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### Digital campaign competence

*The role of citizens in data-driven election campaigns*

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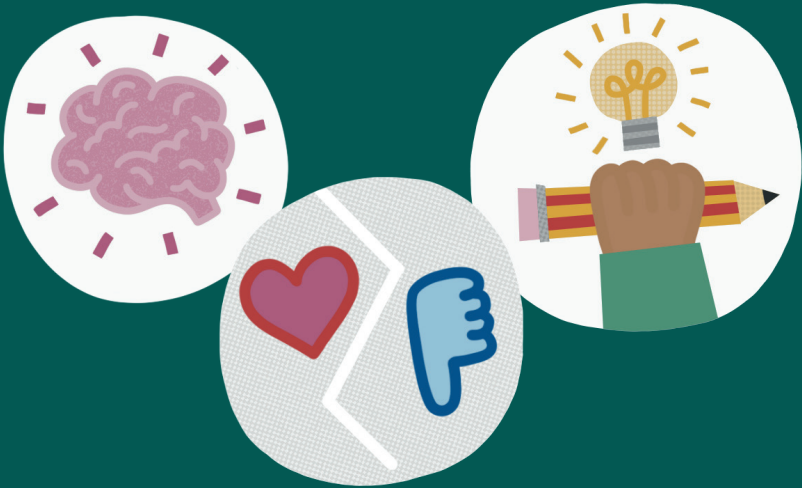
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## Chapter 7

# Game Over? Using (Not So) Innovative Interventions to Increase Digital Campaign Competence

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## Abstract

Data-driven political campaigning strategies often remain a black-box for citizens; however, educational interventions provide a means to enhance understanding, conscious evaluations, and skills. In this context, we term this combination digital campaign competence (DCC). We conducted an online pre-registered experiment in Austria (N = 553) using a 2x2+1 between-subject design to compare intervention formats (reading a voter guide vs. playing a campaign game) and content framing (emphasizing risks vs. benefits of data-driven campaigning). Results show no significant differences of framing on DCC. However, variations are observed among different formats, with the non-interactive voter guide proving to be the most effective. Contrary to our expectations, the voter guide emphasizing the risks of data-driven political campaigning enhanced conceptual understanding levels, influenced evaluative perceptions, and aided skill development to detect highly targeted ads. We argue that innovative interventions do not always guarantee success in enhancing competences.

**Keywords:** data-driven campaign, political advertising, competence; inoculation, intervention, gamified

## 7.1 Introduction

Citizens play a dual role in data-driven campaigns as both targets of political ads and enablers. Their data is the fuel for data-driven political advertisements. Political parties can access and analyze voter data, generate insights into their target audience, evaluate and optimize their campaign interventions (Dommett et al., 2023). This data can serve a positive purpose, such as delivering tailored content to citizens, but it also holds potential to be misused for manipulation or neglect of certain groups of citizens (Zuiderveen Borgesius et al., 2018, p.92). Often, citizens do not grasp the full extent of data-driven techniques and inadvertently contribute to them without their knowledge (Helberger et al., 2021, p. 3).

To counter this, the Digital Services Act of the European Commission emphasizes the importance of empowering citizens and helping them understand which role their data plays in political advertisements (Lomas, 2021). Research into educating citizens about data-driven advertising has received limited scholarly attention, with an even greater scarcity of studies that integrate citizens' evaluation and behavioral responses to such advertising (Ham, 2017). To address this research gap, our study specifically investigates the impact of interventions on citizens' understanding, evaluation, and behaviors in dealing with data-driven political campaigns, which we call digital campaign competence (hereafter DCC). Building on the theoretical notions of the *Inoculation Theory* (McGuire, 1961) and *Framing Theory* (Entman, 1993), we argue it is crucial to consider two central aspects in an intervention: the gamification of interventions and the framing of the message conveyed to comprehensively understand citizens' competence in dealing with data-driven campaigning, including their understanding levels, evaluations, and behaviors (Friestad & Wright, 1994).

More specifically, while it is unclear how and to what extent the DCC of citizens can be increased, previous research has shown that educational interventions with higher levels of *interactivity* are helpful tools to increase awareness of misinformation (Roozenbeek & van der Linden, 2019), and behavioral advertising (Lorenz-Spreen et al., 2021). Next to this, providing a specific narrative of a story through *framing* could affect how people perceive the information and respond towards it, for example as shown with task-framing in citizen-science-games (Tang & Prestopnik, 2019), or with “loss” and “gain” frames in environmental behavior (Ahn et al., 2015). This is especially relevant as people perceive data-driven advertising usually as more harmful than beneficial, but highlighting its advantages can help reduce resistance among citizens towards its use (Ham, 2017). While negative implications of data-driven tactics like the uneven distribution of information are detrimental to democracy (Bayer, 2020;

Zuiderveen Borgesius et al., 2018), positive aspects such as receiving more relevant information should not be overlooked either (Dommett et al., 2022). For example, targeted ads might inform less politically interested people about the standpoints of politicians in election campaigns. Rather than examining two crucial aspects of interventions (i.e., interactivity and framing) in isolation, this study investigates how they individually, but also in conjunction, affect citizens.

We conducted a pre-registered survey experiment ( $N = 553$ ) on the effects of educational interventions on digital campaign competence in the Austrian context. This research contributes to the communication literature in three ways. First, we compare the effectiveness of cognitive training techniques with different levels of interactivity by expanding the use of highly interactive gamified education approaches to the data-driven political advertising sphere. Second, we look at different framings of data-driven campaigning techniques by highlighting either the benefits or the risks for individuals, society, or the political party. Third, we investigate to what extent all three components (i.e. understanding, evaluation, skills) of digital campaign competence are affected by an intervention, instead of only focusing on one aspect of this multifaceted competency.

### 7.1.1 Boosting Campaign Competences

While regulatory bodies, such as the General Data Protection Regulation (GDPR), and technological tools, like social media architecture, can play a role in limiting unwanted influences in digital environments (Kozyreva et al., 2020), our focus lies on enhancing citizens' competence to navigate these challenges. Boosting competences means helping people develop and improve their thinking and behavioral abilities so that they can make choices that are beneficial for themselves. Interventions in the field of fake news have proven effective in equipping people with the knowledge and skills to identify and resist misinformation (Basol et al., 2020; Roozenbeek & van der Linden, 2019). Likewise, boosting people's familiarity with persuasive ad strategies can enhance their ability to identify targeted advertisements. Lorenz-Spreen et al. (2021) found that reflecting on one's personality enhances the accuracy of identifying personality-targeted ads. Theoretically, these studies are based on the inoculation theory, which uses a biological analogy in the context of information processing. As such, exposure to weak doses of a virus should stimulate antibody production, which helps confer resistance against future infections (McGuire, 1961). Applied to the communication science context, the idea is that pre-emptive explanations about commonly used fake news strategies can reduce the influence of these strategies when people are exposed to them later. Similarly, if people actively reflect on their personality (e.g., introvert or extrovert), this can aid them in identifying behavioral advertising that uses this information.

Following previous literature on defining competence (Le Deist & Winterton, 2005), we argue that three components are essential to enhance digital campaign competence: understanding data-driven campaigning, evaluating it, and having the necessary skills to respond effectively. First, citizens require a comprehensive understanding of several key factors related to data-driven political campaigning. Being aware of sponsored content and how it influences persuasion (Boerman et al., 2018), understanding the economic model behind data-driven personalized advertising (hereafter DDPA) (Kruschinski & Haller, 2017), regulations surrounding DDPA (Dobber et al., 2019), and online privacy literacy (Masur, 2020). Based on the understanding, evaluations about the appropriateness of the data-driven tactics, the (dis)liking, and the skepticism towards (Boerman et al., 2018; Rozendaal et al., 2011) and the relevance for oneself can be assessed. Lastly, one needs skills to react. In the data-driven context, this might refer to correctly assessing content as targeted, being able to critically reflect (Boerman et al., 2014), and using privacy enhancing techniques or technologies (Ireland, 2021; Kaaniche et al., 2020).

Having thus established the importance of enhancing competences through interventions, the next crucial step is to explore the most effective approach to achieve this goal, which we will elaborate on in the section below.

## **7.1.2 Gamification and Framing Strategies**

There are various approaches to achieve the goal of increasing awareness about persuasive online architectures, potentially manipulative spaces, and fostering individuals' motivation to engage with them effectively (Hertwig & Grüne-Yanoff, 2017). In the following part, we look at two aspects of educational interventions: the format and the content, as potential avenues for boosting competences.

### **7.1.2.1 Boosting competences through gamification**

Educational formats that are highly interactive, such as games, are increasingly recognized as more effective tools for learning and informing citizens compared to traditional methods of only providing information (de Freitas, 2018, p. 80). The gamification in education refers to applying game design elements in non-game contexts. As such, game-based learning approaches are said to increase motivation to engage with a topic by tapping into basic gamification techniques such as creating competitive elements and rewarding players (Al-Azawi et al., 2016). As a consequence, they can lead to behavioral changes in players, as new skills and cognition are trained (Al-Azawi et al., 2016; de Freitas, 2018). An illustrative example is the social impact game “Bad News Game” which aimed to boost competences in an entertaining way (Basol et al., 2020; Roozenbeek & van der Linden, 2019). Through competitive, and

choice-based elements, as well as rewards, this game immersed players in the role of fake news creators on Twitter, successfully teaching them about six common misinformation techniques (e.g. emotional language). The replication study by Basol (2020) demonstrated the success of using active educational interventions to instill reliability assessments and to spot fake news items. While interactivity on its own does not cause better learning, it is related to more attention, and motivation to engage with a topic (Moreno & Mayer, 2007). Nevertheless, the authors also observe that gamified formats could induce cognitive overload due to their heightened demand for attention and processing, unlike non-interactive environments. However, the interactivity of games might provide individuals with a sense of control, thereby aiding cognitive processing (Chung & Zhao, 2004).

While gamified interventions inherently involve interactivity, non-gamified interventions can either incorporate interaction or not. In non-gamified educational formats (e.g., narrated animations, text on websites) the learners' actions do not affect the way information is presented (Moreno & Mayer, 2007, p. 310) but they foster critical thinking (Basol et al., 2020). As a contrast to the game, this study uses a non-gamified “voter guide” resembling a standard website supplemented with videos in between, requesting active reflection from participants. This juxtaposition is important given that prior research (Basol 2020) underscores the need to explore not just learning outcomes from (non-)gamified information but also the distinction between interactive and non-interactive formats. Green et al. (2022) discovered that interactive skill development proved more effective in enhancing resistance to persuasion compared to the non-interactive method (i.e. solely providing information). Likewise, the study by Lorenz-Spreen et al. (2021) underscores the importance of active forms of learning within the targeted advertising context. The authors compared passive inoculation (simply providing information about personality dimensions) versus active inoculation (asking participants to reflect on their own personality). They found that simply informing participants is not sufficient, but prompting them to reflect on personality dimensions is necessary to accurately detect targeted ads. Reflecting helps people to integrate new information, and thus leads to better learning (Moreno & Mayer, 2007). In this study, we prompt participants reading the voter guide to reflect on how their personal data can be used through implementation intentions (Gollwitzer, 1993) by linking a specific situation (e.g. “The next time I see an online post of a political party”) with an intention (e.g. “I can check whether the post is sponsored or not”).

To summarize, (inter)active educational interventions were found to decrease the perceived reliability of misinformation in a gamified version (Roozenbeek & van der Linden, 2019), as well as in a not gamified version (Green et al., 2022). Prompting active

reflection is crucial to detect targeted ads, while raising awareness is not (Lorenz-Spreen et al., 2021). In response to the call from Roozenbeek and van der Linden (2019) to explore the boundaries of inoculation theory beyond game environments, and in light of the limited knowledge about more and less active inoculation in the context of data-driven political advertising, our aim is to contribute to the literature by comparing a gamified educational intervention with a non-gamified educational intervention that also requires participants' active reflection. We anticipate that both intervention format will result in learning, with the gamified intervention to yield greater outcomes:

**H1:** Playing a game about data-driven political advertising (vs. reading a voter guide) leads to an increase of Digital Campaign Competence.

#### **7.1.2.2 Boosting competences through risk and benefit frames**

Next, we want to investigate how the framing of content affects how people are informed. Frames define problems and solutions, and provide the basis for making moral judgments (Entman, 1993). On the most basic level, information can be framed in positive or negative terms, such as gains and losses, benefits and risks, thereby influencing the opinions and behaviors of citizens. The way information about data-driven campaigns is presented could thus influence citizens' understanding and evaluation, as well as their willingness to develop or apply the necessary skills to respond to it (e.g., use more or less privacy-enhancing technology).

Given the data exploitation scandals surrounding political data-driven advertising (e.g. Cambridge Analytica, Hu, 2020), data-driven campaigning has often been discussed with regards to its risks for individuals and democracy by the media, governments, and scholars alike (Bennett & Lyon, 2019; Dommert et al., 2022). Commonly named threats concern citizens (e.g. exclusion of voter groups), political parties (e.g. more power to commercial entities), or public opinion (e.g. lack of transparency regarding political standpoints) (Zuiderveen Borgesius et al., 2018). While they do exist, less often discussed are the potential benefits of targeted advertising (Dommert et al., 2022). Examples are more relevant content for citizens, more efficient campaign spending for parties, and even engaging politically disinterested citizens who tend to bypass traditional media but can be reached through social media (Zuiderveen Borgesius et al., 2018). According to the study, by Dommert et al. (2022) citizens' acceptance of targeting practices varies depending on the type of data being used, indicating that the rejection of such practices is not uniform.

However, the current imbalance in public discussions concerning the risks and benefits of data-driven campaigning might affect how citizens react to DDC. For

example, as proposed in the social exchange theory (Emerson, 1976), citizens' tendency to assess social exchanges in terms of costs and rewards (e.g. personal data for political information) might be biased if only the risks of DDC are repeatedly emphasized in public discourse (e.g. Dommett et al., 2022). Furthermore, psychologists have repeatedly shown that negatively framed information exerts more influence on citizens than positively framed information. This negativity bias (e.g. Rozin & Royzman, 2001) is characterized by negative information leaving a more substantial impression on people and demanding greater cognitive processing (Fiske, 1980). In line with this, individuals are more inclined to avoid risks rather than to gain benefits (Kahneman & Tversky, 1979). Consequently, they take protective actions when they perceive risks to outweigh potential benefits (Ham, 2017). While Kirmani and Campbell (2004) argue that people might be more likely to accept persuasive strategies if the perceived benefits outweigh the costs, the study by (Ham, 2017) in the online behavioral advertising context found that perceived risks are more strongly related to behaviors, than perceived benefits were. This means that even if people are accepting of inherently persuasive data-driven advertising strategies, perceived benefits might not necessarily lead to behavioral changes. Hence, we expect that:

**H2:** Exposure to a risk-framed (vs. benefit-framed) educational intervention about data-driven political advertising leads to an increase of Digital Campaign Competence.

As mentioned before, educational interventions incorporating gamification or interactive components are effective in helping people acquire new information and skills across various contexts. Additionally, when content is presented with an emphasis on risks, it tends to grab attention and prompt behavioral changes more effectively than content emphasizing benefits. Thus, the combination of gamified educational interventions, along with highlighting potential risks, seems most promising to enhance awareness of data-driven campaigning, encouraging conscious evaluations of information and ultimately driving behavioral changes or adaptations. While research on the combined impact of interaction levels and gain/loss message framing exists in environmental behavior (Ahn et al., 2015), such insights are lacking in the context of data-driven campaigns. We propose the following research question:

**RQ:** To what extent does the mode of an educational intervention about data-driven political advertising (reading a voter guide vs. playing a game) and the framing (risk-framed vs. benefit-framed) of an educational intervention interact and affect citizens' Digital Campaign Competence?

## 7.2 Method

### 7.2.1 Experimental design

We conducted a pre-registered  $2 \times 2$  between-subjects experiment with a control group. The experimental groups received interventions, while the control group only filled in the questionnaire, without receiving an intervention or a filler task. For the experimental groups, the *first* factor refers to the mode of the educational intervention: participants either played a game or read a voter guide informing about common data-driven campaigning techniques. The game and voter guide present the same information, yet their mediums differ in terms of interactivity levels. The gamified intervention had players role-playing as campaign managers for a fictional party. It included interactive features, allowed players to decide the next content, provided feedback on choices, and rewarded them with badges after they concluded a chapter. The voter guide necessitated less engagement from participants because it encouraged active reflection but lacked feedback and gamified elements. The *second* factor refers to the framing of the intervention: either the benefits or the risks of data-driven campaigning for individuals, the political party, and democracy were emphasized. For example, while the risk-frame condition underscored the threat of excluding people from information using location-based data in political campaigns, the benefit-frame condition emphasized the positive aspect that individuals would not be overwhelmed by excessive information thanks to location-based data. Thus, the conditions presented the same information but framed it differently. Participants were randomly allocated. To ensure ecological validity of the stimulus, we collaborated with the NGO Tactical Tech to use their original content and design about data-driven campaigning but adapted it. Examples of the stimulus materials can be found on OSF under [https://osf.io/ahj9t/?view\\_only=9e4eaa020ea240e5a923467198b1fef3](https://osf.io/ahj9t/?view_only=9e4eaa020ea240e5a923467198b1fef3).

### 7.2.2 Sample

An a priori power analysis in R was conducted based on expected mean differences for the main effect based on previous research in similar contexts (Lorenz-Spreen et al., 2021; Roozenbeek & van der Linden, 2019). The power analysis suggested that at least 300 participants are needed to detect the expected mean differences with a power of 1.00 ( $\alpha = .05$ ) for the main effect. In order to test for interaction effects, we aimed at 500 participants. The study was reviewed by the Ethics Review Board at the University of Amsterdam (filed as FMG-501\_2022). In March 2023, the polling company Dynata collected the sample for this study using a quota sampling method considering the distribution of age and gender in Austria<sup>14</sup> ( $N = 553$ ): age ( $M = 44.6$ ,  $SD = 16.1$ ),

<sup>14</sup> Austrian Central Population Register: Mean age is 43.2 years, 50.7 % share of women (as of January 1st, 2023; (Population Structure Statistik Austria, n.d.))

gender (51.2 % female). Education levels were diverse with 42.5% having higher education, 29.7% having middle levels of education, and 27.8 % having lower levels of education. To ensure the data's validity and reliability, non-completes, individuals who failed the attention check after the second attempt, and duplicates were excluded from the analysis. Data and code are available on OSF ([https://osf.io/ahj9t/?view\\_only=9e4eaa020ea240e5a923467198b1fef3](https://osf.io/ahj9t/?view_only=9e4eaa020ea240e5a923467198b1fef3)). The analysis here is reported with outliers, the analysis without outliers in the appendix C.

### 7.2.3 Procedure

In the online experiment, we first assessed participants' informed consent, measured social-demographics and other possible predictors (see pre-registration: [https://osf.io/9rfma/?view\\_only=8464ebcd5a244305ab1ado7400eafdfc](https://osf.io/9rfma/?view_only=8464ebcd5a244305ab1ado7400eafdfc)). We randomly allocated participants to either the control group or one of the four experimental conditions. Next, participants completed a post-treatment survey to measure the dependent variables and subsequently a comprehension check. At the end of the questionnaire, we assessed manipulation checks for the mode and framing of the intervention. During debriefing we referred all participants, including the control group, to Tactical Tech's Data-Detox-Kit to ensure equal access to educational benefits from participating.

The randomization was successful as the five conditions did not differ significantly with respect to age ( $F_{4,548} = 1.11, p = .349$ ), gender  $\chi^2(4, N = 553) = 1.86, p = .762$ , educational levels  $\chi^2(20, N = 553) = 19.47, p = .491$ , use of ad blockers  $\chi^2(8, N = 553) = 5.53, p = .806$ , political interest ( $F_{4,548} = 0.27, p = .90$ ), and need for cognition ( $F_{4,548} = 0.46, p = .763$ ).

### 7.2.4 Measures

If not stated otherwise, items were measured on a 7-point Likert-scale (1 = lowest level, 7 = highest level). The English translation of all items can be found on OSF <sup>15</sup> ([https://osf.io/9rfma/?view\\_only=8464ebcd5a244305ab1ado7400eafdfc](https://osf.io/9rfma/?view_only=8464ebcd5a244305ab1ado7400eafdfc)). Multiple items relating to understanding, evaluation, and skills in the context of data-driven campaigning are examined to allow for a nuanced assessment of the multifaceted concept of digital campaign competence.

#### *Dependent Variables*

*Understanding.* A scale composed of eight true statements measured people's self-reported conceptual understanding of DDPA. Higher scores on this scale indicate greater understanding of data-driven political campaigning (Cronbach  $\alpha = .79$ ,  $M = 4.77$ ,  $SD = 1.32$ ). The statements referred to the persuasive intent, the political source, the persuasive tactics, the economic model, data collection and surveillances

<sup>15</sup> The study was conducted in German.

practices by political parties and online service providers, as well as data protection laws and technical knowledge related to data privacy (based on Boerman et al., 2018; General Data Protection Regulation (GDPR, n.d.); Macintyre & Cladis, n.d.; Masur, 2020; Rozendaal et al., 2016). For example, to assess understanding of the political source of data-driven campaigning, participants considered the following statement: “Political parties pay social media and search engines like Google, to show campaign ads to certain groups of people but not to others”.

*Evaluation.* Evaluative perceptions of data-driven targeting with election ads were assessed with semantic differentials referring to skepticism, appropriateness, and liking based on the study by Boerman et al. (2018). We additionally measured “relevance”. Skepticism (trustworthy – untrustworthy; honest – dishonest;  $M = 5.21$ ,  $SD = 1.44$ , Spearman-Brown’s  $r = 0.86$ ) and appropriateness (problematic – unproblematic; unacceptable – acceptable;  $M = 3.10$ ,  $SD = 1.58$ , Spearman-Brown’s  $r = 0.82^{16}$ ) were each assessed through two items. Liking (disliking – liking;  $M = 3.12$ ,  $SD = 1.63$ ) and relevance (irrelevant – relevant;  $M = 4.60$ ,  $SD = 1.60$ ) are composed of one item each.

*Skills.* Participants were shown a fictitious person’s social media profile and then we asked participants to spot data-driven ads and react to them. First, we assessed participants’ perception of the degree of targeting of five postings/ads received by the fictitious person. Four were sponsored ads, one was a regular, non-sponsored post<sup>17</sup>. Three ads were highly targeted toward the fictitious person (Cronbach  $\alpha = .59$ ,  $M = 5.59$ ,  $SD = 1.21$ ). Confirmatory Factor Analysis indicated good model fit  $\chi^2(6) 161.736$ ,  $p < .001$ ,  $TLI = 1.00$ ,  $CFI = 1.00$ ,  $RMSEA = .00$ ,  $SRMR = .00$ . One ad and one posting were not tailored towards the fictitious person (Spearman-Brown’s  $r = .53$ ,  $M = 4.50$ ,  $SD = 1.66$ ). Higher values indicate that participants judged the perceived degree of targeting (i.e. either highly targeted or not targeted) correct.

Another measured skill is the *ability to identify targeting criteria*. Two ads/postings were shown again to the participants (one highly targeted, one not targeted). They were tasked to determine the (un)likelihood of different targeting criteria having been used to distribute them. Participants considered seven factors such as age, gender, location, hobbies, interests, job, and relationship status. For each criterion, participants assessed whether it was unlikely or likely used for targeting. In total, participants could score 14 points (i.e. seven points per ad/posting;  $M = 9.27$ ,  $SD = 2.80$ ).

<sup>16</sup> Spearman-Brown reliability coefficients are used for two-item scales.

<sup>17</sup> Due to technical issues at Qualtrics, 443 participants had six response categories (with the middle category 4 missing), while 141 participants had seven categories to rate their perception of ad targeting. After comparing the response distributions, we found them to be similar, allowing us to use all responses.

Two items, adapted to the data-driven advertising context, were used to assess *critical processing* (Boerman et al., 2014). Participants were asked to indicate to what extent they were critical about influential ad tactics when they reviewed the ads shown earlier ( $M = 4.53$ ,  $SD = 1.55$ , Spearman-Brown's  $r = 0.75$ ).

*Intent to use privacy enhancing technology and techniques* (PET) was assessed using four items. Participants were asked to what extent they would use do not track browsers, use privacy settings, restrict personal information online, and obfuscate personal information online (Cronbach  $\alpha = .72$ ,  $M = 4.39$ ,  $SD = 1.65$ ; *Data Detox Kit*, n.d.; Ireland, 2021; Kaaniche et al., 2020). Confirmatory Factor Analysis indicated good model fit  $\chi^2(8) 15.951$ ,  $p < .001$ ,  $TLI = 0.90$ ,  $CFI = 0.97$ ,  $RMSEA = .11$ ,  $SRMR = .03$ . To mitigate potential bias from their current privacy practices, we instructed them to choose "very likely" if they already use the technique or technology.

To measure the *use of privacy enhancing technologies and techniques* ( $M = 5.15$ ,  $SD = 1.56$ ), participants were asked if they wanted to take immediate control over their digital privacy and security. Only those who responded with "likely" or "very likely" were informed that they would receive access to the Data Detox Kit developed by Tactical Tech at the end of the study.

### 7.2.5 Pilot Test & Manipulation Checks

A pilot study in Austria ( $N = 102$ ) confirmed the validity and credibility of the independent variables (mode and framing of the educational intervention)<sup>18</sup>. For the manipulation check in the main study, we grouped the experimental groups by mode (i.e. game or guide) and framing (i.e. risk or benefit). ANOVA tests and Tukey posthoc-tests confirmed that our manipulations were successful (see appendix A).

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<sup>18</sup> See pre-registration on OSF

## 7.3 Results

### 7.3.1 Format: game vs. voter guide vs. control

To answer the first hypothesis, we examined whether game-based educational interventions are more successful in instilling digital campaign competence among citizens compared to the voter guide conditions. To do this, we grouped gamified conditions, regardless of framing, and voter guide conditions, regardless of framing. First, we performed a Kruskal-Wallis chi-square test<sup>19</sup> (see Table 1). This test informs us about significant group differences for conceptual understanding, appropriateness perceptions, and detecting highly targeted ads. Subsequently, we performed Dunn post-hoc tests with Bonferroni corrections to see which formats differ significantly from one another.

We conclude that, in comparison to the control group, game conditions ( $z = 2.39, p = .017, p.adj = .050, r = .13$ ), and voter guide conditions ( $z = 3.43, p < .001, p.adj = .002, r = .18$ ) increased conceptual understanding about data-driven political advertising among the participants. Between game conditions and voter guide conditions no significant differences with regard to conceptual understanding of DDPA exist. We do, however, find a significant difference with regard to perceptions of appropriateness of data-driven campaigning between the game conditions and the voter guide conditions. Participants in the voter guide conditions think data-driven campaigning strategies are less appropriate compared to the game condition ( $z = -2.62, p = .009, p.adj = .026, r = -.13$ ). Furthermore, participants in the voter guide conditions performed significantly better in detecting highly targeted ads compared to the control group ( $z = 3.59, p < .001, p.adj < .001, r = .19$ ), but not better than participants in the game conditions. Contrary to H1, game interventions did not prove to be the most effective format. The voter guide condition reduces appropriateness levels compared to the game-based interventions, and enhances understanding, and the ability to identify highly targeted ads compared to the control group.

### 7.3.2 Framing: risk vs. benefit vs. control

To investigate the second hypothesis, we compared whether risk-framed educational interventions are more effective in increasing DCC among citizens, compared to benefit-framed conditions. To do this, we grouped risk-framed conditions, regardless of their format, as well as benefit-framed conditions. The Kruskal-Wallis test indicates significant group differences with regard to conceptual understanding and the perceived degree of targeting of highly targeted ads. Post-hoc tests show that both

<sup>19</sup> In this section we deviate from the pre-registered MANOVA due to non-normal residuals of our dependent variables. The assumptions for the non-parametric Kruskal-Wallis tests were satisfied.

the benefit-framing ( $z = 2.66, p = .008, p.adj = .023, r = -.15$ ) and the risk framing ( $z = 3.21, p < .001, p.adj < .01, r = .17$ ) increase conceptual understanding compared to the control conditions. There are no group differences between risk-framed and benefit-framed educational interventions for increasing the understanding of data-driven campaigning among citizens. Likewise, both benefit ( $z = 2.54, p = .011, p.adj = .033, r = .14$ ) and risk-framed educational formats ( $z = 2.79, p = .005, p.adj = .016, r = .15$ ) increase the detection abilities of highly targeted ads compared to the control group. H2 is thus not supported. We conclude that the framing of educational intervention does not seem to have a significant impact. Instead, our results suggest that the provision of information itself is crucial, irrespective of how it is presented.

### 7.3.3 Interaction between formats and frames

Finally, we examine the interaction effects of educational intervention formats and framings on citizens' Digital Campaign Competence. The Kruskal-Wallis shows significant group differences regarding conceptual understanding, skepticism, appropriateness, liking, and detecting highly targeted ads (Table 1). Dunn post-hoc tests (Table 2) show that the risk-framed voter guide condition is most effective, albeit not consistently across conditions. In terms of understanding, the voter-guide risk condition increases the understanding of data-driven political campaigning ( $z = 3.38, p < .001, p.adj = .007, r = .21$ ) compared to the control condition. No other group differences are significant. Participants in the voter-guide risk condition exhibit higher levels of skepticism ( $z = 3.23, p < .001, p.adj = .012, r = .22$ ), lower levels of appropriateness ( $z = -3.60, p < .001, p.adj = .003, r = -.24$ ), and they like DDPA significantly less ( $z = -3.19, p < .001, p.adj = .014, r = -.22$ ) compared to the gamified risk condition. Interestingly, the levels of skepticism and liking towards DDPA were only significantly affected when we considered the interaction between format and framing. Lastly, participants in the voter guide risk condition are significantly better in detecting highly targeted ads ( $z = 3.62, p < .001, p.adj = .003, r = .23$ ) compared to the control condition. Based on our findings, it appears that a non-gamified and more educational format, specifically a voter guide that emphasizes the risks associated with data-driven political campaigning techniques, seems to be a highly effective approach in enhancing understanding of data-driven political advertising, influencing evaluations, and developing detection skills of highly targeted ads.

Table 1. Kruskal-Wallis chi-square test by format, framing, and experimental conditions

	Format (games vs voter guide vs control)		Framing (risk vs benefit vs control)		Experimental conditions vs control	
	$\chi^2$	DF	p-value	$\chi^2$	DF	p-value
Conceptual Understanding	<b>11.86</b>	<b>2</b>	<b>.003</b>	<b>11.00</b>	<b>2</b>	<b>.004</b>
Skepticism	4.45	2	.108	0.64	2	.726
Appropriateness	<b>7.17</b>	<b>2</b>	<b>.028</b>	<b>0.74</b>	<b>2</b>	<b>.692</b>
Liking	4.38	2	.112	1.23	2	.542
Relevance	0.21	2	.900	0.22	2	.895
Perceived degree of targeting: high	<b>13.44</b>	<b>2</b>	<b>.001</b>	<b>8.84</b>	<b>2</b>	<b>.012</b>
Perceived degree of targeting: low	0.93	2	.627	3.88	2	.144
Identifying Targeting Criteria	0.80	2	.670	2.28	2	.320
Critical Processing	1.80	2	.406	1.52	2	.467
Intent to use PET	0.80	2	.671	2.39	2	.303
Use of PET	2.99	2	.224	3.09	2	.214
				<b>12.48</b>	<b>4</b>	<b>.014</b>
				<b>11.26</b>	<b>4</b>	<b>.024</b>
				<b>13.69</b>	<b>4</b>	<b>.008</b>
				<b>11.56</b>	<b>4</b>	<b>.021</b>
				1.92	4	.750
				<b>15.12</b>	<b>4</b>	<b>.004</b>
				4.30	4	.367
				2.30	4	.681
				3.03	4	.552
				2.62	4	.623
				6.11	4	.191

Note: all comparisons include the control group; PET = Privacy Enhancing Technology/Techniques.

Table 2. Significant mean differences based on Dunn post-hoc tests with Bonferroni corrections

	Game Benefit		Game Risk		Guide Benefit		Guide Risk		Control	
	M	SD	M	SD	M	SD	M	SD	M	SD
Conceptual Understanding	5.34	0.93	5.31	0.92	5.37	0.90	5.40**	1.11	5.03**	1.03
Skepticism	5.15	1.58	4.89*	1.42	5.17	1.29	5.47*	1.50	5.27	1.37
Appropriateness	3.15	1.63	3.44*	1.56	3.10	1.48	2.73*	1.64	3.14	1.52
Liking	3.17	1.67	3.43*	1.63	3.23	1.53	2.77*	1.70	3.09	1.59
Relevance	4.71	1.64	4.56	1.51	4.49	1.48	4.64	1.79	4.59	1.57
Perceived degree of targeting: high	5.63	1.13	5.48	1.21	5.69	1.20	5.78**	1.34	5.38**	1.11
Perceived degree of targeting: low	4.59	1.61	4.26	1.71	4.68	1.54	4.34	1.79	4.61	1.59
Identifying Targeting Criteria	9.54	2.65	9.07	2.96	9.51	2.74	9.10	3.02	9.17	2.65
Critical Processing	4.35	1.49	4.57	1.53	4.55	1.56	4.69	1.61	4.48	1.54
Intent to use PET	4.35	1.61	4.45	1.75	4.30	1.67	4.56	1.65	4.30	1.62
Use of PET	5.35	1.53	5.07	1.47	5.07	1.66	5.27	1.62	5.00	1.50

Note: Per row (i.e. dependent variable), only two conditions differ significantly from one another. Measures range from 1 - 7, except Identifying targeting criteria (0 - 14).

\*\*\*  $p.adjusted < .001$ , \*\*  $p.adjusted < .01$ , \*  $p.adjusted < .05$ .  $N_{control} = 128$ ,  $N_{Game-Risk} = 98$ ,  $N_{Game-Benefit} = 99$ ,  $N_{VG-Risk} = 122$ ,  $N_{VG-Benefit} = 106$ .

## 7.4 Discussion and conclusion

Citizens are exposed to increasingly *data-driven* political content online. While most research in this area focuses on establishing the extent that data-driven strategies are used (Dommett, 2019), few studies put citizens in the center of attention. The purpose of this study was thus to investigate how citizens can be supported to increase their digital campaign competence by recognizing, evaluating, and responding to data-driven techniques and implications. We argue that this multi-faceted competency is important because a lack of it might mean that a) citizens may be unable to fully harness the potential benefits of data-driven campaigns, and b) citizens may be susceptible to unconscious informational bias and data exploitation. To the best of our knowledge, this study is one of the first, using an online experimental set-up, to investigate how educational interventions help foster competencies necessary in a data-driven *political* context.

Our first key finding indicates that reinventing the wheel might not be necessary when it comes to boosting digital campaign competences because the “voter-guide”, a non-gamified educational format, outperformed both the interactive gamified condition and the control condition, especially when the risks associated with data-driven political campaigning techniques were highlighted in the text. For example, only participants in the voter guide with the risk-frame showed significantly higher understanding of data-driven political advertising, and were significantly better in identifying highly targeted advertisements compared to the control group. While the other experimental interventions also enhanced understanding and ad recognition in comparison to the control group, observed mean differences were not significant. Based on recent studies using the inoculation theory, we expected that both the gamified intervention (e.g. Roozenbeek & van der Linden, 2019) and the voter guide that encourages active reflection (e.g. Lorenz-Spreen et al., 2021) would lead to learning outcomes, with the game outperforming the guide. The assumption that our gamified intervention would outperform traditional learning formats (Clark et al., 2016; de Freitas, 2018) was made due to the absence of direct comparisons between gamified and non-gamified interventions that contain active reflection elements. The inclusion of active reflection in terms of implementation intentions (Gollwitzer, 1993) in the voter guide might blur the lines, making it less fitting for the traditional format category. Additionally, incorporating narratives in the gamified intervention may shift the attention from the learning content and introduce alternative goals for players (Clark et al., 2016, p. 112). Even though we only included a few gamified elements, the gamified intervention stood out from the voter guide due to its narrative of being a campaign manager for a political party, which the voter guide lacked due to ecological validity considerations.

Second, at first glance, the gamified interventions' ability to immerse players and maintain their interest through rewards (Al-Azawi et al., 2016), might have diminished the seriousness of the topic and thus affected participants attitudes towards data-driven campaigning. Participants playing the game with content highlighting the risks of data-driven campaigning for individuals and democracy were notably less skeptical about scenarios such as political parties gathering data and subsequently excluding specific voter groups based on demographics, behaviors, or interests. Likewise, perceptions of appropriateness of data collection and usage, as well as "liking" these practices and implications were significantly higher in the game conditions with risk-framing, than they were in the non-interactive voter-guide conditions with risk-framing. These findings are consistent with a meta-analysis on narrative persuasion which showed that narratives, a common feature in games, elicit less resistance than non-narratives (Ratcliff & Sun, 2020). This might explain the positive evaluations in the game-based intervention compared to the information-only intervention. However, at second glance, we note that especially skepticism levels were already quite high across all groups ( $M = 5.20$ ,  $SD = 1.44$ ), including the control condition. The gamified condition may have, in fact, illuminated the positive aspects of data-driven campaigning, thus lowering skepticism levels in these groups. In other words, participants may be more inclined to acknowledge the benefits of receiving tailored content to stay informed about topics that interest them most. While moderate skepticism is healthy for scrutinizing ads (Koslow, 2000), excess skepticism can lead to undue distrust and ad avoidance (Baek & Morimoto, 2012). Thus, in data-driven *political* advertisements, too much skepticism could have spillover effects to the source of the advertisement (e.g. the political party), similar to studies on misinformation where disproportionate skepticism levels affect credibility perceptions of reliable news sources (van der Meer et al., 2023). Indeed, informing citizens about the implications of data-driven practices without inducing a sense of resignation is a delicate balancing act (Sander, 2020). The consequence could be privacy cynicism, a feeling of hopelessness and frustration of the widespread data-collection and use (Choi et al., 2018).

Third, we found no significant differences between risk or benefit framed content with regard to any sub-component of digital campaign competence. However, in comparison to the control group, both framings lead to more understanding and skills among participants. The risk-framed voter guide affects understanding and skills compared to the control group, while the positive framed guide does not. This supports Ham's (2017, p.652) finding that perceived risks drive behavioral changes more than perceived benefits. Our study makes a noteworthy contribution by demonstrating that this holds for the non-gamified, information-only intervention in form of a voter guide. Thus, the game may not have induced enough "risk" compared to the voter guide to have an

effect. Given citizens' general aversion to online political advertising (Turow et al., 2012) and their relatively indifferent stance on individual data collection (Kruikemeier et al., 2020), it is possible that positively framed information about data-driven campaigning faced inherent challenges. In this study, "liking" scores were notably low, falling below the scale's midpoint across all conditions. Therefore, considering the greater impact of negative information due to the negativity bias (Rozin & Royzman, 2001), the received positive information might not have had sufficient sway over attitudes towards data-driven campaigning. In essence, whether positive or negative information is presented, a negative overall perception of data-driven campaigning persists. Interestingly, significant differences in "liking" of data-driven campaigning were only observed between the two risk-framed conditions (game-risk, guide-risk). It is possible that participants enjoyed playing the game, which could have influenced their view. This is further supported by the fact that, despite participants expressing a preference for data-driven strategies, there was no significant difference in their perception of the actual relevance of these strategies across conditions. However, it is possible that some individuals like excluding specific groups from political information and do not see this as a heightened risk facilitated by data-driven campaigning. Future research could thus explore political leanings, an aspect we did not investigate.

#### **7.4.1 Limitations and future research**

While the current study provides significant contributions, it also presents limitations that indicate potential areas for future research. First, participants in the game conditions adopted a first-person perspective commonly used in games to learn about data sources and usages available for political campaigns. In comparison, the guide did not convey a specific perspective to the reader, aligning with the style of typical informative websites. Through these decisions, this study stressed ecological validity considerations. Adopting a specific viewpoint might have influenced participants' evaluations of data-driven campaigning techniques, but it is less likely to have affected their understanding abilities and skill adoption in relation to data-driven campaigning. Future studies might want to control for taking different perspectives to rule out this possibility.

Secondly, the game conditions were quite lengthy, thus requiring significant cognitive effort. Although we found no group differences regarding the need for cognition, which measures how much people enjoy challenging tasks (Petty & Cacioppo, 1982), it is possible that certain individuals could derive greater benefits from longer educational games compared to others. As there is not a "one size fits all" solution for boosting competencies (Kozyreva et al., 2020, p. 130), future studies might evaluate who would appreciate which competence boosting intervention most, using qualitative interviews, for example.

Thirdly, we do not know how long the effects of our intervention last. Those in the game conditions might retain content better due to active practice with data collection strategies, unlike the guide condition which focused on reflection tasks instead. However, for lasting changes in understanding and behavior, regular practice over a longer period of time is ideal (Bandura, 1977; Hertwig & Grüne-Yanoff, 2017). Future studies might thus want to explore the duration of educational intervention effects on conceptual understanding, evaluative perceptions, and skills.

Despite these limitations, our study demonstrated that educational interventions can boost digital campaign competence by motivating them to learn, evaluate, and recognize persuasion attempts through data-driven targeting criteria. However, addressing the issue that digital campaign competence of citizens is needed in the first place is crucial. Instead of relying on citizens to identify potentially manipulative and persuasive content enabled by data-driven strategies, regulatory authorities and social media platforms could implement structural interventions to ease this responsibility. This is not only vital for citizens but also imperative for creating and maintaining an informed and capable electorate.

## 7.5 References

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## 7.6 Appendix

Appendix A: Manipulation Check, plot and post-hoc test

Appendix B: Correlation table and post-hoc test of pairwise comparisons – with outliers

Appendix C: Robustness Checks – post-hoc test of pairwise comparisons - without outliers

Appendix D: Exploratory analysis with privacy cynicism

Appendix E: Stimulus examples

## Appendix A. Manipulation Check - plot

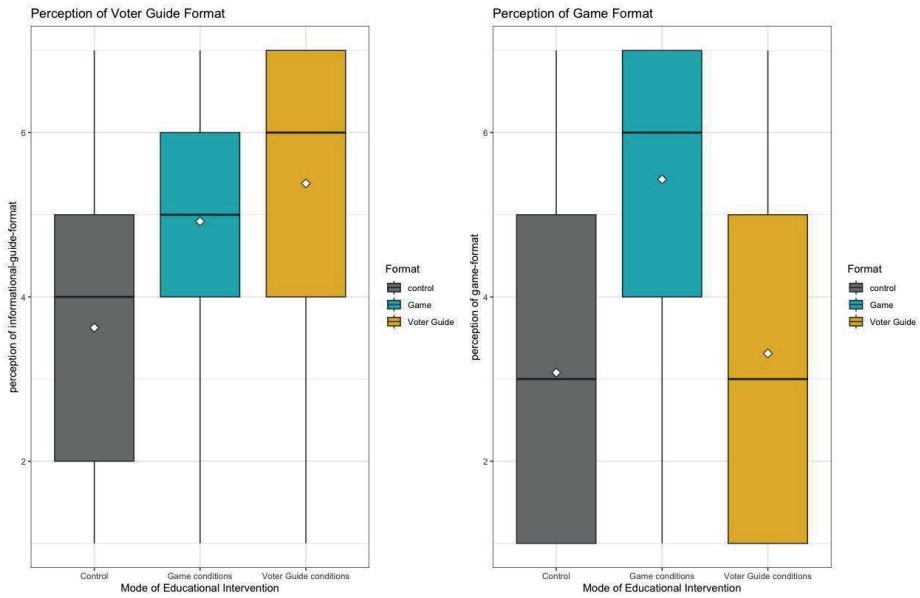


Figure 1. Manipulation check by Format.

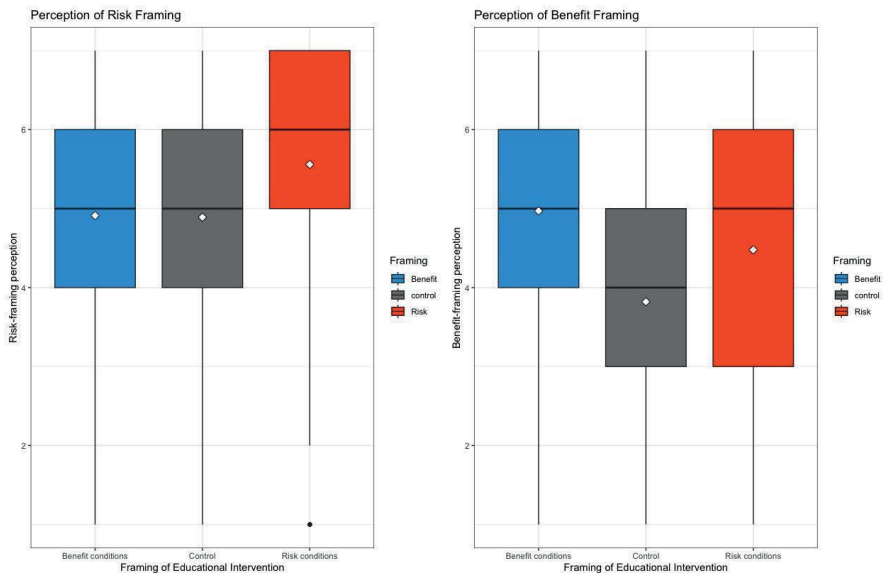


Figure 2. Manipulation check by Frame.

## Appendix A. Manipulation Check – ANOVA results

**Table A1.** ANOVA - Manipulation Check

	Mean	SD	F-value (2,550)
<b>Format: Perception of gamification</b>			
Game	5.43	1.80	92.51***
Voter-guide	3.31	1.96	
Control	3.07	1.80	
<b>Format: Perception of “voter-guide”</b>			
Game	4.91	1.72	47.40***
Voter-guide	5.38	1.52	
Control	3.62	1.72	
<b>Framing: Perception of risks</b>			
Risk	5.56	1.56	10.62***
Benefit	4.90	1.77	
Control	4.89	1.53	
<b>Framing: Perception of benefits</b>			
Risk	4.47	1.81	17.72***
Benefit	4.97	1.67	
Control	3.8	1.60	

Notes: We grouped the experimental groups by format and framing (i.e. Game benefit and Game risk are grouped under “game”)

Table A2. Manipulation Check Tukey Posthoc-test between conditions

Group 1	Group 2	Perception of gamification			Perception of voter-guide			Perception of risk			Perception of benefit		
		M <sub>diff</sub>	CI lo	CI hi	M <sub>diff</sub>	CI lo	CI hi	M <sub>diff</sub>	CI lo	CI hi	M <sub>diff</sub>	CI lo	CI hi
Game	Control	2.35***	1.86	2.84	1.29***	0.85	1.73						
Guide	Control	0.23***	-0.24	0.71	1.76	1.33	2.18						
Guide	Game	-2.12**	-2.54	-1.70	0.46***	0.09	0.84						
Control	Benefit							-0.02	-0.45	0.41	-1.15***	-1.61	-0.70
Risk	Benefit							0.65***	0.27	1.02	-0.49**	-0.89	-0.10
Risk	Control							0.67***	0.24	1.10	0.66**	0.21	1.11

Note.  $N_{\text{control}} = 122$ ,  $N_{\text{Game}} = 171$ ,  $N_{\text{Voter Guide}} = 212$ ,  $N_{\text{Risk}} = 196$ ,  $N_{\text{Benefit}} = 187$ . Without outliers.  
 \*\*\*  $p_{\text{adjusted}} < .001$ , \*\*  $p_{\text{adjusted}} < .01$ , \*  $p_{\text{adjusted}} < .05$ .

## Appendix B. Correlation table

Table B1. Means, standard deviations, and correlations

Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1 Conceptual Understanding	5.28	0.99										
2 Skepticism	5.21	1.44	.21**									
3 Appropriateness	3.10	1.58	-.21**	-.56**								
4 Liking	3.12	1.63	-.17**	-.61**	.81**							
5 Relevance	4.60	1.60	.18**	-.11**	.26**	.27**						
6 Perceived Degree of Targeting: high	5.59	1.21	.43**	.21**	-.17**	-.16**	.12**					
7 Perceived Degree of Targeting: low	4.50	1.66	.05	-.01	-.15**	-.13**	.03	-.21**				
8 Identify Targeting Criteria	9.27	2.80	.17**	.11*	-.23**	-.23**	.07	.12**	.44**			
9 Critical Processing	4.53	1.55	.16**	.23**	-.17**	-.13**	.08	.31**	-.27**	-.11**		
10 Intent to use Privacy Enhancing Technology	4.39	1.65	.02	.12**	-.05	-.09*	.02	.06	-.16**	-.11**	.22**	
11 Use of Privacy Enhancing Technology	5.15	1.56	.18**	.03	-.07	-.06	.11**	.19**	-.14**	-.11*	.25**	.36**

Note. N = 553. All scales range from 1 (lowest value) to 7 (highest value) except for Identifying Targeting Criteria (0-14).

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .

## Appendix B: Detailed post-hoc test of pairwise comparisons – with outliers

Table B2. Pairwise comparison: Between experimental groups and control group

Group 1	Group 2		CU		Skepticism		Appropriateness		Liking		PTD high	
			Z	r	Z	r	Z	r	Z	r	Z	r
Control	Game - Benefit		2.06	0.14	-0.38	-0.03	-0.15	-0.01	0.38	0.02	1.83	0.12
Control	Game - Risk		2.00	0.13	-1.96	-0.13	1.38	0.09	1.57	0.10	0.94	0.06
Control	VG - Benefit		2.46	0.16	-0.83	-0.05	-0.18	-0.01	0.77	0.05	2.48	0.16
Control	VG - Risk		<b>3.38**</b>	<b>0.21</b>	1.39	0.09	-2.40	-0.15	-1.76	-0.11	<b>3.62**</b>	<b>0.23</b>
Game - Benefit	Game - Risk		-0.04	0.00	-1.49	-0.11	1.44	0.10	1.13	0.08	-0.83	-0.06
Game - Benefit	VG - Benefit		0.34	0.02	-0.42	-0.03	-0.02	0.00	0.36	0.03	0.58	0.04
Game - Benefit	VG - Risk		1.12	0.08	1.68	0.11	-2.09	-0.14	-2.01	-0.14	1.57	0.11
Game - Risk	VG - Benefit		0.38	0.03	1.10	0.08	-1.48	-0.10	-0.79	-0.06	1.42	0.10
Game - Risk	VG - Risk		1.17	0.08	<b>3.23*</b>	<b>0.22</b>	<b>-3.60*</b>	<b>-0.24</b>	<b>-3.19*</b>	<b>-0.22</b>	2.44	0.16
VG - Benefit	VG - Risk		0.79	0.05	2.14	0.14	-2.11	-0.14	-2.43	-0.16	0.99	0.07

Note. A positive Z-value means that Group 2 scores higher on this variable than Group 1.

A negative Z-value means that Group 2 scores lower on this variable than Group 1. Table includes outliers.

$N_{\text{control}} = 128$ ,  $N_{\text{Game-Risk}} = 98$ ,  $N_{\text{Game-Benefit}} = 99$ ,  $N_{\text{VG-Risk}} = 122$ ,  $N_{\text{VG-Benefit}} = 106$ .

\*\*\*  $p.adjusted < .001$ , \*\*  $p.adjusted < .01$ , \*  $p.adjusted < .05$ .

**Table B3.** Pairwise comparison of Formats (Game vs. Voter Guide vs. control)

Group 1	Group 2	CU		appropriateness		PTD high	
		Z	r	Z	r	Z	r
control	Game	2.40*	0.13	0.72	0.04	1.64	0.09
control	Voter Guide	3.43**	0.18	-1.57	-0.08	3.59***	0.19
Game	Voter Guide	1.09	0.05	-2.62*	-0.13	2.16	0.10

Note. A positive Z-value means that Group 2 scores higher on this variable than Group 1. A negative Z-value means that Group 2 scores lower on this variable than Group 1. Table includes outliers.

$N_{\text{control}} = 128$ ,  $N_{\text{Game}} = 197$ ,  $N_{\text{Voter Guide}} = 228$ .

\*\*\*  $p_{\text{adjusted}} < .001$ , \*\*  $p_{\text{adjusted}} < .01$ , \*  $p_{\text{adjusted}} < .05$ .

**Table B4.** Pairwise comparison of Framings (Risk vs. Benefit vs. control)

Group 1	Group 2	CU		PTD high	
		Z	r	Z	r
Benefit	Control	-2.66*	-0.15	-2.54*	-0.14
Benefit	Risk	0.59	0.03	0.24	0.01
Control	Risk	3.21**	0.17	2.79*	0.15

Note. A positive Z-value means that Group 2 scores higher on this variable than Group 1. A negative Z-value means that Group 2 scores lower on this variable than Group 1. Table includes outliers.

$N_{\text{control}} = 122$ ,  $N_{\text{Risk}} = 196$ ,  $N_{\text{Benefit}} = 187$ .

\*\*\*  $p_{\text{adjusted}} < .001$ , \*\*  $p_{\text{adjusted}} < .01$ , \*  $p_{\text{adjusted}} < .05$ .

## Appendix C: Robustness Checks – post-hoc test without outliers

Table C1. Pairwise comparison: Between experimental groups and control group

Group 1	Group 2	CU		Skepticism		Appropriateness		Liking		PTD high	
		Z	r	Z	r	Z	r	Z	r	Z	r
Control	Game - Benefit	1.74	0.12	-0.28	-0.02	-0.13	-0.01	0.45	0.03	1.69	0.12
Control	Game - Risk	1.87	0.13	-1.77	-0.12	1.40	0.10	1.53	0.11	1.55	0.11
Control	VG - Benefit	2.33	0.16	-0.99	-0.07	-0.05	0.00	0.86	0.06	2.37	0.16
Control	VG - Risk	<b>3.14*</b>	<b>0.21</b>	1.41	0.09	-2.20	-0.14	-1.66	-0.11	<b>3.55**</b>	<b>0.23</b>
Game - Benefit	Game - Risk	0.13	0.01	-1.38	-0.11	1.42	0.11	1.01	0.08	-0.11	-0.01
Game - Benefit	VG - Benefit	0.47	0.03	-0.64	-0.05	0.08	0.01	0.37	0.03	0.56	0.04
Game - Benefit	VG - Risk	1.17	0.08	1.57	0.11	-1.90	-0.13	-1.96	-0.14	1.59	0.11
Game - Risk	VG - Benefit	0.33	0.02	0.80	0.06	-1.39	-0.10	-0.68	-0.05	0.68	0.05
Game - Risk	VG - Risk	1.02	0.07	<b>3.02*</b>	<b>0.22</b>	<b>-3.38**</b>	<b>-0.24</b>	<b>-3.01**</b>	<b>-0.22</b>	1.69	0.12
VG - Benefit	VG - Risk	0.71	0.05	2.31	0.16	-2.05	-0.14	-2.43	-0.17	1.05	0.07

Note. A positive Z-value means that Group 2 scores higher on this variable than Group 1. A negative Z-value means that Group 2 scores lower on this variable than Group 1. No Outliers.

$N_{\text{control}} = 122, N_{\text{Game-Risk}} = 84, N_{\text{Game-Benefit}} = 87, N_{\text{VG-Risk}} = 112, N_{\text{VG-Benefit}} = 100.$   
 $*** p.adjusted < .001, ** p.adjusted < .01, * p.adjusted < .05.$

**Table C2.** Pairwise comparison of Formats (Game vs. Voter Guide vs. control)

Group 1	Group 2	CU		PTD high	
		Z	r	Z	r
control	Game	2.15	0.13	1.93	0.11
control	Voter Guide	3.22**	0.18	3.48***	0.19
Game	Voter Guide	1.08	0.06	1.63	0.08

Note. A positive Z-value means that Group 2 scores higher on this variable than Group 1. A negative Z-value means that Group 2 scores lower on this variable than Group 1. No Outliers. Compared to the analysis with outliers, appropriateness perceptions do not differ between the guide and the game.

$N_{\text{control}} = 122$ ,  $N_{\text{Game}} = 171$ ,  $N_{\text{Voter Guide}} = 212$ .

\*\*\*  $p_{\text{adjusted}} < .001$ , \*\*  $p_{\text{adjusted}} < .01$ , \*  $p_{\text{adjusted}} < .05$ .

**Table C3.** Pairwise comparison of Framings (Risk vs. Benefit vs. control)

Group 1	Group 2	CU		PTD high	
		Z	r	Z	r
Benefit	Control	-2.42*	-0.14	-2.42*	-0.14
Benefit	Risk	0.66	0.03	0.76	0.04
Control	Risk	3.02**	0.17	3.12**	0.17

Note. A positive Z-value means that Group 2 scores higher on this variable than Group 1. A negative Z-value means that Group 2 scores lower on this variable than Group 1. No Outliers.

$N_{\text{control}} = 122$ ,  $N_{\text{Risk}} = 196$ ,  $N_{\text{Benefit}} = 187$ .

\*\*\*  $p_{\text{adjusted}} < .001$ , \*\*  $p_{\text{adjusted}} < .01$ , \*  $p_{\text{adjusted}} < .05$ .

## Appendix D. Exploratory Analysis with Privacy Cynicism

In an exploratory part of this study, we investigated the role of privacy cynicism with regard to Digital Campaign Competence (i.e. all dependent variables related to understanding, evaluation and skills). The privacy paradox describes a state where individuals express concerns about privacy and data security, yet their actual behaviors and actions do not match these concerns (Dienlin & Trepte, 2015). Citizens' privacy cynicism, a feeling of hopelessness and frustration (Choi et al., 2018) has been proposed as a mechanism that explains privacy protection behaviors (van Ooijen et al., 2022). Thus, especially for the skills component of digital campaign competence (e.g. using privacy enhancing technology and techniques), privacy cynicism might play a role.

In this study, participants across conditions score below the scale midpoint (3.5) on privacy cynicism (see Table D1).

**Table D1.** Mean and standard deviation per condition on privacy cynicism

Condition	M	SD
Control	3.04	1.41
Game Benefit	2.87	1.60
Game Risk	3.08	1.68
Voter Guide Benefit	3.25	1.55
Voter Guide Risk	3.02	1.62

Next, we investigated whether there are differences to be found with regard to privacy cynicism between educational intervention formats or between content framings. Table D2 shows that there are no significant differences for neither intervention formats (game, guide, control group), nor framings (risk, benefit, control).

**Table D2.** Tukey Posthoc-test of Privacy Cynicism between format and frames

		$M_{diff}$	CI lo	CI hi
Game	Control	-0.06	-0.48	0.34
Guide	Control	0.07	-0.32	0.48
Guide	Game	0.14	-0.20	0.50
Control	Benefit	-0.01	-0.43	0.39
Risk	Benefit	-0.01	-0.37	0.34
Risk	Control	0.00	-0.40	0.41

Note. No significant differences observed.

$N_{control} = 122$ ,  $N_{Game} = 171$ ,  $N_{Voter\ Guide} = 212$ ,  $N_{Risk} = 196$ ,  $N_{Benefit} = 187$ .  
 \*\*\*  $p.adjusted < .001$ , \*\*  $p.adjusted < .01$ , \*  $p.adjusted < .05$ .

Finally, we investigated whether privacy cynicism moderates the relationship between the groups and Digital Campaign Competence. An ANOVA revealed a significant moderation effect between participants in the voter guide condition with the benefit-framed information and privacy cynicism on the use of privacy enhancing technology and techniques,  $b = -0.35$ ,  $t = -2.58$ ,  $p < .01$ . This finding is in line with (van Ooijen et al., 2022), who found that highly cynical people engage less in privacy protection behaviors.

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**Table D3.** Moderator Analysis of Privacy cynicism on the Use of Privacy Enhancing Technology

Effect	Estimate	SE	95% CI		p
			LL	UL	
Intercept	5.29	0.32	4.66	5.92	<.001
Game – Benefit	0.46	0.45	-0.42	1.35	0.301
Game – Risk	-0.02	0.45	-0.92	0.87	0.962
VG – Benefit	1.22	0.47	0.29	2.15	0.009
VG – Risk	0.12	0.43	-0.73	0.98	0.770
Privacy Cynicism	-0.09	0.09	-0.28	0.09	0.312
Game – Benefit * Privacy Cynicism	-0.04	0.13	-0.31	0.22	0.737
Game – Risk * Privacy Cynicism	0.03	0.13	-0.23	0.29	0.814
VG – Benefit * Privacy Cynicism	-0.35	0.13	-0.61	-0.08	0.010
VG – Risk * Privacy Cynicism	0.04	0.12	-0.20	0.30	0.718

Note.  $F(9, 543) = 3.319$ ,  $p < .001$

## Appendix E. Stimulus Examples

### Game condition, risk-framing (examples)



**Wir stellen vor: "Campaign Game", ein Lernspiel mit Inhalten der NGO Tactical Tech. Sie werden zum Kampagnenmanager/zur Kampagnenmanagerin einer Partei und lernen datengesteuerte Werbetechniken kennen!**

**Sind Sie bereit, an die Spitze aufzusteigen und ein(e) Meister:in der politischen Kampagnen zu werden? Spielen Sie jetzt "Campaign Game" und sehen Sie, ob Sie das Zeug dazu haben!**

Start Game

Willkommen beim **Campaign Game**! Als Kampagnenmanager:in ist es Ihr Ziel, etwas über datengesteuerte Kampagnen zu lernen, um eine erfolgreiche politische Kampagne zu gestalten. Wählen Sie zu Beginn eine politische Partei, aus deren Perspektive Sie Ihre Kampagne gestalten werden. Lasst die Spiele beginnen!

Think! Die Partei des Volkes (Auf der Agenda: Bildung, Gesundheit, Wohnen)

Partei für alle (Auf der Agenda: Klima, Bildung, Wohnen)

Partei der Arbeit (Auf der Agenda: Wohnen, Infrastruktur, Bildung)



Klicken Sie auf das Kästchen im Bild, um zu sehen, wie sich **nur der Text** zwischen den beiden Anzeigen unterscheidet.

In diesem Beispiel wollte das Konto "People's Vote UK" wissen, **welcher Text am besten abschneidet**. Der Screenshot aus dem Anzeigenarchiv von Facebook zeigt zwei politische Werbeanzeigen gegen Brexit, die das gleiche Bild, aber einen anderen Text verwenden. Die Werbeanzeige auf der linken Seite wurde den Nutzern weniger als 1000 Mal gezeigt, während die Werbeanzeige rechts 5000 - 10.000 Mal gezeigt wurde.

Quelle: Facebook Ad Library, abgerufen am 22.02.2019, übersetzt

<p>● Inactive Feb 12, 2019 - Feb 15, 2019</p> <p>Paid for by <b>People's Vote</b></p>	<p>● Inactive Feb 12, 2019 - Feb 15, 2019</p> <p>Paid for by <b>People's Vote</b></p>
<p><b>People's Vote UK</b> Gesponsert · bezahlt durch People's Vote UK · 🌐</p>	<p><b>People's Vote UK</b> Gesponsert · bezahlt durch People's Vote UK · 🌐</p>
<p>Die Sparmaßnahmen haben Oldham so viel Schaden zugefügt. Theresa Mays nutzloser Brexit-Plan würde die Austerität auf Jahre hinaus fortsetzen.</p> <p>Die Stimme Ihres Abgeordneten wird entscheidend sein, um dieses schlechten Brexit-Deal im Parlament zu verhindern.</p>	<p>Mays nutzloser Brexit-Plan wird Oldham ärmer machen und unserem Gesundheitssystem schaden.</p> <p>Die Stimme Ihres Abgeordneten wird entscheidend sein, um dieses schlechten Brexit-Abkommen im Parlament zu verhindern.</p>
<p><b>WRITE TO YOUR MP NOW!</b> The Government's Brexit deal has failed. I've just told my MP the only way forward is <a href="#">Learn More</a></p> <p>DEMANDPEOPLES.VOTE</p>	<p><b>WRITE TO YOUR MP NOW!</b> The Government's Brexit deal has failed. I've just told my MP the only way forward is <a href="#">Learn More</a></p> <p>DEMANDPEOPLES.VOTE</p>



## RISIKO

### **Das Sammeln von persönlichen Informationen kann die Demokratie gefährden, denn das ermöglicht...**

- ⚠ ... das Ignorieren bestimmter Wähler:innengruppen aufgrund ihrer demographischen Merkmale, ihres Verhaltens oder ihrer Interessen
- ⚠ ...Wähler:innen zu demobilisieren und sie von der Stimmabgabe abzuschrecken



Sie haben gesagt, dass Sie mehrere Themen hervorheben wollen.  
Gute Wahl!

## RISIKO

### **Die Hervorhebung nur eines Themas gefährdet die Demokratie, weil...**

- ⚠ .. Ihre Wähler:innen glauben könnten, dass dieses eine Thema das Wichtigste für Ihre Partei ist, auch wenn das möglicherweise nicht der Fall ist.



Sie haben gesagt, dass Sie sich mit Google und seine Dienste zusammenschließen möchten.  
Sie haben nun Zugang zu vielen weiteren Datenpunkten von Personen!

## RISIKO

### Dies könnte eine Gefahr für die Demokratie sein, weil es ermöglicht die...

- ⚠ Fokussierung auf die Schwächen der Wähler:innen mit Hilfe von Wahlwerbespots (zum Beispiel, gezielt auf Personen mit niedrigerem Bildungsstand).
- ⚠ Wahlbeteiligung dieser Gruppe von Wähler:innen (z.B. Personen mit niedrigem Bildungsniveau) zu minimieren und die Wahlbeteiligung anderer Wähler:innen (z.B. Bürger mit höherem Bildungsniveau) zu maximieren



### Gute Arbeit!

Indem Sie sich mit einem Unternehmen zusammengetanhaben, um mehr Daten zu sammeln, haben Sie sich das zweite von vier Abzeichen im Kampagnenspiel verdient. Weiter so!



## Voter Guide condition, benefit-framing (examples)

**Auf den folgenden Seiten lesen und hören Sie über datengesteuerte politische Werbung. Die Inhalte wurden mit der NGO Tactical Tech entwickelt.**

**Bevor wir beginnen, müssen wir einen Soundcheck durchführen. Bitte klicken Sie auf die Schaltfläche "Sound testen", um sicherzustellen, dass Sie Musik hören. Wenn Sie nichts hören, ändern Sie bitte Ihre Einstellungen so, dass Sie Audio hören können, und drücken Sie die Schaltfläche erneut.**

Sound testen

**Sie haben die Musik gehört? Dann klicken Sie bitte auf "Start".**

Start

Mit der **zunehmenden Automatisierung** von A/B-Tests können Algorithmen weit mehr Varianten und Kombinationen von Text, Medien, Buttons usw. erstellen, basierend auf den Kampagneneingaben. Das bedeutet, dass **Maschinen** - anstelle von Menschen - darüber entscheiden würden, was Menschen lesen und sehen. Dies könnte dazu führen, dass personalisierte politische Inhalte **ohne menschliche Aufsicht erstellt** werden.

**Inactive**  
Feb 12, 2019 - Feb 15, 2019

Paid for by **People's Vote**

**People's Vote UK**  
Gesponsert · bezahlt durch People's Vote UK ·

Die Sparmaßnahmen haben Oldham so viel Schaden zugefügt. Theresa Mays nutzloser Brexit-Plan würde die Austerität auf Jahre hinaus fortsetzen.

Die Stimme Ihres Abgeordneten wird entscheidend sein, um dieses schlechten Brexit-Deal im Parlament zu verhindern.

**TELL YOUR MP >>**

**Vote against Tory Brexit!**

**WRITE TO YOUR MP NOW!**  
The Government's Brexit deal has failed.  
I've just told my MP the only way forward is [Learn More](#)

DEMANDPEOPLES.VOTE

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**Inactive**  
Feb 12, 2019 - Feb 15, 2019

Paid for by **People's Vote**

**People's Vote UK**  
Gesponsert · bezahlt durch People's Vote UK ·

Mays nutzloser Brexit-Plan wird Oldham ärmer machen und unserem Gesundheitssystem schaden.

Die Stimme Ihres Abgeordneten wird entscheidend sein, um dieses schlechten Brexit-Abkommen im Parlament zu verhindern.

**TELL YOUR MP >>**

**Vote against Tory Brexit!**

**WRITE TO YOUR MP NOW!**  
The Government's Brexit deal has failed.  
I've just told my MP the only way forward is [Learn More](#)

DEMANDPEOPLES.VOTE

## VORTEIL

### Stärkung der Demokratie durch ökonomische Effizienz:

- ➔ Datengesteuerte Werbung zielt auf bestimmte Personen ab und reduziert die Ausgaben für Kampagnen
  - ➔ Effiziente Werbung spart den Steuerzahlenden Geld
- ➔ Verbesserte Zielgruppenansprache führt zu wirkungsvolleren politischen Kampagnen



VORTEIL

Wenn Sie das nächste Mal in den sozialen Medien unterwegs sind, können Sie sich diese Frage stellen:

Wer könnte sonst noch sehen, was ich poste?

7

## VORTEIL

### Dies könnte der Demokratie zugute kommen, denn Sie können...

- ➔ ... Bürger erreichen, die normalerweise schwer zu erreichen sind (z. B. könnten Sie sich an Personen mit niedrigerem Bildungsniveau wenden)
- ➔ ... den Wähler:innen helfen, politisch aktiver zu werden oder politische Informationen zu erhalten, auf die sie sonst nicht gestoßen wären



VORTEIL

## Überzeugungsabsicht von datengesteuerten Kampagnen

Politische Parteien können Taktiken anwenden, um Unterstützung zu gewinnen, z. B. indem sie sich als **Ein-Themen-Partei** präsentieren. Das bedeutet, dass sie in einer Werbeanzeige nur ein bestimmtes politisches Thema hervorheben, ohne andere Themen zu erwähnen, auf die sie sich konzentrieren.

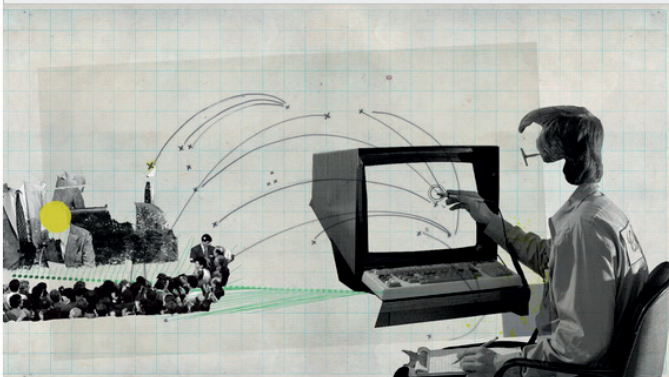
### VORTEIL

Das kann der Demokratie zugutekommen, da ...

- die Konzentration auf ein einziges Thema verhindern kann, dass die Bürger:innen mit Informationen überhäuft werden



VORTEIL



Wenn Sie das nächste Mal eine Online-Anzeige sehen, können Sie sich das fragen:

- 💡 Konzentriert sich die Partei immer auf das gleiche Thema? Wenn ja, könnte es sein, dass sie eine Ein-Thema-Taktik anwenden.

Leitfaden verlassen

## 7.7 References for Appendix

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