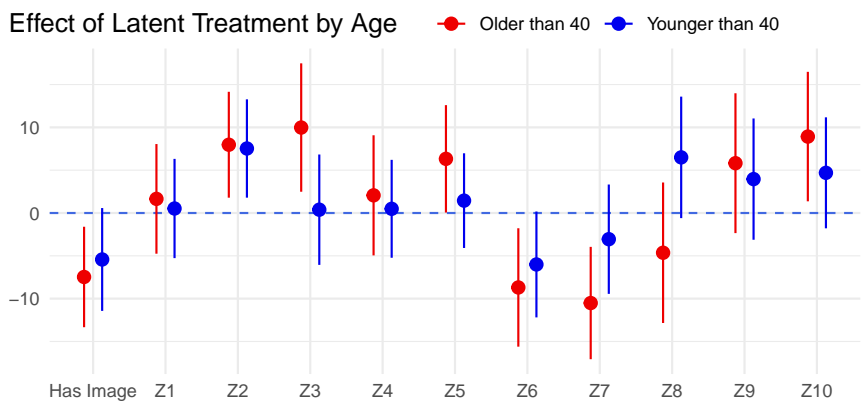
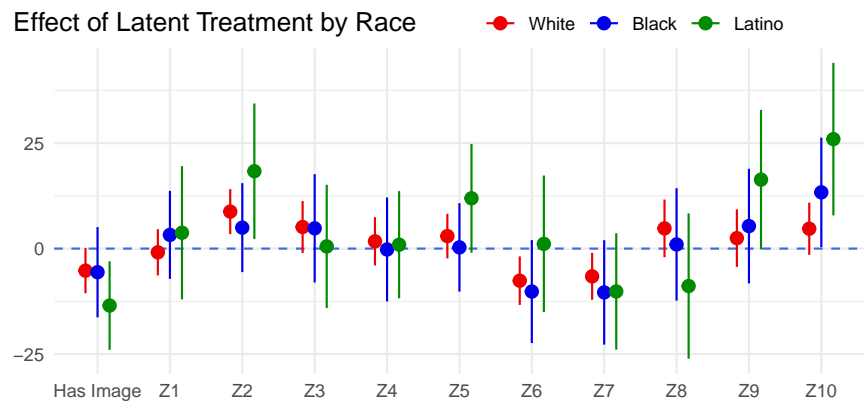
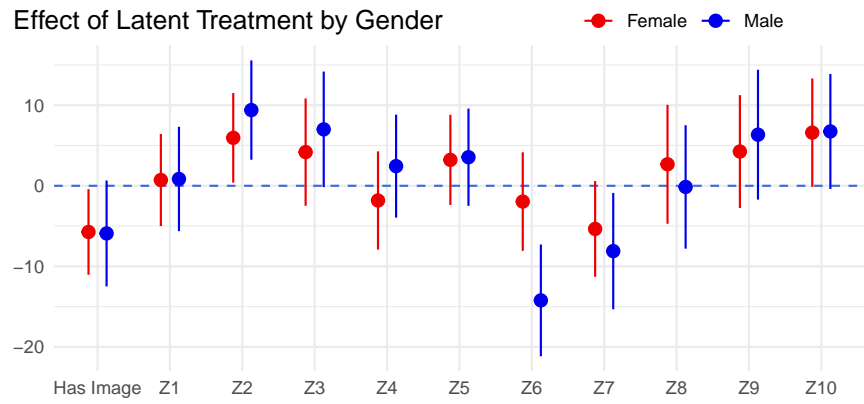
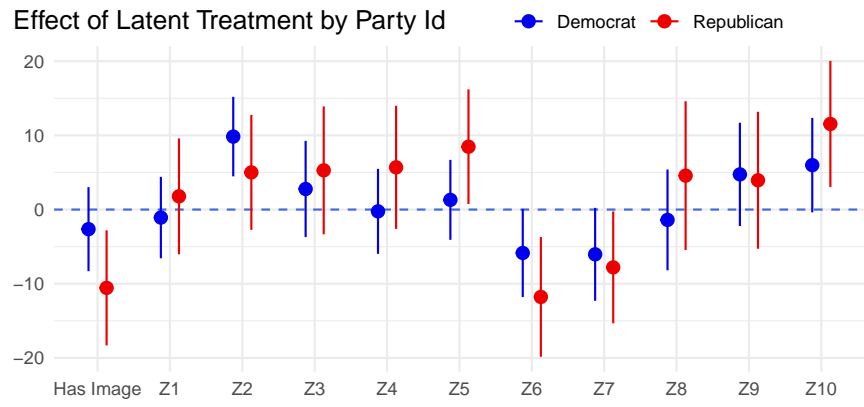


Figure 8: Heterogeneous Treatment Effects.

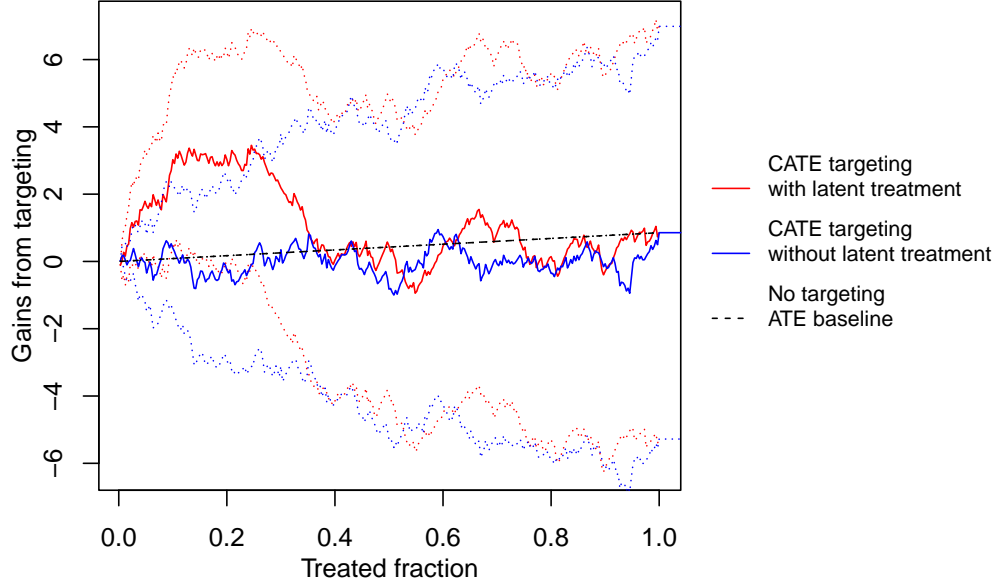


Figure 9: Qini Curve. This plot shows the average policy effect of treating the units most responsive to the treatment as we increase the scale of the treated population.

plots the average policy effect of treating the units most responsive to the treatment as we increase the scale of the treated population. This involves the following steps:

1. We first train a Causal Forest (Wager and Athey 2018) on training set to learn the CATEs across partitions of demographic variables and latent treatments:

$$\tau(G_i = g, Z_j = z) = \mathbb{E}[Y_i(1) - Y_i(0) \mid G_i = g, Z_j = z]$$

The benefit of tree-based Causal Forest is that it can flexibly model the relationship between covariates and outcome without strict model specification.

2. We then use the learned Causal Forest Model to infer CATE on test set, i.e., estimate $\hat{\tau}(\cdot)$. To compare the efficacy of latent treatments, we do this both with and without including information about latent treatments Z_i 's.
3. Form targeting policy $\hat{\pi}(G_i)$ that maps covariates to an optimal treatment decision:

$$\pi : G_i \mapsto \{\text{text-only, image 1, image 2, } \dots\}$$

by comparing across the estimated CATEs $\hat{\tau}(\cdot)$.

4. Calculate the Qini coefficients across treated fractions: In the test data, for each treated fraction, use inverse-propensity weighting (IPW) to estimate the gains from

treatment targeting:

$$\frac{1}{n} \sum_i^n \hat{\pi}(G_i) \left(\frac{D_i Y_i}{P[D_i = 1 | G_i]} - \frac{(1 - D_i) Y_i}{P[D_i = 0 | G_i]} \right).$$

Figure 9 shows the Qini curve for our visual survey experiment. Solid red curve indicates treatment targeting with CATE including information about latent treatments. Solid blue curve indicates treatment targeting with CATE but without including latent treatments. Black dashed line indicates no targeting—just randomly assign respondents to the overall best performing treatment.

First, we can observe from Figure 9 that when treated fraction is not large (smaller than 40%), there is a benefit in treatment targeting. When treated fraction increases, the overall gains converges to the level of non-targeting ATE baseline. This is expected, since with lower treated fraction we can start with targeting respondents most responsive to the treatments. Second, and perhaps more importantly, the benefit of targeting with CATE over ATE **only** occurs when latent treatment information is also included in the CATE. In other words, to reap the full benefits of treatment targeting, it is not sufficient to only include demographic covariates. The presence of heterogeneous responses to latent treatment suggests it is the **interaction** between **demographics** and the **types of imagery** that is driving the benefits of targeting in visual treatments.

7 Conclusions and Discussions

Do images lend credibility to news articles? The answer from this work is that—it depends. We show this by first designing a novel visual survey experiment where respondents are treated with different types of images across four news stories. We then utilize Large Vision Models to extract the visual information from these images to group visually similar image blocks into clusters, without human labeling or supervision. Thirdly, we leverage established method in NLP to identify and adjust for latent treatments—by learning a topic model in training set and use the predicted topic in test set for downstream inference—to separate treatment discovery from treatment effect estimation.

Results suggest that adding images to news articles in itself has no clear overall advantage over text-only controls. However, this overall null effect is masked by blending

together latent visual treatments, some of which can increase respondent’s perception of news credibility while others decrease credibility perception. Heterogeneous Treatment Effect analysis also shows there are differences in group-level responses to certain latent treatments by gender, race, and age. We also provide evidence that targeting respondents by demographics into different visual treatments can be moderately valuable.

7.1 Future Extensions

There are several extensions to continue this research agenda. First, I’m expanding this experiment to a much larger set of news stories—not just those related to US-China relations—to understand the broader relationship between visual media, news credibility, and demographics. Second, we might lose some information by relying SIBP to infer latent treatment. It is totally possible to learn a model to predict latent treatment directly from the visual embeddings, without relying on SIBP, but it will require extra thoughts about interpretability. Thirdly, researchers might also leverage large generative models to generate synthetic images to directly manipulate certain aspects of images, although most open source models to date are trained for generating human portraits or movie scenes instead of images on news websites. Lastly, hosting image-based survey experiment and making inferences on images have a pretty high barrier to entry due to the close to non-existent of researcher-friendly infrastructures. Building these tools are also important next steps.

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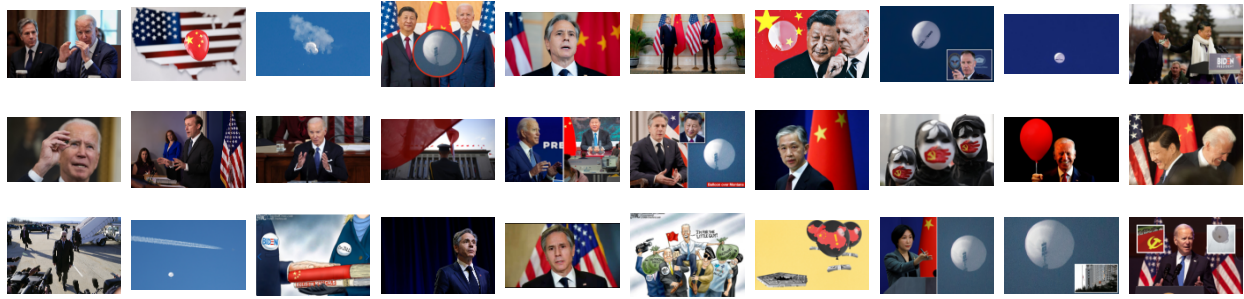
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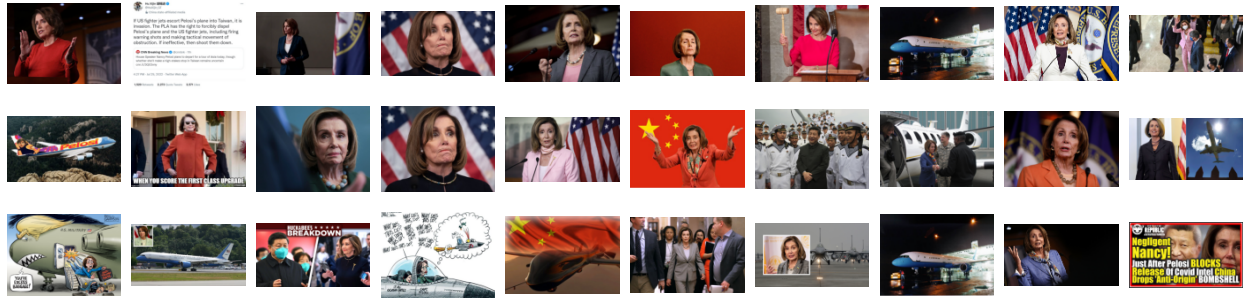
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and navigate crises. But the sources said the current policy hews too closely to an earlier strategy of engagement that enabled China to extract concessions in exchange for high-level dialogues that often yielded few tangible results.

(F1) China threatens to shoot Nancy Pelosi’s plane down if she visits Taiwan



In a recent statement, Chinese Ministry of Defense spokesman Tan Kefei expressed strong concerns over the possibility of Speaker Nancy Pelosi visiting Taiwan. The spokesman warned that such a visit would pose a severe threat to China’s sovereignty and territorial integrity.

“The Chinese military will never sit idly by and will certainly take strong and resolute measures to thwart any interference by external forces and secessionist attempts for ‘Taiwan independence,’ and firmly defend China’s national sovereignty and territorial integrity,” emphasized Tan Kefei.

(F2) Soviet and Chinese communists have grabbed control of U.S. entertainment, movies, television, music, academia, K-12 education and the news media



In a recent interview, Monica Crowley, former assistant secretary for public affairs at the Treasury Department, made an assertion suggesting that overseas communists have exerted control over key institutions of American life for several decades. Crowley argued that these foreign forces have utilized these institutions as pillars to inflict significant damage over time, ultimately leading the country to a critical juncture.

“With those pillars, they have been able to inflict tremendous damage over many decades. And now we are at a tipping point where the useful idiots on the left—the Soviet Union collapsed, the CCP (Chinese Communist Party) stepped in to take over this grand project to destroy the country from within—that’s exactly what’s happening,” stated Crowley during the interview.

2 Evaluate Image Clustering

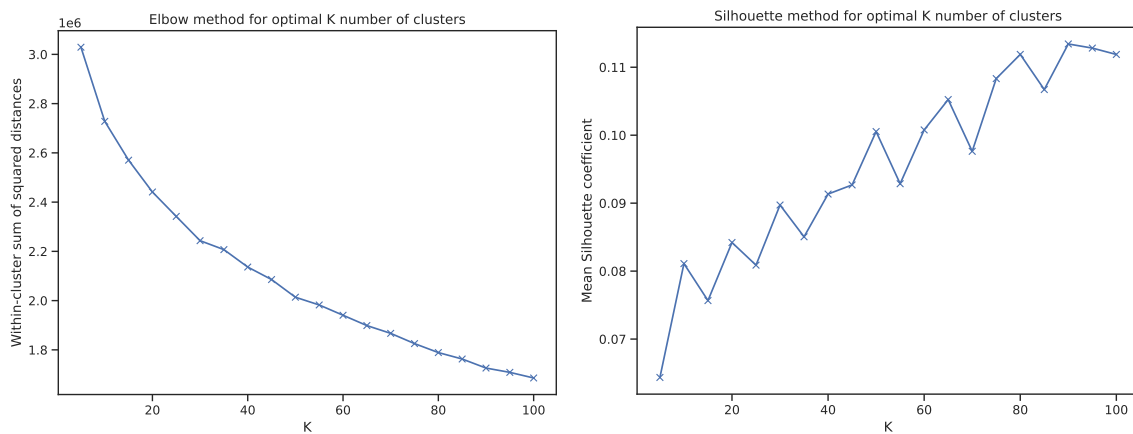


Figure SI 1: Elbow and Silhouette Methods for Evaluating K-Means.

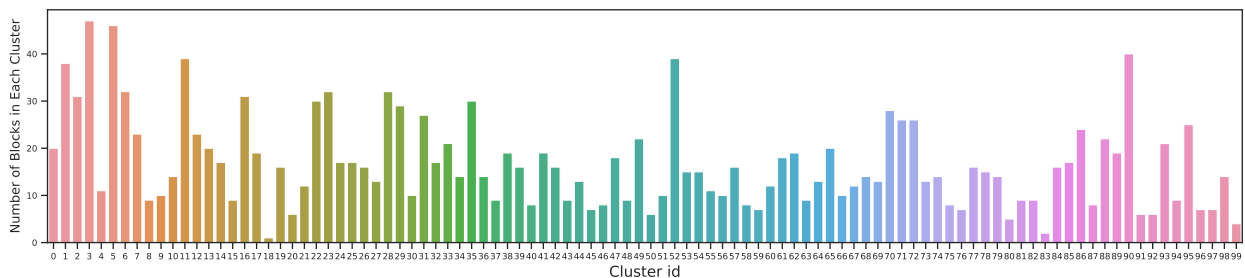


Figure SI 2: Distribution of Clusters from K-Means.

3 Additional Tables

Table SI 1: Average Treatment Effects

	(1)	(2)	(3)	(4)
Has Image	-0.372 (1.210)	-0.341 (1.244)		
Has Image x Z1			-0.276 (2.179)	-0.097 (2.070)
Has Image x Z2			5.418** (2.023)	5.298 (3.836)
Has Image x Z3			4.530+ (2.497)	4.337 (1.546)
Has Image x Z4			-1.169 (2.201)	-1.168** (0.018)
Has Image x Z5			1.246 (1.949)	1.206 (1.390)
Has Image x Z6			-8.140*** (2.375)	-7.958 (2.324)
Has Image x Z7			-7.526** (2.470)	-7.548+ (0.928)
Has Image x Z8			0.813 (2.709)	0.631 (3.158)
Has Image x Z9			3.994 (2.702)	3.602 (1.705)
Has Image x Z10			5.635* (2.466)	4.988+ (0.439)
Fixed Effects: Party, Gender, Race, Age, Edu, Region		Yes		Yes
Num.Obs.	2628	2628	2628	2628
R2	0.000	0.036	0.013	0.048
R2 Adj.	0.000	0.029	0.009	0.038
RMSE	29.22	28.70	29.03	28.52

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Survey Flow

Block: Consent (1 Question)

EmbeddedData

Treatment_id = \${rand://int/0:1}
img_id_T = \${rand://int/1:30}
img_id_F = \${rand://int/1:30}
participantIdValue will be set from Panel or URL.
assignmentIdValue will be set from Panel or URL.
projectIdValue will be set from Panel or URL.

Standard: Demographics_Political (8 Questions)

Branch: New Branch

If

If Help us keep track of who is paying attention to the survey. Please select
“Somewhat disagree” fr... Somewhat disagree Is Not Selected

EndSurvey: Advanced

Standard: Instructions (1 Question)

BlockRandomizer: 4 - Evenly Present Elements

Standard: Treatment_T_1 (12 Questions)
Standard: Treatment_T_2 (12 Questions)
Standard: Treatment_F_1 (12 Questions)
Standard: Treatment_F_2 (12 Questions)

Standard: Demographics_General (6 Questions)

Standard: Attention_2 (1 Question)

Branch: New Branch

If

If Help us keep track of who is paying attention to the survey. Please select
“Disagree” from the op... Disagree Is Not Selected

EndSurvey: Advanced

EndSurvey: Advanced

Page Break

Start of Block: Consent

consent_form **Take this survey to let your voice heard!** We are researchers at the University of California, San Diego interested in understanding your opinion. A full description of the study is available here: [Consent](#) Please read this document and download or print a version for your records. If you wish to participate in this study, please click the arrow below to continue.

End of Block: Consent

Start of Block: Demographics_Political



party_id Generally speaking, do you usually think of yourself as a Democrat, a Republican, an independent, or what?

- Democrat (1)
 - Republican (2)
 - Independent (3)
 - Something else, please specify: (4)
-

Page Break

Display This Question:

If Generally speaking, do you usually think of yourself as a Democrat, a Republican, an independent,... = Democrat

party_id_dem Would you call yourself a strong Democrat or a not very strong Democrat?

- Strong (1)
 - Not very strong (2)
-

Display This Question:

If Generally speaking, do you usually think of yourself as a Democrat, a Republican, an independent,... = Republican

party_id_rep Would you call yourself a strong Republican or a not very strong Republican?

- Strong (1)
 - Not very strong (2)
-

Display This Question:

If Generally speaking, do you usually think of yourself as a Democrat, a Republican, an independent,... = Independent

Or Generally speaking, do you usually think of yourself as a Democrat, a Republican, an independent,... = Something else, please specify:



party_id_ind Do you think of yourself as closer to the Republican Party or to the Democratic Party?

- Closer to the Republican Party (1)
 - Closer to the Democratic Party (2)
 - Neither (3)
-

Page Break

pol_ideology Here is a 7-point scale on which the political views that people might hold are arranged from extremely liberal (left) to extremely conservative (right).

Where would you place yourself on this scale?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Extremely Liberal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely Conservative

pol_attention How often do you pay attention to what's going on in government and politics?






- Always (1)
- Most of the time (2)
- About half the time (3)
- Some of the time (4)
- Never (5)

Page Break

trust_pre On a 0-100 scale, how much trust and confidence do you have in the following:

← None at all Not very much A fair amount A great deal →

0 10 20 30 40 50 60 70 80 90 100

The US government (14)	
The government of China (15)	
Content you see on social media (16)	
The US democracy (17)	
People in China (18)	

Page Break

attention_1 Help us keep track of who is paying attention to the survey. Please select "Somewhat disagree" from the options below.

- Strongly agree (1)
- Agree (2)
- Somewhat agree (3)
- Neither agree nor disagree (4)
- Somewhat disagree (5)
- Disagree (6)
- Strongly disagree (7)

End of Block: Demographics_Political

Start of Block: Instructions

pre_treatment_block For the next part of the study, you will be shown excerpts from four recent news articles. Please take a look at them, and you will be asked to provide your beliefs about them.

End of Block: Instructions

Start of Block: Treatment_T_1

timing_T_1 Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

Display This Question:

If Treatment_id = 1

T_1_tr Take a look at the following news article that someone has shared on a social media site:

Chinese hackers seeking to disrupt communications between US and Asia in event of crisis, Microsoft says Chinese government-backed hackers are likely pursuing cyber capabilities that could be used to “disrupt critical communications” between the US and the Asia Pacific region in the event of a future US-China crisis, Microsoft warned on Wednesday. The Chinese hackers have been active since mid-2021 and targeted critical infrastructure organizations in the US territory of Guam and in other parts of the US as part of a stealthy spying and information gathering campaign, Microsoft said in a new report. In a separate advisory released Wednesday, Western security agencies said they believe the Chinese hackers could apply the same stealthy techniques against critical sectors “worldwide.”

Display This Question:
If Treatment_id = 0



T_1_co Take a look at the following news article that someone has shared on a social media site:

Chinese hackers seeking to disrupt communications between US and Asia in event of crisis, Microsoft says Chinese government-backed hackers are likely pursuing cyber capabilities that could be used to “disrupt critical communications” between the US and the Asia Pacific region in the event of a future US-China crisis, Microsoft warned on Wednesday. The Chinese hackers have been active since mid-2021 and targeted critical infrastructure organizations in the US territory of Guam and in other parts of the US as part of a stealthy spying and information gathering campaign, Microsoft said in a new report. In a separate advisory released Wednesday, Western security agencies said they believe the Chinese hackers could apply the same stealthy techniques against critical sectors “worldwide.”

T_1_share On a 0-100 scale, how likely:

← Extremely Unlikely Extremely Likely →

0 10 20 30 40 50 60 70 80 90 100

You will "like" or "share" this article on social media (8)	
Other people will "like" or "share" this article on social media (10)	

Page Break

timing_T_1_2 Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

Display This Question:

If Treatment_id = 1

T_1_tr_2

Chinese hackers seeking to disrupt communications between US and Asia in event of crisis, Microsoft says Chinese government-backed hackers are likely pursuing cyber capabilities that could be used to “disrupt critical communications” between the US and the Asia Pacific region in the event of a future US-China crisis, Microsoft warned on Wednesday. The Chinese hackers have been active since mid-2021 and targeted critical infrastructure organizations in the US territory of Guam and in other parts of the US as part of a stealthy spying and information gathering campaign, Microsoft said in a new report. In a separate advisory released Wednesday, Western security agencies said they believe the Chinese hackers could apply the same stealthy techniques against critical sectors “worldwide.”

Display This Question:

If Treatment_id = 0

T_1_co_2



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JS

T_1_perception On a 0-100 scale, how likely:

← Extremely Unlikely Extremely Likely →

0 10 20 30 40 50 60 70 80 90 100

This news is true (5)	
Other people will think this news is true (12)	

Page Break

timing_T_1_3 Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

Display This Question:

If Treatment_id = 1

T_1_tr_3

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Display This Question:

If Treatment_id = 0



T_1_co_3

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JS

T_1_trust On a 0-100 scale, how much trust and confidence do you have in:

← None at all Not very much A fair amount A great deal →
0 10 20 30 40 50 60 70 80 90 100

The government of China (15)	
Content you see on social media (16)	

End of Block: Treatment_T_1

Start of Block: Treatment_T_2

timing_T_2 Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

Display This Question:

If Treatment_id = 0

T_2_tr Take a look at the following news article that someone has shared on a social media site:

Biden Administration Delayed Sanctions over Spy Balloon to ‘Limit Damage’ to China Ties When an alleged Chinese spy balloon traversed the United States in February, some U.S. officials were confident the incursion would galvanize the U.S. bureaucracy to push forward a slate of actions to counter China. Instead, the U.S. State Department held back human rights-related sanctions, export controls and other sensitive actions to try to limit damage to the U.S.-China relationship, according to four sources with direct knowledge of U.S. policy. Former diplomats and members of Congress from both parties have argued that the U.S. must keep channels of communication open with Beijing to avoid misunderstandings and navigate crises. But the sources said the current policy hews too closely to an earlier strategy of engagement that enabled China to extract concessions in exchange for high-level dialogues that often yielded few tangible results.



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T_2_share On a 0-100 scale, how likely:

← Extremely Unlikely Extremely Likely →
0 10 20 30 40 50 60 70 80 90 100

You will "like" or "share" this article on social media (8)	
Other people will "like" or "share" this article on social media (10)	

Page Break

timing_T_2_2 Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

Display This Question:

If Treatment_id = 0

T_2_tr_2

Biden Administration Delayed Sanctions over Spy Balloon to ‘Limit Damage’ to China

Ties When an alleged Chinese spy balloon traversed the United States in February, some U.S. officials were confident the incursion would galvanize the U.S. bureaucracy to push forward a slate of actions to counter China. Instead, the U.S. State Department held back human rights-related sanctions, export controls and other sensitive actions to try to limit damage to the U.S.-China relationship, according to four sources with direct knowledge of U.S. policy. Former diplomats and members of Congress from both parties have argued that the U.S. must keep channels of communication open with Beijing to avoid misunderstandings and navigate crises. But the sources said the current policy hews too closely to an earlier strategy of engagement that enabled China to extract concessions in exchange for high-level dialogues that often yielded few tangible results.

Display This Question:

If Treatment_id = 1

T_2_co_2

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Ties When an alleged Chinese spy balloon traversed the United States in February, some U.S. officials were confident the incursion would galvanize the U.S. bureaucracy to push forward a slate of actions to counter China. Instead, the U.S. State Department held back human rights-related sanctions, export controls and other sensitive actions to try to limit damage to the U.S.-China relationship, according to four sources with direct knowledge of U.S. policy. Former diplomats and members of Congress from both parties have argued that the U.S. must keep channels of communication open with Beijing to avoid misunderstandings and navigate crises. But the sources said the current policy hews too closely to an earlier strategy of engagement that enabled China to extract concessions in exchange for high-level dialogues that often yielded few tangible results.

JS

T_2_perception On a 0-100 scale, how likely:

← Extremely Unlikely Extremely Likely →

0 10 20 30 40 50 60 70 80 90 100

This news is true (5)	
Other people will think this news is true (12)	

Page Break

timing_T_2_3 Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

Display This Question:

If Treatment_id = 0

T_2_tr_3

Biden Administration Delayed Sanctions over Spy Balloon to ‘Limit Damage’ to China

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T_2_co_3



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JS

T_2_trust On a 0-100 scale, how much trust and confidence do you have in:

← None at all Not very much A fair amount A great deal →
0 10 20 30 40 50 60 70 80 90 100

The government of China (15)	
Content you see on social media (16)	

End of Block: Treatment_T_2

Start of Block: Treatment_F_1

timing_F_1 Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

Display This Question:

If Treatment_id = 0

F_1_tr Take a look at the following news article that someone has shared on a social media site:

China threatens to shoot Nancy Pelosi's plane down if she visits Taiwan In a recent statement, Chinese Ministry of Defense spokesman Tan Kefei expressed strong concerns over the possibility of Speaker Nancy Pelosi visiting Taiwan. The spokesman warned that such a visit would pose a severe threat to China's sovereignty and territorial integrity. "The Chinese military will never sit idly by and will certainly take strong and resolute measures to thwart any interference by external forces and secessionist attempts for 'Taiwan independence,' and firmly defend China's national sovereignty and territorial integrity," emphasized Tan Kefei.



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F_1_share On a 0-100 scale, how likely:

← Extremely Unlikely Extremely Likely →
0 10 20 30 40 50 60 70 80 90 100

You will "like" or "share" this article on social media (8)	
Other people will "like" or "share" this article on social media (10)	

Page Break

timing_F_1_2 Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

Display This Question:

If Treatment_id = 0

F_1_tr_2

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JS

F_1_perception On a 0-100 scale, how likely:

← Extremely Unlikely Extremely Likely →

0 10 20 30 40 50 60 70 80 90 100

This news is true (5)	
Other people will think this news is true (12)	

Page Break

Timing_F_1_3 Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

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If Treatment_id = 0

F_1_tr_3

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F_1_trust On a 0-100 scale, how much trust and confidence do you have in:

← None at all Not very much A fair amount A great deal →

0 10 20 30 40 50 60 70 80 90 100

The government of China (15)	
Content you see on social media (16)	

End of Block: Treatment_F_1

Start of Block: Treatment_F_2

timing_F_2 Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

Display This Question:

If Treatment_id = 1

F_2_tr Take a look at the following news article that someone has shared on a social media site:

Soviet and Chinese communists have grabbed control of U.S. entertainment, movies, television, music, academia, K-12 education and the news media In a recent interview, Monica Crowley, former assistant secretary for public affairs at the Treasury Department, made an assertion suggesting that overseas communists have exerted control over key institutions of American life for several decades. Crowley argued that these foreign forces have utilized these institutions as pillars to inflict significant damage over time, ultimately leading the country to a critical juncture. “With those pillars, they have been able to inflict tremendous damage over many decades. And now we are at a tipping point where the useful idiots on the left—the Soviet Union collapsed, the CCP (Chinese Communist Party) stepped in to take over this grand project to destroy the country from within—that’s exactly what’s happening,” stated Crowley during the interview.

Display This Question:

If Treatment_id = 0



F_2_co Take a look at the following news article that someone has shared on a social media site:

Soviet and Chinese communists have grabbed control of U.S. entertainment, movies, television, music, academia, K-12 education and the news media In a recent interview, Monica Crowley, former assistant secretary for public affairs at the Treasury Department, made an assertion suggesting that overseas communists have exerted control over key institutions of American life for several decades. Crowley argued that these foreign forces have utilized these institutions as pillars to inflict significant damage over time, ultimately leading the country to a critical juncture. “With those pillars, they have been able to inflict tremendous damage over many decades. And now we are at a tipping point where the useful idiots on the left—the Soviet Union collapsed, the CCP (Chinese Communist Party) stepped in to take over this grand project to destroy the country from within—that’s exactly what’s happening,” stated Crowley during the interview.

F_2_share On a 0-100 scale, how likely:

← Extremely Unlikely Extremely Likely →

0 10 20 30 40 50 60 70 80 90 100

You will "like" or "share" this article on social media (8)	
Other people will "like" or "share" this article on social media (10)	

Page Break

timing_F_2_2 Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

Display This Question:

If Treatment_id = 1

F_2_tr_2

Soviet and Chinese communists have grabbed control of U.S. entertainment, movies, television, music, academia, K-12 education and the news media In a recent interview, Monica Crowley, former assistant secretary for public affairs at the Treasury Department, made an assertion suggesting that overseas communists have exerted control over key institutions of American life for several decades. Crowley argued that these foreign forces have utilized these institutions as pillars to inflict significant damage over time, ultimately leading the country to a critical juncture. “With those pillars, they have been able to inflict tremendous damage over many decades. And now we are at a tipping point where the useful idiots on the left—the Soviet Union collapsed, the CCP (Chinese Communist Party) stepped in to take over this grand project to destroy the country from within—that’s exactly what’s happening,” stated Crowley during the interview.

Display This Question:

If Treatment_id = 0

F_2_co_2



Soviet and Chinese communists have grabbed control of U.S. entertainment, movies, television, music, academia, K-12 education and the news media In a recent interview, Monica Crowley, former assistant secretary for public affairs at the Treasury Department, made an assertion suggesting that overseas communists have exerted control over key institutions of American life for several decades. Crowley argued that these foreign forces have utilized these institutions as pillars to inflict significant damage over time, ultimately leading the country to a critical juncture. “With those pillars, they have been able to inflict tremendous damage over many decades. And now we are at a tipping point where the useful idiots on the left—the Soviet Union collapsed, the CCP (Chinese Communist Party) stepped in to take over this grand project to destroy the country from within—that’s exactly what’s happening,” stated Crowley during the interview.

JS

F_2_perception On a 0-100 scale, how likely:

← Extremely Unlikely Extremely Likely →

0 10 20 30 40 50 60 70 80 90 100

This news is true (5)	
Other people will think this news is true (12)	

Page Break

timing_F_2_3 Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

Display This Question:

If Treatment_id = 1

F_2_tr_3

Soviet and Chinese communists have grabbed control of U.S. entertainment, movies, television, music, academia, K-12 education and the news media In a recent interview, Monica Crowley, former assistant secretary for public affairs at the Treasury Department, made an assertion suggesting that overseas communists have exerted control over key institutions of American life for several decades. Crowley argued that these foreign forces have utilized these institutions as pillars to inflict significant damage over time, ultimately leading the country to a critical juncture. “With those pillars, they have been able to inflict tremendous damage over many decades. And now we are at a tipping point where the useful idiots on the left—the Soviet Union collapsed, the CCP (Chinese Communist Party) stepped in to take over this grand project to destroy the country from within—that’s exactly what’s happening,” stated Crowley during the interview.

Display This Question:

If Treatment_id = 0

F_2_co_3



Soviet and Chinese communists have grabbed control of U.S. entertainment, movies, television, music, academia, K-12 education and the news media In a recent interview, Monica Crowley, former assistant secretary for public affairs at the Treasury Department, made an assertion suggesting that overseas communists have exerted control over key institutions of American life for several decades. Crowley argued that these foreign forces have utilized these institutions as pillars to inflict significant damage over time, ultimately leading the country to a critical juncture. “With those pillars, they have been able to inflict tremendous damage over many decades. And now we are at a tipping point where the useful idiots on the left—the Soviet Union collapsed, the CCP (Chinese Communist Party) stepped in to take over this grand project to destroy the country from within—that’s exactly what’s happening,” stated Crowley during the interview.

JS

F_2_trust On a 0-100 scale, how much trust and confidence do you have in:

← None at all Not very much A fair amount A great deal →

0 10 20 30 40 50 60 70 80 90 100

The government of China (15)	
Content you see on social media (16)	

End of Block: Treatment_F_2

Start of Block: Demographics_General

Page Break

dem_race How would you describe your race or ethnicity? Please mark all that apply.

- White (1)
- Hispanic or Latino/Latina (2)
- Black or African American (3)
- Asian or Pacific Islander (4)
- American Indian or Alaskan native (5)
- Other (6)

Page Break

dem_birth What is your year of birth?



dem_gender What is your gender?

- Male (1)
- Female (2)
- Prefer to self-describe: (3)

Page Break

dem_edu What is the highest level of education you have completed?

- No degree or diploma earned (1)
- High school diploma or GED (4)
- Some college (2)
- Associate's degree (3)
- Bachelor's degree (5)
- Graduate or professional degree (6)



dem_zip_code What is your US Zip Code?

Page Break



dem_social_media In which social media applications do you have an active account?

By active account, we mean you open this application at least once every week:

- Facebook (1)
 - Instagram (2)
 - Twitter (3)
 - YouTube (4)
 - TikTok (5)
 - Reddit (6)
 - Others, please specify: (7)
-
- None (8)

End of Block: Demographics_General

Start of Block: Attention_2

attention_2 Help us keep track of who is paying attention to the survey. Please select "Disagree" from the options below.

- Strongly agree (1)
- Agree (2)
- Somewhat agree (3)
- Neither agree nor disagree (4)
- Somewhat disagree (5)
- Disagree (6)
- Strongly disagree (7)

End of Block: Attention_2
