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Inoculation Hesitancy: An Exploration of Challenges in Scaling Inoculation Theory

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Abstract

In the digital age, combatting misinformation is a pressing concern, and prior inoculation theory research offers a promising psychological “vaccine” against misinformation. But are people willing to take this vaccine? This research explores the scalability of inoculation theory and individuals' willingness to engage with inoculations as a means of achieving "herd immunity" against the spread of misinformation. Expanding on the biological metaphor that inoculation theory is based on, I introduce the concept of “inoculation hesitancy” as a framework for exploring reluctance to engage with misinformation interventions. Two studies were conducted to investigate the determinants of inoculation hesitancy. The first study (N=151) investigated whether individuals feel a need for misinformation inoculations. In an online comparative self-evaluation, participants assessed their own experiences with misinformation and expectations of inoculation and compared them to those of the average person. Results exposed a better-than-average effect. While participants acknowledged their concern over the problem of misinformation, they also estimated that they were less likely to be exposed to it and more skillful at detecting it than the average person. They also said that their likelihood of engaging with inoculation was moderate, and that the average person would benefit more from being inoculated. The second study (N=210) examined the influence of trust on the willingness to partake in misinformation inoculations. Participants evaluated their inclination to watch misinformation inoculation videos from sources varying in trustworthiness and political affiliation. Results suggest that participants are significantly less willing to accept inoculations from low-trust sources and much less likely to accept inoculations from partisan sources that are antithetical to their own political beliefs. Overall, this research identifies potential motivational obstacles in reaching herd immunity with inoculation theory, providing guidance for future development of inoculation interventions.

Introduction

Online manipulation is one of the greatest problems of our time. Misinformation, disinformation, and influence operations have become issues deliberated at length by governments, academics, and concerned citizens alike. The speed at which technology developed allows us to consume information with unprecedented ease but also leaves us susceptible to unwanted persuasion from people who are able to manipulate the affordances of that technology for their own gain. In the last several years we have seen how misinformation can drastically affect our world. Misinformation has affected the rise of authoritarian leaders throughout Europe (Pascale, 2019), the January 6th riot in the US (Riley, 2022), and ill-informed self-treatments of Covid-19 (Chary et al., 2020) –just to name a few consequences.

There have been several proposed solutions to the problem of misinformation, fact-checking, warning labels, detection algorithms, and others. But many of these solutions can only be put in place after the misinformation has already gone viral and been caught and analyzed by fact-checkers or social media administrators. Debunking is valuable, but the continued influence effect of misinformation means that stopping the misinformation from going viral in the first place should be the primary goal. The continued influence effect means that misinformation often continues to guide an individual's reasoning, even after they have received a correction (Sanderson et al., 2022). One of the most effective known interventions for preventing misinformation is known as inoculation theory. Inoculation theory posits that individuals can be fortified against persuasive messages by exposing them to weakened versions of the same messages, analogous to how vaccines work to make individuals resistant to a virus by exposing individuals to a weakened form of the same virus (McGuire, 1961). These "inoculations" build cognitive defenses, enabling individuals to recognize and resist attempts to sway their beliefs or

attitudes. By using this psychological vaccine to immunize individuals against misinformation, inoculation theory offers a promising approach to fostering a more resilient and discerning populace.

Because of its success in building resistance to misinformation (Compton et al., 2021; Cook et al., 2017; Lewandowsky & van der Linden, 2021; Roozenbeek et al., 2020), there is a growing interest in scaling up inoculation theory interventions to create "herd immunity" (Basol et al., 2020). Inoculation theory has mostly been used in lab situations where participation of the sample has been guaranteed, but it is unknown how many people would be willing to participate if researchers pushed for population-wide immunity. A fundamental question arises: Can inoculation theory be effectively scaled to tackle the controversial landscape of misinformation in the digital age? In this research, I look at potential challenges in convincing a reluctant populace to engage with inoculation interventions.

Expanding on the founding metaphor of inoculation theory I attempt to define the concept of inoculation hesitancy. Using the insights uncovered by looking at the causes of vaccine hesitancy, I identify two main drivers that can also apply to inoculation interventions, lack of need and lack of trust. My research tests whether these demotivational drivers exist in the case of misinformation inoculations by conducting two online survey studies. The first study is a comparative self-evaluation that looks at people's perceptions of their own immunity to misinformation, and their perceptions of potential interventions to identify whether "lack of need" may be a potential obstacle to inoculation uptake. Then I look at "lack of trust," by conducting a survey on how the source of the inoculation, or the "inoculator," affects how likely individuals are to voluntarily participate in an inoculation intervention. These insights aim to aid in developing more effective communication techniques and fostering greater engagement with inoculation interventions.

Literature Review

Inoculation Theory

In the 1960s, McGuire pioneered inoculation theory, a social psychological theory built on the analogy of a medical vaccination (McGuire and Papageorgis, 1961; McGuire,1961). Medical inoculation works by injecting a weakened form of a virus into an individual to enable that person to build antibodies that make them resistant to future attacks from that virus. In the same way, inoculation theory suggests exposing people to weakened doses of arguments can cause individuals to develop mental antibodies and build resistance to stronger unwanted persuasive arguments. Psychological inoculation has two parts, a threat and a refutational preemption (Traberg et al., 2022). The threat is a forewarning of an attack on the subject's beliefs, essentially informing the subject that they are likely to be misled in a specific way in the future. This serves to provide motivation for building psychological resistance. The second part is the refutational preemption, also known as pre-bunking. This operates by modeling how to refute the attack and providing an arsenal of information and arguments that strengthen attitudes and can be used to refute future challenges (Banas & Rains, 2010; McGuire, 1961).

The original work on inoculation theory focused on maintaining beliefs in "cultural truisms" or widely shared unchallenged beliefs. Cultural truisms that McGuire studied were uncontroversial issues such as the benefits of teeth brushing and penicillin. In McGuire's view, if people had already heard challenges to a belief, then the inoculation couldn't be considered "preemptive". This narrow focus enabled tests of resistance with issues people hadn't previously heard attacked and avoided complications to the medical inoculation analogy. However, in the years since McGuire's original formulation of inoculation theory, it has been expanded beyond the "germ-free" environment of cultural truisms into much more infectious issues. Inoculation theory has since been found to be effective even when people had differing prior attitudes about the issue in question (Pryor & Steinfatt,

1978). This was an essential development as inoculation in real life, can hardly ever be truly preemptive (Basol et al., 2020). A meta-analysis of inoculation research by Banas and Rains (2010) measured 40 studies with a combined total of more than 10,000 participants and established an effect size of inoculation interventions of about d= 0.43 (conventionally considered to be “medium” effect size). This validated that inoculation theory was an effective method at creating resistance to persuasion.

The Misinformation Vaccine

Most recently inoculation theory has been applied to the politically fraught problem of misinformation. McGuire developed his theory well before the rise of the internet, but his metaphor seems particularly apt as misinformation online spreads similarly to a virus. In fact, the spread of false and misleading information can be modeled much like the spread of viral contagion. Persuasive misinformation can spread quickly from person to person, replicating and evolving to “infect” as many people as possible (Lewandowsky & van der Linden, 2021). The natural solution to a rapidly spreading virus is a vaccine, and as such inoculation theory has been used to build resistance against climate change misinformation (Van Der Linden et al., 2016; Cook et al., 2017), anti-vaccine misinformation (Vivion et al., 2022), and political misinformation (Zerback & Töpfl, 2022). Not only does inoculation work to safeguard desirable stances on an issue from misinformation, but even when individuals hold undesirable views, the use of "therapeutic" inoculation messages can yield positive outcomes. Therapeutic inoculation expanded the vaccine metaphor by emulating advances in medicine where therapeutic vaccines can build antibodies even among people that have already been infected.

One of the biggest issues with inoculation theory in its original formulation was it lacked scalability. Traditional inoculation focuses on inoculating against specific arguments so that when you see a similar stronger argument, you will be resistant. Unfortunately, this is a very impractical approach to online misinformation, as new misleading arguments pop up every day, and inoculating against each

one is impossible. To create a more effective vaccine against misinformation, recent focus has been on refutational-different messaging, which help boost resistance towards an array of persuasive attacks. These broad-spectrum inoculations have come to be referred to as “technique-based” inoculations. Cook et al. (2017) discerned the effectiveness of technique-based inoculations by inoculating against climate misinformation by explaining a specific technique used to cast doubt on scientific consensus. Participants were given a typical warning about political attempts to undermine the scientific consensus on climate change. However, rather than countering the climate misinformation with factual rebuttals, they were shown how a technique that uses dissenting "fake experts" had been used in the tobacco industry to spread false messages about “healthy” cigarettes in the past.

Two of the leading minds in inoculation theory research, Sander van der Linden and Jon Roozenbeek, used the concept of technique-based inoculations, and set out to create a broad-spectrum misinformation vaccine. They first identified manipulation techniques and the rhetorical strategies that typically underpin misinformation. Then, they did studies gamifying the inoculation process through an online “fake news game” called Bad News (www.getbadnews.com). The game allows players to take on the role of a fake news producer and gain as many followers as possible without losing credibility over the course of approximately 15 minutes. This lets players actively engage with the techniques used to spread fake news while bringing awareness to the potential threat of misinformers (Roozenbeek & van der Linden, 2019a; Van Der Linden & Roozenbeek, 2020).

They were able to test their game on thousands (n≈15,000) of voluntary participants and found that regardless of political ideology, age, gender, or education they were significantly better at recognizing the manipulative techniques after playing the game than before it. This gamification of inoculation is considered “active” inoculation as the participants are forced to actively develop counterarguments to the techniques shown, not just passively read them. There have been other successful active inoculations including Go Viral! (Basol et al., 2021) and Harmony Square (Roozenbeek

& van der Linden, 2020). These games showed that manipulative techniques can be isolated for inoculation without centering on specific content, thus providing broad resilience against online misinformation that uses those manipulative techniques. In further testing the effectiveness of inoculation games, they found that the inoculation effect was cross-cultural, and was effective at building resistance in Swedish, German, Polish, and Greek participants as well as in the original English-speaking samples (Roozenbeek et al., 2020). The major benefit of technique-based and active inoculations lies in their broader applicability. They build resistance to persuasion from attacks that may be different in content but use the same underlying persuasion techniques.

Though these games inoculated thousands of participants, the real-world sample was entirely voluntary and self-selected, so they were limited to people who already found the concept of becoming more resistant to misinformation interesting. Unfortunately, not everyone is willing to participate in a 15+ minute active inoculation game, so with the help of Google Jigsaw, they created a series of videos that offered a similar technique-based inoculation, though a more passive one (Roozenbeek et al.,2022). Their team identified five manipulation techniques commonly encountered in online misinformation: the use of excessively emotional language, incoherence, false dichotomies, scapegoating, and ad hominem attacks, and created 2-3 minute videos that contained both the threat and the refutational preemption for each. After watching these videos, they found that people's ability and confidence in recognizing manipulation techniques on social media improved. Additionally, the videos improved people's ability to distinguish between trustworthy and untrustworthy content, and improved the quality of their sharing decisions (Roozenbeek et al., 2022). These videos offer a successful and convenient way to be inoculated against misinformation. Because of this convenience I decided to use them as my hypothetical inoculation intervention in testing potential inoculation hesitancy. As a low-effort inoculation, any hesitancy to engage with this intervention is likely to be exacerbated in longer or more high-effort interventions.

Extending the Metaphor: Inoculation Hesitancy

The big question remains: is inoculation theory scalable? The end goal of any good vaccine is reaching herd immunity. In the case of misinformation, this would mean that enough people were resistant to the persuasive power of misinformation that it would not go viral at all and would not have the chance to infect the population. Technique-based inoculations have proven effective against a variety of misinformation, so it has the efficacy to work, but the treatment is only valuable if people are willing to take it.

Extending the metaphor that inoculation theory is based on can reveal some of the potential problems with achieving herd immunity. In recent years medical professionals have faced major hurdles in convincing the population to voluntarily get vaccines, regardless of their proven effectiveness. Vaccine hesitancy is defined as, "the delay in acceptance or refusal of vaccination despite the availability of vaccination services." (MacDonald, 2015, p. 4161). There are several identified causes of vaccine hesitancy, but the two major ones that can also be applied to inoculation theory are, a) lack of need, and b) lack of trust. These factors were identified as part of a systematic analysis of vaccine hesitancy (Kumar et al., 2022) and will be used in the present research as a framework for outlining the potential causes of inoculation hesitancy. I define inoculation hesitancy as the lack of motivation to engage with or the outright avoidance of inoculation interventions.

Lack of Need

In the case of vaccines, the vaccine-hesitant identify their own "lack of need" as a major cause of reluctance. In Kumar et al.'s (2022) review of the causes of COVID-19 and influenza vaccine hesitancy, they found that "some were of the view that it was unnecessary as they rarely contracted infectious diseases, the vaccine would be ineffective, or that their immune system was sufficient to handle the

infection" (p. 6). When people think they are personally immune to the disease, or they don't think the disease is a problem at all, they are unlikely to seek out a vaccine and may even try to avoid it. In fact, a meta-analysis has shown that the amount which people perceive themselves to be vulnerable to health problems is predictive of the likelihood that they will engage in health-promoting behaviors (Harrison et al., 1992). People who have "unrealistic optimistic" about their own immunity, tend to avoid learning about or adopting preventive measures because they don't recognize any personal risk (Dunning et al., 2004).

In the process of scaling up inoculation theory, the consequences of perceived immunity are important to evaluate. The existing body of literature on inoculation theory tends to overlook the voluntary nature of its real-world application, neglecting the pivotal role of individual motivation in accepting inoculation measures. Most people agree that misinformation is a problem, and a solution is needed, but on the individual level, it is unclear if people feel that the problem is something that affects them directly. One poll (AP-NORC, 2021) shows that 95% of Americans acknowledge that they view misinformation as a problem, but only 21% think they have personally shared misinformation. This implies that in the case of misinformation, there may be perceived immunity where people believe that they are not affected by the problem in the same way as the "average" person.

People tend to rate their abilities and character traits as better than average. Although only half the population can be above average on any given characteristic, a majority of people often believe that they are above average. Unfortunately, this is not how averages work. This phenomenon, named the better-than-average effect (or sometimes the illusory superiority effect (Hoorens, 1993)) has been documented across many different dimensions. People rate everything from their intelligence (Kruger, 1999) to their driving skills (Walton, 1999), more favorably than the average person's abilities.

Sometimes the better-than-average effect is just a mild inflation of one's own abilities, but in the words of Charles Darwin, "Ignorance more frequently begets confidence than does knowledge." The

Dunning-Kruger effect is a subset of the better-than-average effect wherein the least capable have the most over-confidence in their abilities (Dunning, 2011). Although the existence of the Dunning-Kruger effect is up for debate (Nuhfer et al., 2016) it has been replicated repeatedly with regard to information literacy (Mahmood, 2016). In the case of misinformation, this could result in those who are most in need of inoculation being the least likely to engage with inoculation interventions. When faced with evidence or input that challenges an individual's perceived competence, they may dismiss or discount it, clinging to their inflated self-assessment (Dunning et al., 2004). This dismissal could prevent them from recognizing the value of a psychological vaccine and hamper their willingness to engage with misinformation interventions. The first study I conducted intends to discover whether Americans fall prey to the better-than-average effect when assessing their own capabilities in relation to misinformation and the need for inoculation. Personal motivation is essential to embrace voluntary inoculation measures, which requires individuals to embrace their own vulnerability to the harms of misinformation.

Lack of Trust

Lack of trust in the people behind the vaccine also tends to play a large role in vaccine hesitancy. A lack of trust in healthcare policies, the government, pharmaceutical companies, and published studies caused high levels of vaccine hesitancy in the systematic analysis of COVID-19 and influenza vaccine hesitancy conducted by Kumar et al. (2022). This lack of trust caused difficulties in scaling up vaccination and reaching herd immunity in the case of COVID-19, partially because of a lack of trust in the people and institutions distributing the vaccine, and partially of the politicized nature of the disease itself.

Over the years, researchers have emphasized the significant role of source trustworthiness in persuasion (Pornpitakpan, 2004). Yet, the discussion of inoculation theory generally seems to treat the inoculation as “sourceless” while at the same time acknowledging that the source of the misinformation

is key. This may be an acceptable situation in a laboratory setting where the only source is the research scientists, but in scaling up inoculation the funding necessary will inevitably involve an outside source that will play a role in how people evaluate if they wish to participate in that inoculation intervention. The only research that has been done on the source of the inoculation has found that in general, the more positively a recipient perceives the source of the inoculation, the more effective the inoculation process tends to be (An & Pfau, 2004; Compton et al., 2021). But this doesn't acknowledge how source plays into the decision of whether to inoculate yourself or not. Source credibility doesn't only effect how people process information, but also how people select which information to consume. While high credibility sources don't necessarily get more exposure, low credibility sources often deter engagement (Metzger et al., 2020).

Selectivity about the content we consume is not only driven by levels of trust, but also by political attitudes. Misinformation has been heavily politicized with some viewing it as a problem perpetuated or even created by partisan adversaries (Tong et al., 2020). Political elites and media personalities increasingly use terms like misinformation and fake news to discredit information they do not agree with and delegitimize political rivals (Farkas & Schou, 2018). As such, there is considerable variation in support for misinformation interventions depending on partisanship. General sentiments towards inoculation interventions have not been measured but sentiments towards other interventions have been. Saltz et al. (2021) found that support for interventions such as social media labeling and downranking differs considerably by political party, trust in institutions, and frequency of social media usage. The politics surrounding misinformation have led to conservatives being less supportive of misinformation interventions and particularly skeptical about fact-checking and fact-checkers (Shin & Thorson, 2017; Rich et al., 2020). Yet, even though widespread inoculation will require overcoming partisan feelings about misinformation interventions, very little research has been done on how alignment of the "inoculator" could influence engagement with interventions. The second study I

conducted investigates how partisan sources and various levels of trustworthy sources effect inoculation uptake.

Methodology

Throughout both main surveys and the pilot survey, I referred to the inoculation intervention as a "series of misinformation training videos" as I found this to be the simplest and most accessible way of describing the short technique-based misinformation inoculation videos developed by Jon Roozenbeek and his team (2022). I avoided using the term inoculation in order to avoid complicating the perceptions of the participants with the possible association with vaccines. I used these videos as the theoretical inoculation intervention because they have proven effectiveness and offer the shortest time (2-3 minutes per video) to achieve inoculation which makes them the most convenient form of inoculation currently available.

Participants in both surveys were recruited from the registered pool on Prolific, because Prolific has been found to have a subject pool that is higher quality than other similar methods such as Amazon's mTurk (Douglas et al., 2023). Compensation was provided to participants upon completion of the surveys through the Prolific platform. Both study's desired sample sizes, included variables, hypotheses, survey designs, and planned analyses were preregistered on Open Science Framework (Study 1 https://osf.io/byw7n/, Study 2 https://osf.io/df3r4) prior to any data being collected.

Study 1: A Comparative Self-Evaluation of Misinformation Perceptions

Design

The first aspect of inoculation hesitancy I explored is lack of need and whether individuals perceived themselves and their peers as vulnerable to misinformation and in need of inoculation

interventions. I designed a survey using Qualtrics that compared perceptions of participants' own experiences/capabilities to that of the average person regarding misinformation and their perceived need and willingness to partake in training to help spot misinformation. I used a comparative self-evaluation, and the questions were formatted in the indirect method, which has participants evaluate themselves and the average person on separate scales. By having participants rate themselves on separate scales instead of the direct method (which has participants evaluate themselves in comparison to the average person on one scale), or the forced choice method (where participants choose whether they rank above or below average) I was able avoid some of the egocentrism and focalism that can typically skew tests of the better-than-average effect (Zell et al., 2020).

The survey asked participants to evaluate five main measures, both by looking at their own perceptions, and what they assumed to be the "average" person's perception (full survey in appendix E). All questions were measured on a 7-point Likert scale. The first three measures looked at perceptions of the problem of misinformation. These measures observed (1) the perceived *frequency* of exposure to misinformation, (2) the perceived *concern* about misinformation, and (3) the perceived *skill* at detecting misinformation (and 5 specific misinformation techniques identified by Roozenbeek et al. (2022)). The last two measures looked at perceptions of inoculation interventions. These were, (4) the perceived *benefit* from watching misinformation training videos and (5) the perceived *likelihood of watching* misinformation training videos. For each of these five factors, participants were asked about their perception of themselves and their perception of the "average" person. Lastly, demographic information was collected from the participants. This included questions about their political ideology, gender, age, and education level. In addition to these conventional demographic questions, I also included three questions measuring institutional trust, one about trust in the government, one about trust in educational institutions, and one about trust in the media. These questions were added based

on the observations of Saltz et al. (2021) that trust in American public institutions robustly predicts support for all categories of misinformation interventions.

This survey was exploratory in nature, and as such I only had a soft hypothesis. I broadly expected the participant's perceptions of themselves to be more positive than their perceptions of the average person. The comparison of self-perception and other-perception will be conducted with a series of paired t-tests, and demographic effects will be explored using one-way ANOVAs.

Participants

To collect the data for my study, I utilized the Prolific platform to administer a survey targeting American adults (18+) who were English speakers, with an equal distribution of males and females. The data was collected at the beginning of June 2023. An a priori power analysis was conducted with G* power to obtain .95 power to detect a medium effect size of .25 at the standard .05 alpha error probability. The minimal sample size required for detecting the main effect was approximately 142. 157 participants were recruited through prolific, but 6 were eliminated due to incomplete answers or failing to consent to the research, leaving a total of 151 participants.

Study 2: The Impact of Source on the Willingness to Inoculate

Design and Pilot Study

To test how the source of the inoculation changes the willingness to participate in inoculation interventions I first did a pilot study (N=47) where participants evaluated 17 possible sources on their trustworthiness and effectiveness (full survey in Appendix F). Then I identified a high trust source, a medium trust source, a low trust source, and two partisan sources. All 17 sources were rated on a sliding scale of 1-100. Interestingly, all 17 sources were rated below 65 (out of 100), the highest rated was an “Ivy League University” rated at 62.3. The middle rating was actually “The Democratic Party” at 32.34,

but I used that rating as my partisan (left) source so I chose to use “Meta” (29.53) as the medium trust source since it had the closest score. The lowest rated source was “The Russian Government” at 11.89. I also used “The Republican Party” (23.21) as an opposite partisan source to “The Democratic Party”.

Once I had determined my five sources, I proceeded with the study on willingness to inoculate. The study itself measured how likely people believe they are to voluntarily watch videos that inoculate them against misinformation and how that likelihood is affected by whether the video comes from a high-trust source, a low-trust source, a medium-trust source, or a partisan source. My hypotheses were as follows:

H1: Participants are less likely to voluntarily watch inoculation videos if the source is less trustworthy.

H2: Participants are less likely to voluntarily watch inoculation videos if the source represents an opposite political affiliation compared to the participant.

The first hypothesis refers to the three trust level conditions and the second hypothesis refers to the partisan source conditions.

This survey asked two questions about each of the five different trust scenarios. I asked participants to imagine that a team of researchers has developed a series of training videos. They claim these videos are specifically designed to make viewers more resistant to the techniques used to spread misinformation. In each scenario, participants are asked to imagine the team of researchers is from a different group, Harvard University (high trust), Meta (medium trust), the Russian government (low trust), the Democratic Party (partisan trust left), and the Republican Party (partisan trust right). The order in which these scenarios appeared was randomized for each participant. For each scenario they were asked 1) whether they would be likely to voluntarily watch the videos on a 7-point Likert scale ranging from "Extremely unlikely" to "Extremely likely" and 2) whether they believe that if they were to watch the videos, they would get better at detecting misinformation as a result on a 7-point likert scale

ranging from "Definitely not" to "Definitely yes". The second question operates primarily to clarify the motivation of the answer to the first question. For instance, someone might want to watch a training video from a source out of curiosity even if they don't believe it will benefit them, or they may believe a training video would benefit them but are unlikely to watch it out of laziness. By asking both questions, I hope to be able to obtain more precise data about the effect of the source. I also asked the same series of demographic questions as survey 1, with the addition of a question about how you are planning to vote in the next election (see full survey in appendix G).

The data will be evaluated using independent t-tests comparing each source to the baseline likelihood to watch score established in the first survey. Whether political affiliation effects willingness to take an inoculation from a partisan source will be evaluated using a one-way ANOVA.

Participants

To collect the data for my study, I utilized the Prolific platform to administer a survey targeting American adults (18+) who were English speakers. An a priori power analysis was conducted with G* power to obtain .95 power to detect a medium effect size of .25 at the standard .05 alpha error probability. The minimal sample size required for detecting the main effect was calculated to be approximately 210. During the data collection in late June 2023, four participants were excluded from the original sample size of 214 due to incomplete results or failure to give consent, yielding a total of 210 participants.

Results

Study 1: Better-Than-Average Effect

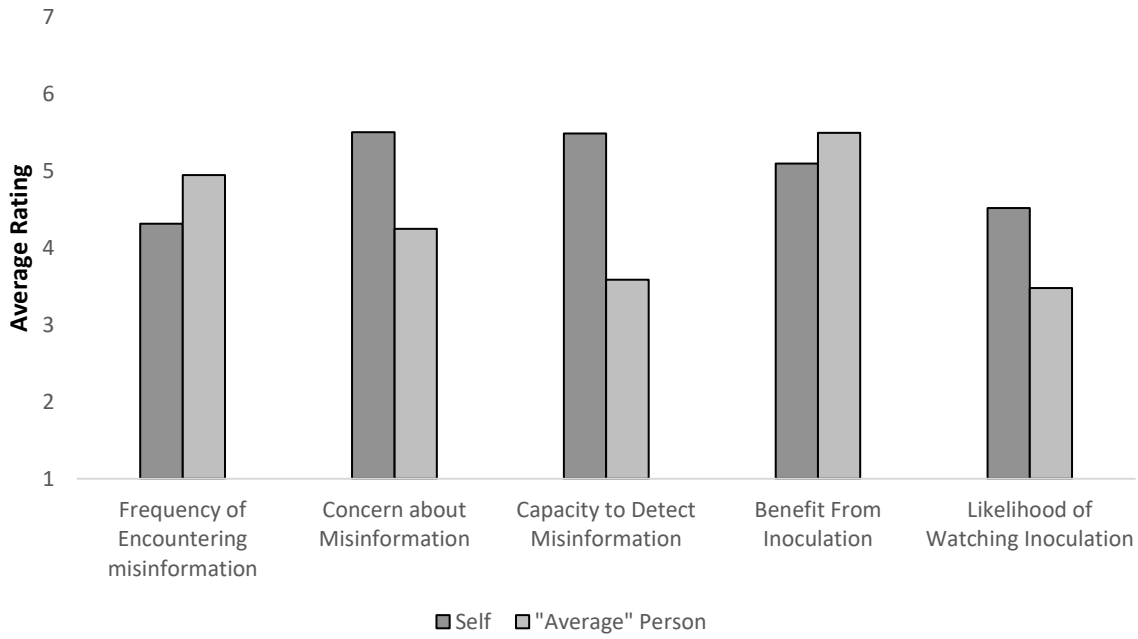
I conducted a series of paired-sample t-tests across five different measures of self-comparison. I found a statistically significant difference in the rating of self vs. the rating of the average person for all five measures. The results are illustrated in figure 1. The first measure tested was how often participants

believed they were exposed to misinformation compared with how often they believed others were exposed to misinformation. Participants perceived their own exposure to misinformation (M = 4.32 SD= 1.63) as significantly lower compared to their perception of others' exposure (M = 4.95 SD= 1.63), t (151) = −6.19, p < 0.001. The effect size, as measured by Cohen's d, was d = 0.38, indicating a small effect. The second measure looked at how concerned participants were about misinformation and found that generally, they rated their own concern (M = 5.51 SD= 1.51) as higher than the perceived concern of the "average" person (M= 4.25, SD=1.44), t(151) = 9.37, p < 0.001. The effect size, as measured by Cohen's d, was d = 0.84, indicating a large effect.

The largest difference in the participant's self-estimation compared to other-estimation was in the capacity to detect misinformation. To determine this score, I averaged the scores of 6 questions about the participant's ability to detect misinformation and 6 questions about the participant's

Figure 1

Comparative self-evaluation of misinformation and inoculation



Note. Each measure was rated on a 7-point Likert scale. N=151.

perception of other's ability to detect misinformation. The first questions asked generally about how they perceived their ability/others misinformation detection abilities, and the following 5 sets of questions outlined the specific misinformation techniques as identified by Roozenbeek et al. (2022). These questions explained the techniques (emotionally manipulative language, incoherent arguments, false dichotomies, scapegoating individuals or groups, and ad hominem attacks) and asked about participants' self-perceived abilities to detect these techniques and how effective they believed others were at detecting the same techniques. Consistent with my soft hypothesis, across all 6 questions, participants rated their own abilities as significantly better (p-value<.001) than the average person. The overall capacity to detect scores show that the participants evaluate their own ability (M= 5.49 SD=0.83) to detect misinformation of any type as significantly better than the average person (M= 3.95 SD= 1.2), $t(151) = 13.33$, $p < .001$. The effect size, as measured by Cohen's d, was d = 1.51, indicating a large effect.

The next measures focused on perceptions of inoculation interventions. The first, tested whether participants felt they would benefit from watching short training videos designed to make them more resistant to misinformation. Participants did generally think they would benefit (M= 5.1, SD=1.53), but they believed others (M = 5.5, SD=1.38) would benefit more, $t(151)=-4.08$, $p<.001$. The effect size, as measured by Cohen's d, was d = 0.28, indicating a small effect. The final measure looked at the willingness of participants to watch short videos to make them more resistant to misinformation and how willing they believed the average person would be to watch those videos. I found that the overall average score fell in the middle of a 7-point Likert scale with a mean of 4.52, indicating between "neither likely nor unlikely" and "slightly likely" to voluntarily watch misinformation training videos. But though it was somewhat low for the self-rating (M=4.52, SD=1.88), participant's perception that others (M=3.48, SD=1.71) might voluntarily watch misinformation training videos was even lower, $t(151)=8.14$, $p<.001$. The effect size, as measured by Cohen's d, was d = 0.58, indicating a medium effect.

Study 1: The Importance of Age

As an exploratory measure I also conducted a series of one-way ANOVAs to test the effect of demographic variables on the data (full results in Appendix A). The most consistent demographic difference was age. Table 1 shows the shows the variations in means by age for the main measures.

The results revealed a significant effect of age on the self-ascribed likelihood of watching inoculation videos, $F(6,144) = 4.39$, $p < .001$. There was a similar variation of age on participants'

Table 1

Summary statistics results for Demographic Factors on Likelihood of Watching

Age	Freq self		Freq other*		Benefit self*		Benefit other*		Watch self***		Watch other***		n
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	
18-24	4.56	1.67	5.00	1.22	4.89	1.76	4.89	1.62	3.89	1.76	3.44	1.67	9
25-34	4.50	1.73	5.50	1.56	5.04	1.48	5.65	1.31	4.33	1.68	3.17	1.50	54
35-44	4.28	1.46	4.81	1.23	4.47	1.63	4.88	1.36	3.59	1.83	2.56	1.44	32
45-54	4.30	1.64	4.74	1.68	5.09	1.44	5.70	1.26	5.04	1.99	4.09	1.59	23
55-64	4.10	1.77	4.10	2.07	5.65	1.35	5.80	1.40	5.15	1.98	4.05	1.88	20
65-74	3.75	1.48	4.50	1.68	6.25	0.97	6.08	1.31	6.17	0.83	4.92	1.56	12
75-84	4.00	NA	4.00	NA	6	NA	6	NA	6	NA	7	NA	1

Note. ‘’***’ indicates that p<0.001 ‘**’ indicates that p<0.01 ‘*’ indicates that p< 0.05. The main measures were rated on a 7-point Likert scale. Freq self and Freq other refer to the frequency of exposure to misinformation, benefit self and benefit other indicate if they believed there would be benefit from watching misinformation training videos, watch self and watch other refer to the likelihood of watching misinformation training videos. Skill at detecting misinformation and concern about misinformation were not included in this table as they had no significant variance by age.

perception of the likelihood of others watching inoculation videos, $F(6,144) = 5.7$, $p < .001$. Post hoc comparisons using the Tukey HSD test indicated that the mean self-ascribed likelihood to watch score

for those in the 35-44 age group (M = 3.59, SD = 1.83) was significantly lower than the score for the 45-54 group (M=5.04, SD=1.99), the 55-64 group (M=5.15, SD=1.98) and the 65-74 group (M = 6.17, SD = 0.83). The 65-74 age group score (M = 6.17, SD = 0.83) was also significantly higher than the score for those in the 25-34 age group (M= 4.33, SD=1.68). The remaining scores showed no significant differences from each other. The pattern was the same for the perceived likelihood of others watching inoculation videos. Once again, those in the 35-44 age group rated others as significantly less likely to watch inoculation videos (M = 2.56, SD = 1.44) as compared to those in the 45-54 group (M= 4.09, SD=1.59), the 55-64 group (M= 4.05, SD=1.88) and the 65-74 group (M = 4.91, SD = 1.56). And once again, the 65-74 age group score (M = 4.91, SD = 1.56) was also significantly higher than the score for those in the 25-34 age group (M= 3.1, SD=1.5). In general, these results suggest that age does influence the likelihood of engaging with inoculation interventions and that generally older participants (ages 45-74) had more faith that both themselves and others were more likely to watch inoculation videos, whereas younger participants (ages 25-44) had less faith in the likelihood that they or their peers would watch inoculation videos. Neither the youngest nor oldest age groups surveyed had any significant differences from other groups, though this is possibly because of their very small sample sizes (18-24 n=9, 75-84 n=1). Importantly, the better-than-average effect was still present across all ages, so regardless of age, participants believed they were more likely to watch a misinformation training video than the average person would be.

There were also significant effects of age on the perceived frequency of others misinformation exposure, $F(6,144) = 2.36$, $p=.0334$. Post hoc comparisons using the Tukey HSD test indicated that the mean frequency of other exposure score for those in the 55-64 age group (M = 4.1, SD = 2.07) was significantly lower than the score for the 25-34 group (M=5.5, SD=1.56). Perceptions of self-ascribed benefit of inoculation videos also varied significantly by age, $F(6,144) = 2.76$, $p = .0142$. Post hoc comparisons using the Tukey HSD test indicated that the mean self-benefit score for those in the 65-74

age group (M = 6.25, SD = 0.97) was significantly higher than the score for the 35-44 group (M=4.47, SD=1.63). Indicating that the older age group thought they would benefit more from inoculation videos than those in the younger age group. Finally, perceptions of how much others would benefit from inoculation videos varied significantly by age, F(6,144) = 2.22, p = .0441. Post hoc comparisons using the Tukey HSD test found that there was no individual pairwise comparison that were significant, likely due to the weakly significant global effect.

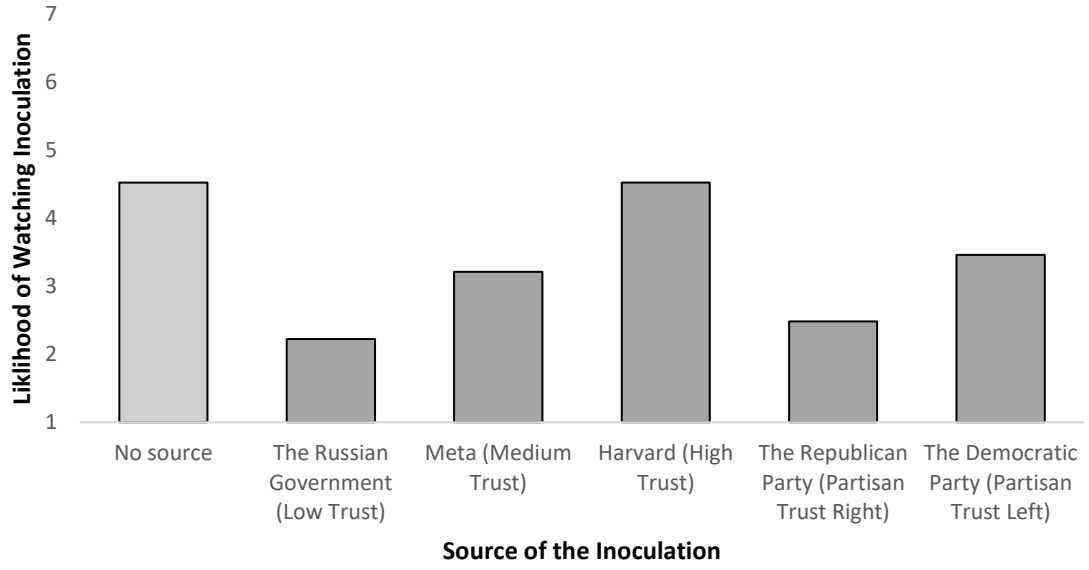
Study 2: Source Trust and Inoculation

The original hypothesis was that less trustworthy sources would result in participants being less willing to watch misinformation training videos. I ran a series of independent t-tests using the self-evaluated 'likelihood of watching' data from the first study (N=151) as a baseline since it did not include a source and compared it to the willingness to watch data from each of the five sources. Participants were significantly less likely to say they would voluntarily watch both partisan sources, the low trust, and the medium trust sources than the no-source condition, and the high trust source was rated about the same as the no-source condition (See Figure 2).

The participant's rated their likelihood of watching inoculation training videos of the low trust source (M=2.22, SD= 1.8) significantly lower than the no source condition (M= 4.52, SD=1.88) meaning that participants are significantly less likely to say they would watch inoculation training videos from the Russian government, $t(359) = 11.77$, $p < .001$. The effect size, as measured by Cohen's d, was d = 1.26, indicating a large effect. Meta, the medium trust source (M= 3.21, SD= 1.93) was also rated significantly lower than the no source condition, $t(359)=6.45$, $p < .001$. The effect size, as measured by Cohen's d, was d = 0.68, indicating a medium effect. The partisan left source (M=3.46, SD=1.89) and the partisan

Figure 2

Source Trustworthiness by Likelihood of Watching Misinformation Inoculation Videos



Note. The results of the no-source inoculation are from study 1 (N=151) whereas the rest of the results are from study 2 (N=210). All likelihood ratings were built on a 7-point Likert scale ranging from "Extremely Unlikely" to "Extremely Likely".

right source (M=2.48, SD=1.74) were both rated significantly lower than the no source condition, $t(359)=5.29$, $p < .001$, $t(359)=10.64$, $p < .001$. But the effect size, as measured by Cohen's d, was d = 0.56 for the partisan left source, indicating a medium effect, but it was d=1.14 for the partisan right source, indicating a large effect size. The only condition that was not significantly lower than the no source condition was the high trust condition (M=4.52, SD=1.96) which was not significantly different from the no source condition at all, $t(359)=-0.003$, $p = .9976$.

I also ran a series of t-tests to discover whether participants said that they were likely benefit from the inoculation even if they weren't as likely to say they were willing to watch the inoculation. Apart from the partisan sources, the participants rated their likelihood of benefiting from watching inoculation videos as significantly higher than their likelihood of voluntarily watching those videos. Even

for the low trust source, participants rated their likelihood of watching inoculation videos from the Russian Government (M=2.22, SD=1.8) as significantly lower than their likelihood of benefiting from the same videos (M=2.45, SD=1.6) at the p<.05 level, t(209)=-2.4, p=.01712. The difference was even more pronounced for the medium trust source, where the likelihood of watching (M=3.21, SD=1.93) was lower than the likelihood of benefiting (M=3.59, SD= 1.21), t(209)=-4.23, p<.001. The same pattern continued with the high trust source, with the likelihood of watching inoculations from Harvard (M=4.52, SD=1.96) rated lower than the likelihood of benefiting from those videos (M=4.82, SD= 1.55), t(209)=-3.36, p<.001. The benefit question was specifically added to evaluate whether lack of interest or laziness may factor into the likelihood of watching inoculation videos. This pattern of consistently seeing potential benefit from inoculation videos but still rating your likelihood of watching those videos as lower, implies that a certain level of apathy may affect the outcome of these results as well as the trustworthiness of the source. The partisan sources did not fit the same pattern.

Study 2: Inoculation Across Party Lines

To test the second hypothesis, two one-way ANOVA tests were conducted to compare the effect of political party preference on willingness to watch partisan-sourced inoculation videos. The second hypothesis was confirmed as there was a significant effect of political party preference on willingness to watch across party lines for both parties (see Table 3).

There was a significant effect of voting preferences on willingness to watch inoculation videos from the Democratic Party, F(3, 206) = 25.24, p<.001. Post hoc comparisons using the Tukey HSD test indicated that the mean likelihood of watching score for those intending to vote for the Democratic Party (M = 4.15, SD = 1.71) was significantly higher than the score for those intending to vote for the Republican Party (M=1.9, SD=1.42) and higher than those not intending to vote in the next election (M = 2.45, SD = 1.47). The willingness to watch score for those intending to vote Republican was significantly

Table 3

Willingness to Watch Partisan Sources by Voting Preference

Voting Preference	Likelihood of watching Democratic Party Inoculation		Likelihood of watching Republican Party Inoculation		
	M	SD	M	SD	N
Democratic Party	4.15	1.71	2.14	1.65	125
Republican Party	1.9	1.42	3.04	1.72	48
Third Party	3.94	1.78	3.71	2.08	17
Not Voting	2.45	1.47	2.25	1.25	19

lower than those intending to vote third party (M=3.94, SD=1.78). However, the Democratic voters did not differ significantly in willingness to watch inoculation videos from the third-party voters, nor did the Republican voters differ significantly from the non-voters. Taken together, these results suggest that Republican voters (and non-voters) are significantly less likely to voluntarily take a misinformation inoculation from a left-leaning source such as the Democratic Party.

On the opposite side of the political spectrum, the pattern held true in reverse. There was also a significant effect on the likelihood of watching inoculation videos from the Republican Party at the $p<.001$ level for the four conditions [$F(3, 206) = 25.24$, $p<.001$]. Post hoc comparisons using the Tukey HSD test indicated that the mean likelihood to watch score for those intending to vote for the Democratic Party (M = 2.14, SD = 1.65) was significantly lower than the score for those intending to vote for the Republican party (M=3.04, SD=1.73) and lower than third party voters (M = 3.71, SD = 2.08). However, the Democratic voters did not differ significantly in willingness to watch inoculation videos from the non-voters, nor did the Republican voters differ significantly from the third-party voters and only slightly differed from the non-voters (p-adj=.043943). In general, these results suggest that voters are unlikely to take inoculation from across party lines and non-voters are unlikely to take inoculation from either major political party.

Study 1 & 2: The Importance of Institutional Trust

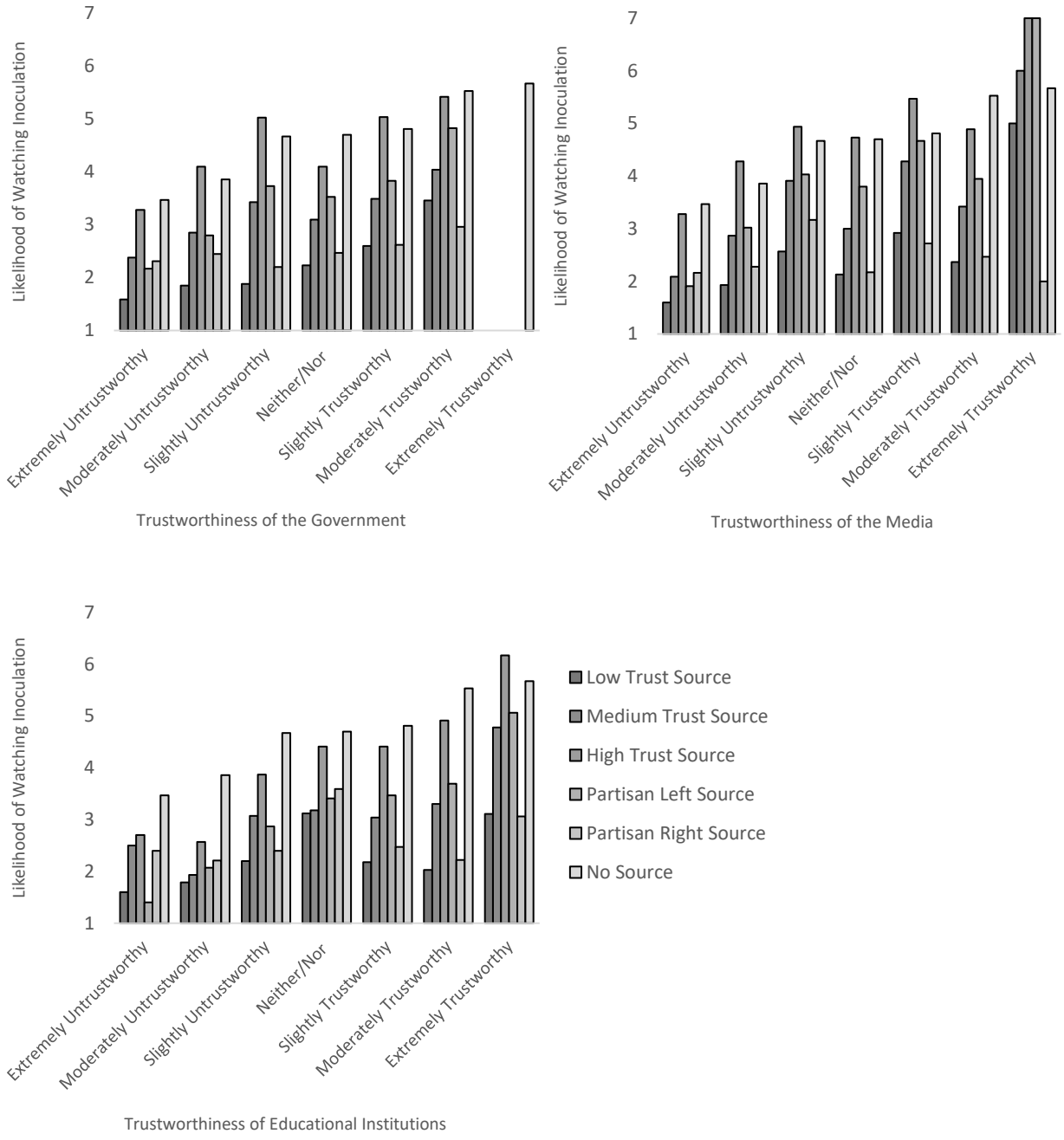
A pattern emerged in the ANOVAs measuring the variance in the likelihood of watching across different types of institutional trust int the first study (see Appendix A). I found that there was significant variance explained by institutional trust in the likelihood of watching scores. There was a statistically significant difference in the self-ascribed likelihood of watching inoculation videos among the levels of government trust, $F(6,144) = 2.99$, $p = .00873$. Post hoc comparisons using the Tukey HSD test indicated those who found the government moderately trustworthy in the first study ($M = 5.53$, $SD = 1.37$) were significantly more likely to say they would watch inoculation videos than those that find the government extremely untrustworthy ($M=3.57$, $SD=2.12$) and moderately untrustworthy ($M = 3.86$, $SD = 1.9$). This implies that lower government trust is associated with being less willing to watch inoculation videos. The trend was similar for significant variations in media trust, $F(6,203) = 2.94$, $p = .00973$, and educational trust, $F(6,203) = 2.89$, $p = .0109$.

After noticing this pattern, I decided to also run a series of one-way ANOVAs for the five source conditions in the second study. I discovered that there was statistically significant variance for every source condition except for the partisan right source (for all types of institutional trust) and the low trust source (for educational trust only). Looking at the comparative bar chart (figure 3-5), you can see there is trend that the likelihood to watch score is generally higher when the institutional trust level is higher. I will explicitly discuss the results of the ANOVA tests for the government trust levels, but the full the post hoc results and ANOVA tests for media trust and educational trust can be found in appendix C.

There was a statistically significant difference in the likelihood of watching the high trust source inoculation among the levels of government trust, $F(5,204) = 5.78$, $p < .001$. Post hoc comparisons using the Tukey HSD test for the high trust source likelihood to watch scores indicated that those who rated

Figure 3-5

The Effect of Institutional Trust on Likelihood to Watch Inoculation Videos.



Note. The no source condition was derived from study 1 (N=151) while the rest of the conditions were derived from study 2 (N=210). In study 2, zero participants rated the government as extremely trustworthy, hence the gap in the data.

the government as extremely untrustworthy were significantly less likely to watch inoculation videos

from the Democratic Party (M=3.28, SD = 2.09) than those who rated the government as only slightly untrustworthy (M=5.03, SD=1.44), slightly trustworthy, (M = 5.04, SD = 1.76), and moderately trustworthy (M=4.83, SD=1.93). The trend was similar for significant variations in media trust, $F(6,203) = 5.83$, $p < .001$, and educational trust, $F(5,204) = 8.13$, $p < .001$.

There was also statistically significant difference in the likelihood of watching the medium trust source inoculation among the levels of government trust, $F(5,204) = 2.66$, $p=0.0236$. Post hoc comparisons using the Tukey HSD test for the medium trust source likelihood to watch scores indicated that those who rated the government as extremely untrustworthy were significantly less likely to watch inoculation videos from Meta (M=2.38, SD = 1.78) than those who rated the government as moderately trustworthy (M=4.04, SD=2.21). The trend was similar for significant variations in media trust, $F(6,203) = 6.61$, $p < .001$, and educational trust, $F(6,203) = 3.59$, $p = .00211$.

There was even significant variance in the likelihood to watch scores of the low trust source by government trust, $F(5,204) = 4.38$, $p < .001$. Post hoc comparisons using the Tukey HSD test for the low trust source likelihood to watch scores indicated that those who rated the government as moderately trustworthy were significantly more likely to watch inoculation videos from the Russian government (M=3.46, SD = 2.36) than those who rated the government as slightly untrustworthy (M=1.88, SD=1.56), moderately untrustworthy (M=1.85, SD=1.46), and extremely untrustworthy (M=1.59, SD=1.32). The trend was similar for significant variations in media trust, $F(6,203) = 2.72$, $p = .0146$, but there was no significant variance by educational trust levels.

The partisan trust sources were a bit different, the left leaning source had similar variation by all types of institutional trust levels, but the right leaning source had no significant variation at all. There was a statistically significant difference in the likelihood of watching the partisan left trust source inoculation among the levels of government trust, $F(5,204) = 7.78$, $p < .001$. Post hoc comparisons using the Tukey HSD test indicated that for the partisan left source likelihood to watch scores for those who

found the government extremely untrustworthy (M = 2.17, SD = 1.69) were significantly lower than the score for those who rated the government as only slightly untrustworthy (M=3.73, SD=1.43), neither trustworthy nor untrustworthy, (M=3.53, SD=1.72) slightly trustworthy, (M = 3.83, SD = 1.89), and moderately trustworthy (M=4.83, SD=1.93). Those who found the government moderately untrustworthy (M = 2.8, SD = 1.86) also has a significantly lower likelihood of watching those who rated the government moderately trustworthy (M=4.83, SD=1.93). The trend was similar for significant variations in media trust, $F(6,203) = 12.03$, $p < .001$, and educational trust, $F(6,203) = 6.78$, $p < .001$.

Discussion

The present research explored the scalability of inoculation theory and individuals' willingness to receive inoculations against misinformation. The results of these studies together make a case that immunizing the public against misinformation will be an uphill battle. I introduced the concept of inoculation hesitancy as an expansion of the metaphor that inoculation theory is based on to understand the psychological factors that might prevent the uptake of inoculation interventions. These studies uncovered a perceived lack of need for inoculation among individuals and a hesitance to engage with inoculations from sources that they don't find trustworthy, demotivators that may be major obstacles in overcoming inoculation hesitancy.

In my first study, I examined the aspect of inoculation hesitancy related to the lack of need. This study evaluated whether the better-than-average effect could be affecting individuals' perceptions of misinformation. The results demonstrated a clear pattern, participants rated their own capacity to detect misinformation significantly higher than they perceived the average person's capacity, revealing the notion that they may believe themselves to be less vulnerable to the effects of misinformation. This is in line with past studies of the better-than-average effect where people tend to think better of themselves and their abilities (Zell et al., 2020). They also believed they were exposed to misinformation less frequently than the average person. Yet, participants claimed to have a higher level

of concern about misinformation compared to other people, indicating their recognition of misinformation as a pertinent issue. These findings taken together imply that people view others as both the primary spreaders and victims of misinformation.

The first study also looked at the better-than-average effect in the context of potential inoculation interventions. The effect was consistent, with participants assuming the average person would benefit more from watching misinformation training videos than they would, showing that they don't believe improvement is as necessary for themselves as it is for others. Participants expressed only a moderate willingness to voluntarily watch misinformation training videos, possibly because of their confidence in their abilities to detect misinformation, but still participants belief in their own superiority remained consistent as they believed the average person would be even less likely to watch. This suggests that individuals tend to believe that they are less susceptible to misinformation and, therefore, might not perceive a pressing need for inoculation interventions for them personally. This phenomenon is similar to the perceived immunity that prevents people from engaging with preventative health measures (Dunning, 2004; Kumar et al., 2022).

I also explored demographic effects on misinformation and inoculation perceptions and found that age is a significant factor. Generally, younger age groups rated both themselves and others as less likely to watch misinformation training videos than their older counterparts. This has implications for any future campaigns to spread inoculation interventions, because it means that the primary focus should be on younger age groups, though this pattern did not hold true in the second study so further research is needed.

In the second study, I found that the untrustworthiness of the source delivering the inoculation lowered participants' willingness to receive inoculations, and that that participants were less willing to take inoculations across political party lines. Participants were significantly less willing to watch videos from low and medium-trust sources and partisan sources, while the high-trust source yielded results

almost identical to those of the no-source condition. Any future campaigns for inoculation interventions should keep “the inoculator” in mind when trying to reach the largest number of people. High-trust sources are more likely to garner acceptance, suggesting the importance of partnering only with reputable institutions to disseminate misinformation inoculations effectively.

Additionally, my findings underscore the importance of political affiliation in shaping individuals' attitudes toward misinformation inoculations. Participants tended to be more unwilling to engage in inoculations from sources that did not align with their political beliefs. But even among party supporters, the likelihood of watching was lower than the no-source condition, showing that it is best to keep partisan politics and government far away from inoculation interventions.

Across both studies, I found that institutional trust was an important indicator of how likely participants would be to watch inoculation videos. As previously observed by Saltz et al. (2021) institutional trust predicted support for misinformation interventions, in this case inoculation videos. Even the least trustworthy source had more support from people who had higher trust in institutions, underscoring the importance of building up trust in institutions. It also indicates that it may be necessary to target people who have low levels of institutional trust with tailored appeals to engage with interventions.

Limitations and Directions for Future Research

Roozenbeek et al.’s (2022) study that formulated the inoculation videos referred to in the present research already attempted to circumvent the problem of a reluctant public by partnering with Google Jigsaw to run the videos as YouTube ads. This essentially put the videos in front of an audience without them having to actively choose to watch them. Interestingly, though the videos were developed in conjunction with Google Jigsaw (Roozenbeek et al., 2022), the word google is found nowhere in the video. Instead, they state the source as “Truth Labs” (which is a source that doesn’t seem to exist

beyond these videos), in conjunction with University of Cambridge, University of Bristol, and Inoculation Science. Obscuring one of the sources and placing videos in front of people without their input are both possible solutions to the problems stated in this research, but they also bring up ethical concerns. Future research should look at what occurs when someone does take an inoculation from a source they don't necessarily trust, or that they don't recognize, as that could potentially affect the success of the inoculation. There is evidence that persuasion originating from low-trust sources is often rejected (An & Pfau, 2004; Pilditch et al., 2020).

A major limitation of both studies is that they focused on self-reported perceptions and likelihoods. Unfortunately, I could not compare these to real-world actions. It is unclear if people who rated their own ability to detect misinformation highly are actually good at detecting misinformation or if they are being unrealistically optimistic. It may be useful in future research to have a baseline quiz to test participants misinformation recognition skills to get a sense of whether the Dunning-Kruger effect (Dunning et al., 2011) is at play.

I also don't know if these participants were presented with actual inoculation training videos from various sources, if they would be more or less likely to watch them than they reported. Future research on inoculation hesitancy should endeavor to give participants a choice to participate in real inoculation interventions in order to see more accurate levels of uptake.

It is also difficult to determine what other causes may be affecting the likelihood to engage with inoculation interventions. I did not ask participants whether their perceived skill at detecting misinformation was the reason they were claiming that they were not very likely to watch inoculation videos. The fact that participants thought that they had higher detection skills, and that other people would benefit more from the inoculation points to a potential belief in their own immunity, but it does not necessarily follow that their motivation for not wanting to watch the videos is because of that perceived immunity. In the second study, even the most trustworthy source inspired only a lukewarm

likelihood of watching score of 4.52, the equivalent of halfway between “neither likely nor unlikely” and “slightly likely” on the Likert scale, showing a general lack of enthusiasm that goes beyond the source. Future research could explore this question in a more qualitative manner to more deeply investigate why the reluctance to engage with inoculation interventions exists.

The possibility of achieving herd immunity in the future may also be further deterred by the decay of the inoculation effect over time. There is significant research that resistance bestowed by inoculation deteriorates over time, though the amount of time varies (Maertens et al., 2021; Pfau et al., 2006), and as a result “boosters” are needed to maintain psychological resistance (Ivanov et al., 2018). The struggle to persuade the public to receive COVID-19 boosters (Shah & Coiado, 2023) is an indicator that even if someone is willing to get a vaccine, they may not be willing to get a booster. The willingness to repeat the treatment is likely to decrease with time, and future research into inoculation interventions should investigate not only building interest in the intervention, but also in maintaining that interest in boosters down the road.

Conclusion

Misinformation can be deeply harmful to democracy, health literacy, and interpersonal relationships, so finding a viable psychological vaccine is an enormous step, but it is only the first step in a much longer process of inoculating the public. Inoculation hesitancy is a significant obstacle. Lack of need and lack of trust operate as demotivational drivers for people in assessing whether to engage with inoculation interventions. Convincing individuals of the importance of misinformation inoculations and personal relevance is crucial to overcome hesitancy and increase uptake. To gain voluntary participation in inoculation interventions, creating awareness of individual vulnerability, building trust in the inoculator, and decentering partisan politics is essential. Campaigns should be tailored to address the unique concerns of different political affiliations and highlight the potential benefits of inoculation interventions, emphasizing that inoculation is important for everyone. Inoculation theory is worth

scaling, but the road to achieving herd immunity against misinformation will be challenging. These findings are not meant to discourage the use of inoculation theory, but to offer insights into the obstacles ahead.

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Appendices

Appendix A

Demographic effects on main measures from Study 1

Demographic Factor	Comparative Self Evaluation of Misinformation and Inoculation										
Age	Freq self	Freq other*	Concern self	Concern other	Benefit self*	Benefit other*	Watch self***	Watch other***	Skill self	Skill other	n
18-24	4.56	5.00	5.67	4.56	4.89	4.89	3.89	3.44	5.19	4.06	9
25-34	4.50	5.50	5.67	3.94	5.04	5.65	4.33	3.17	5.62	3.70	54
35-44	4.28	4.81	5.16	4.06	4.47	4.88	3.59	2.56	5.32	3.65	32
45-54	4.30	4.74	5.52	4.61	5.09	5.70	5.04	4.09	5.70	4.51	23
55-64	4.10	4.10	5.40	4.20	5.65	5.80	5.15	4.05	5.29	4.08	20
65-74	3.75	4.50	5.83	5.33	6.25	6.08	6.17	4.92	5.69	4.36	12
75-84	4.00	4.00	5.00	5	6	6	6	7	5.00	5.17	1
Gender	Freq self	Freq other	Concern self	Concern other	Benefit self	Benefit other	Watch self	Watch other	Skill self	Skill other	n
Male	4.45	5.04	5.66	4.16	5.10	5.55	4.63	3.49	5.50	3.74	73
Female	4.16	4.80	5.34	4.39	5.11	5.43	4.45	3.47	5.48	4.18	74
Non-Binary	3.67	5.33	6.33	4.00	6.00	6.00	4.67	3.00	5.67	3.72	3
Prefer Not to Say	7.00	6.00	5.00	2.00	2.00	6.00	2.00	4.00	6.83	2.17	1
Government Trust	Freq self	Freq other	Concern self	Concern other	Benefit self	Benefit other	Watch self**	Watch other**	Skill self	Skill other	n
Extremely Untrustworthy	4.95	5.16	5.37	3.95	4.42	4.95	3.47	2.95	5.47	3.39	19
Moderately Untrustworthy	4.29	5.07	5.39	4.25	4.75	5.32	3.86	2.75	5.52	3.77	28
Slightly Untrustworthy	4.41	4.96	5.63	4.15	5.22	5.59	4.67	3.11	5.67	3.83	27
Neither/Nor	4.70	5.25	5.15	4.40	4.90	5.25	4.70	3.70	5.23	3.98	20
Slightly Trustworthy	3.84	4.65	5.38	4.14	5.38	5.89	4.81	3.97	5.42	4.18	37
Moderately Trustworthy	4.41	5.06	6.24	4.76	5.71	5.71	5.53	4.29	5.78	4.41	17
Extremely Trustworthy	2.33	2.67	6.33	5.00	6.00	5.67	5.67	4.67	5.22	4.44	3
Educational Trust	Freq self	Freq other	Concern self	Concern other	Benefit self	Benefit other	Watch self*	Watch other**	Skill self	Skill other**	n
Extremely Untrustworthy	5.13	5.00	5.75	3.50	4.25	5.13	3.00	2.38	5.77	2.54	8
Moderately Untrustworthy	4.50	4.83	4.92	4.92	4.83	5.50	4.33	3.08	5.57	4.39	12

Slightly Untrustworthy	4.61	5.26	5.65	4.17	4.83	5.17	3.91	2.96	5.41	3.74	23
Neither/Nor	3.73	4.67	5.07	3.87	4.53	4.67	3.80	2.87	5.19	3.94	15
Slightly Trustworthy	4.41	5.34	5.41	4.14	5.28	5.52	4.72	3.28	5.33	3.90	29
Moderately Trustworthy	4.20	4.69	5.61	4.27	5.41	5.88	4.94	4.18	5.73	4.25	51
Extremely Trustworthy	4.00	4.77	6.00	4.92	5.38	5.77	5.46	3.85	5.28	3.71	13

Media Trust	Freq self	Freq other	Concern self	Concern other	Benefit self	Benefit other	Watch self**	Watch other*	Skill self	Skill other*	n
Extremely Untrustworthy	4.90	5.21	5.38	4.03	4.62	5.28	3.55	2.66	5.60	3.47	29
Moderately Untrustworthy	4.82	5.14	5.50	4.39	4.75	5.46	4.11	3.21	5.64	4.00	28
Slightly Untrustworthy	4.04	5.37	5.81	4.26	5.41	5.44	5.15	3.41	5.41	3.68	27
Neither/Nor	4.04	4.70	5.09	3.96	4.74	5.09	4.43	3.48	5.38	3.99	23
Slightly Trustworthy	4.12	4.48	5.58	4.42	5.70	5.88	5.15	4.15	5.48	4.33	33
Moderately Trustworthy	3.25	4.50	6.25	4.88	5.50	6.25	5.00	4.38	5.77	4.69	8
Extremely Trustworthy	3.33	4.33	4.67	4.00	5.33	5.67	4.67	4.67	4.44	3.89	3

Level of Education	Freq self	Freq other	Concern self	Concern other	Benefit self*	Benefit other	Watch self	Watch other*	Skill self	Skill other	n
High School	4.54	5.08	5.23	4.08	4.15	5.08	3.92	2.85	5.69	3.49	13
Some College	4.40	5.03	5.63	4.30	5.17	5.53	4.67	3.87	5.63	4.39	30
Associates Degree	3.79	4.79	5.64	3.79	5.71	5.86	4.29	3.43	5.32	3.90	14
Bachelors Degree	4.53	4.98	5.50	4.24	4.90	5.31	4.21	3.07	5.39	3.74	58
Post-Graduate Degree	4.00	4.78	5.47	4.50	5.47	5.81	5.22	4.06	5.57	4.08	36

Political Ideology	Freq self*	Freq other	Concern self	Concern other	Benefit self	Benefit other	Watch self	Watch other*	Skill self	Skill other	n
Extremely Liberal	4.65	5.48	6.13	3.91	5.13	5.30	4.26	2.48	5.80	3.55	23
Liberal	3.70	4.53	5.37	4.09	5.37	6.05	4.81	3.84	5.44	3.98	43
Slightly liberal	4.91	5.43	5.70	4.26	5.35	5.57	5.00	3.52	5.57	4.00	23
Moderate	4.26	4.91	5.26	4.51	4.69	5.14	4.23	3.74	5.35	4.12	35
Slightly Conservative	4.13	4.73	5.40	4.53	5.27	5.33	4.40	3.53	5.47	4.07	15
Conservative	5.00	4.40	5.20	4.60	5.00	5.10	4.50	3.60	5.27	4.23	10
Extremely Conservative	5.50	6.00	6.00	3.50	2.50	5.00	2.00	1.00	6.67	1.83	2
Overall Totals	4.31	4.93	5.51	4.26	5.10	5.50	4.52	3.48	5.50	3.95	151

Note. Shading indicates significant ANOVA tests. ‘‘***’ indicates that p<0.001 ‘**’ indicates that p<0.01 ‘*’ indicates that p< 0.05. The main measures were rated on a 7-point Likert scale. Freq self and Freq other refer to the frequency of exposure to misinformation, Concern self and concern other refer to concern about misinformation, benefit self and benefit other refer if they believed there would be benefit from watching misinformation training videos, watch self and watch other refer to the likelihood of watching misinformation training videos, and skill self and skill other are perceived ability to detect misinformation (and detect 5 specific misinformation techniques) amalgamated into one score.

Appendix B

Demographic effects on main measures from Study 2

Demographic Factor	Likelihood of Watching Each Source Type					
Voting Preference	Low Trust	Medium Trust	High Trust***	Partisan Left***	Partisan Right***	N
Democrat	2.23	3.33	4.93	4.15	2.14	125
Republican	2.04	2.75	3.60	1.90	3.04	48
Third Party	2.88	3.82	4.71	3.94	3.71	17
Not Voting	2.05	3.05	4.05	2.45	2.25	20
Education	Low Trust	Medium Trust**	High Trust**	Partisan Left	Partisan Right	N
High School	2.60	3.40	4.28	3.08	2.96	25
Some college	1.97	2.50	4.05	3.11	2.00	38
Associates	2.31	3.31	5.07	3.86	2.45	29
Bachelors	2.05	3.07	4.25	3.39	2.41	83
Post Graduate	2.57	4.09	5.40	3.94	2.86	35
Gender	Low Trust	Medium Trust	High Trust	Partisan Left	Partisan Right	N
Female	2.17	2.99	4.35	3.31	2.46	108
Male	2.30	3.48	4.69	3.60	2.53	100
Other	1.50	1.50	5.50	4.00	1.00	2
Age	Low Trust**	Medium Trust	High Trust	Partisan Left	Partisan Right*	N
18-24	2.72	2.64	4.16	3.00	2.20	25
25-34	2.00	3.24	4.85	3.46	2.18	74
35-44	1.74	2.84	4.05	3.49	2.35	43
45-54	2.31	3.74	4.69	3.63	2.91	35
55-64	2.36	3.00	4.09	3.05	2.64	22
65-74	4.20	4.50	5.40	5.00	4.00	10
75-84	1.00	4.00	5.00	1.00	4.00	1
Government Trust	Low Trust***	Medium Trust*	High Trust***	Partisan Left***	Partisan Right	N
Extremely Untrustworthy	1.59	2.38	3.28	2.17	2.31	29
Moderately Untrustworthy	1.85	2.85	4.10	2.80	2.45	40
Slightly Untrustworthy	1.88	3.43	5.03	3.73	2.20	40
Neither/Nor	2.23	3.10	4.10	3.53	2.47	30
Slightly Trustworthy	2.60	3.49	5.04	3.83	2.62	47
Moderately Trustworthy	3.46	4.04	5.42	4.83	2.96	24

Extremely Trustworthy	NA	NA	NA	NA	NA	0
Media Trust	Low Trust*	Medium Trust***	High Trust***	Partisan Left***	Partisan Right	N
Extremely Untrustworthy	1.60	2.09	3.28	1.91	2.16	43
Moderately Untrustworthy	1.93	2.87	4.28	3.02	2.28	46
Slightly Untrustworthy	2.57	3.91	4.94	4.03	3.17	35
Neither/Nor	2.13	3.00	4.73	3.80	2.17	30
Slightly Trustworthy	2.92	4.28	5.47	4.67	2.72	36
Moderately Trustworthy	2.37	3.42	4.89	3.95	2.47	19
Extremely Trustworthy	5.00	6.00	7.00	7.00	2.00	1
Educational Trust	Low Trust	Medium Trust**	High Trust***	Partisan Left***	Partisan Right	N
Extremely Untrustworthy	1.60	2.50	2.70	1.40	2.40	10
Moderately Untrustworthy	1.79	1.93	2.57	2.07	2.21	14
Slightly Untrustworthy	2.20	3.07	3.87	2.87	2.40	15
Neither/Nor	3.12	3.18	4.41	3.41	3.59	17
Slightly Trustworthy	2.18	3.04	4.41	3.47	2.47	49
Moderately Trustworthy	2.03	3.30	4.91	3.69	2.22	87
Extremely Trustworthy	3.11	4.78	6.17	5.06	3.06	18
Political Ideology	Low Trust	Medium Trust	High Trust*	Partisan Left***	Partisan Right*	N
Very Liberal	1.97	3.25	5.00	4.56	2.00	36
Liberal	2.39	3.43	4.96	4.20	2.33	49
Slightly liberal	2.80	3.55	4.90	3.95	2.25	20
Moderate	2.07	3.13	4.40	2.95	2.43	60
Slightly Conservative	1.64	3.27	4.00	2.64	2.82	11
Conservative	2.19	3.00	3.67	2.15	3.07	27
Very Conservative	3.14	1.86	3.14	1.86	4.29	7
Overall Total	2.22	3.21	4.52	3.46	2.48	210

Note. Shading indicates significant ANOVA tests. ‘’***’ indicates that p<0.001 ‘**’ indicates that p<0.01 ‘*’ indicates that p< 0.05. The low trust source is the Russian government, the medium trust source is Meta (Instagram, Facebook, WhatsApp), and the high trust source is Harvard University. The partisan sources are the Democratic and Republican political parties of the United States. These sources were predetermined by a pilot study (N=47) that rated a series of possible sources.

Appendix C

Institutional Trust on The Likelihood of Watching Inoculation Videos

Government Trust	No source**			Low Trust Source***		Medium Trust Source*		High Trust Source***		Partisan Left Source***		Partisan Right Source		
	M	SD	n	M	SD	M	SD	M	SD	M	SD	M	SD	n
Extremely Untrustworthy	3.47	2.12	19	1.59	1.32	2.38	1.78	3.28	2.09	2.17	1.69	2.31	1.69	29
Moderately Untrustworthy	3.86	1.90	28	1.85	1.46	2.85	1.99	4.10	2.09	2.80	1.86	2.45	1.63	40
Slightly Untrustworthy	4.67	1.59	27	1.88	1.56	3.43	1.68	5.03	1.44	3.73	1.43	2.20	1.30	40
Neither/Nor	4.70	1.72	20	2.23	1.70	3.10	1.63	4.10	1.95	3.53	1.72	2.47	1.66	30
Slightly Trustworthy	4.81	1.96	37	2.60	1.93	3.49	2.02	5.04	1.76	3.83	1.89	2.62	2.02	47
Moderately Trustworthy	5.53	1.37	17	3.46	2.36	4.04	2.22	5.42	1.84	4.83	1.93	2.96	2.14	24
Extremely Trustworthy	5.67	1.15	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
Tukey HSD Results	Mod trustworthy > Extremely untrustworthy, Mod untrustworthy			mod trustworthy> extremely untrustworthy, mod untrustworthy, slightly untrustworthy		extremely untrustworthy < mod trustworthy		extremely untrustworthy<slightly trustworthy, mod trustworthy, slightly untrustworthy		extremely untrustworthy<slightly untrustworthy, neither/nor, slightly trustworthy, mod trustworthy. Mod trustworthy> mod untrustworthy		NA		

Media Trust	No source**			Low Trust Source*		Medium Trust Source***		High Trust Source***		Partisan Left Source***		Partisan Right Source		
	M	SD	n	M	SD	M	SD	M	SD	M	SD	M	SD	n
Extremely Untrustworthy	3.55	2.01	29	1.60	1.33	2.09	1.46	3.28	2.09	1.91	1.44	2.16	1.43	43
Moderately Untrustworthy	4.11	1.75	28	1.93	1.42	2.87	1.83	4.28	1.85	3.02	1.78	2.28	1.67	46
Slightly Untrustworthy	5.15	1.46	27	2.57	2.08	3.91	2.02	4.94	1.91	4.03	1.62	3.17	1.77	35
Neither/Nor	4.43	1.75	23	2.13	1.63	3.00	1.62	4.73	1.74	3.80	1.42	2.17	1.64	30
Slightly Trustworthy	5.15	1.79	33	2.92	2.12	4.28	1.80	5.47	1.48	4.67	1.77	2.72	1.94	36
Moderately Trustworthy	5.00	2.07	8	2.37	2.09	3.42	2.14	4.89	1.82	3.95	1.90	2.47	2.06	19
Extremely Trustworthy	4.67	3.21	3	5.00	NA	6.00	NA	7.00	NA	7.00	NA	2.00	NA	1
Tukey HSD Results	extremely untrustworthy < Slightly untrustworthy, Slightly trustworthy			extremely untrustworthy < slightly trustworthy		extremely untrustworthy < slightly untrustworthy, slightly trustworthy. Mod untrustworthy<		extremely untrustworthy < slightly untrustworthy, slightly trustworthy, mod trustworthy		extremely untrustworthy<mod untrustworthy, slightly untrustworthy, neither/nor, slightly		NA		

						slightly trustworthy				trustworthy, mod trustworthy, extremely trustworthy. Mod untrustworthy< slightly trustworthy				
Educational	No source*			Low Trust Source		Medium Trust Source**		High Trust Source***		Partisan Left Source***		Partisan Right Source		
	M	SD	n	M	SD	M	SD	M	SD	M	SD	M	SD	n
Extremely Untrustworthy	3.00	1.93	8	1.60	1.07	2.50	1.96	2.70	2.00	1.40	1.26	2.40	1.78	10
Moderately Untrustworthy	4.33	2.31	12	1.79	1.42	1.93	1.21	2.57	1.87	2.07	1.27	2.21	1.58	14
Slightly Untrustworthy	3.91	1.98	23	2.20	1.74	3.07	1.87	3.87	1.88	2.87	1.73	2.40	1.50	15
Neither/Nor	3.80	1.82	15	3.12	2.26	3.18	1.88	4.41	1.97	3.41	1.94	3.59	1.97	17
Slightly Trustworthy	4.72	1.56	29	2.18	1.69	3.04	1.80	4.41	1.84	3.47	1.91	2.47	1.54	49
Moderately Trustworthy	4.94	1.69	51	2.03	1.56	3.30	1.92	4.91	1.72	3.69	1.73	2.22	1.60	87
Extremely Trustworthy	5.46	1.94	13	3.11	2.76	4.78	2.07	6.17	1.47	5.06	1.80	3.06	2.53	18
Tukey HSD results	Extremely untrustworthy < extremely trustworthy			NA		extremely untrustworthy < extremely trustworthy. extremely trustworthy > Mod untrustworthy, slightly trustworthy, moderately trustworthy.		extremely untrustworthy< mod trustworthy, extremely trustworthy. Mod untrustworthy< slightly trustworthy, mod trustworthy, extremely trustworthy. extremely trustworthy> slightly untrustworthy, slightly trustworthy, moderately trustworthy.		extremely untrustworthy < slightly trustworthy, mod trustworthy, extremely trustworthy. Mod untrustworthy< Mod trustworthy, extremely trustworthy. extremely trustworthy> slightly untrustworthy, slightly trustworthy, moderately trustworthy.		NA		

Note. Shading indicates significant ANOVA tests. ‘’***’ indicates that p<0.001 ‘**’ indicates that p<0.01 ‘*’ indicates that p< 0.05. The low trust source is the Russian government, the medium trust source is Meta (Instagram, Facebook, WhatsApp), and the high trust source is Harvard University. The partisan sources are the Democratic and Republican political parties of the United States. These sources were predetermined by a pilot study (N=47) that rated a series of possible sources.

Appendix D

Pilot Survey Results

Source	Trust		Effectiveness	
	M	SD	M	SD
An Ivy League University (Harvard, Yale, Princeton)	62.30	29.73	63.36	27.12
A group of educators	59.47	30.93	55.26	29.38
A Non-Governmental Organization (NGO)	50.11	25.04	49.11	22.96
Google	45.83	29.39	50.23	26.38
Your local news station	44.09	27.38	44.00	25.48
The United Kingdom Government	44.00	25.98	47.55	25.05
The United States Government	43.91	28.03	50.83	23.84
A think tank	43.36	25.06	48.04	25.84
The Democratic Party (US)	32.34	27.16	45.85	28.46
Meta (Facebook, Instagram, Whatsapp)	29.53	24.85	43.57	27.09
A broadcast news company (Fox, CNN, MSNBC)	29.49	23.46	45.62	27.57
Twitter	27.98	28.16	41.98	27.24
A group of celebrities	25.89	23.12	37.53	27.63
The Republican Party (US)	23.21	22.98	39.11	29.20
TikTok	19.21	21.63	41.51	30.23
The Chinese Government	12.85	18.13	30.85	29.02
The Russian Government	11.89	18.16	28.60	28.31

Note. All results were rated on a sliding scale of 1-100. N=47.

Appendix E

Survey 1: Comparative Self-Evaluation Survey

Thank you for considering participating in this study. This information sheet outlines the purpose of the study and provides a description of your involvement and rights as a participant if you agree to take part.

1. What is the research about? This research is about building resistance to misinformation online.
2. Do I have to take part? It is up to you to decide whether or not to take part. You do not have to take part if you do not want to. If you do decide to take part, we will ask you to give your consent here.
3. What will my involvement be? You will answer a series of questions that relate to your own resistance to misinformation, your perception of others' resistance, and your attitude toward interventions.
4. How do I withdraw from the study? You can withdraw from the study at any point until June 30, 2023, without having to give a reason. If any questions during the study make you feel uncomfortable, you do not have to answer them. Withdrawing from the study will have no effect on you. If you withdraw from the study, we will not retain the information you have given thus far, unless you are happy for us to do so.
5. What will my information be used for? The collected information will be used for this research project and any resulting academic papers.
6. Will my taking part and my data be kept confidential? Will it be anonymized? The records from this study will be kept as confidential as possible. Only the researcher and her supervisor will have access to the files. Your data will be anonymized – no personal identifying information will be collected. Limits to confidentiality: confidentiality will be maintained as far as it is possible, unless you tell us something which implies that you or someone you mention might be in significant danger of harm and unable to act for themselves; in this case, we may have to inform the relevant agencies of this, but we would discuss this with you first.
7. Who has reviewed this study? This study has undergone ethics review in accordance with the LSE Research Ethics Policy and Procedure.
8. Data Protection Privacy Notice The LSE Research Privacy Policy can be found at: https://info.lse.ac.uk/staff/divisions/Secretarys-Division/Assets/Documents/Information-RecordsManagement/Privacy-Notice-for-Research-v1.2.pdf?from_serp=1

The legal basis used to process your personal data will be legitimate interests. The legal basis used to process special category personal data (e.g. data that reveals racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership, health, sex life or sexual orientation, genetic or biometric data) will be for scientific and historical research or statistical purposes. To request a copy of the data held about you please contact: glpd.info.rights@lse.ac.uk

What if I have a question or complaint? If you have any questions regarding this study please contact the researcher, Alexandra Johnson at a.johnson11@lse.ac.uk If you have any concerns or complaints regarding the conduct of this research, please contact the LSE Research Governance Manager via research.ethics@lse.ac.uk.

○ I consent to take part in this study (1)

○ I do not consent (2)

Skip To: End of Survey If Thank you for considering participating in this study. This information sheet outlines the purpos... = I do not consent

Setting the scene: Recognizing the problem

In the following, we will ask you some questions concerning your experience and ability to detect misinformation as well as how you think the average person experiences and can detect misinformation.

For the purpose of this survey, we take 'misinformation' to be any information that is untrue or misleading. The sender of the misinformation may spread it deliberately (knowing that it is false) or unwittingly (not knowing that it is false). That is, no matter the intention, if it is false, it is considered misinformation.

Recognizing the problem

How often do you encounter information that you later find out is untrue or misleading?

○ Never (1)

○ Once a month (2)

○ Once every couple of weeks (3)

○ Once a week (4)

○ 2-3 times a week (5)

○ 4-6 times a week (6)

○ Daily (7)

How often do you think other people encounter information that they later find out is untrue or misleading?

○ Never (1)

○ Once a month (2)

○ Once every couple of weeks (3)

- ○ Once a week (4)
- ○ 2-3 times a week (5)
- ○ 4-6 times a week (6)
- ○ Daily (7)

How concerned are you about misinformation?

- ○ Extremely unconcerned (1)
- ○ Moderately unconcerned (2)
- ○ Slightly unconcerned (3)
- ○ Neither unconcerned nor concerned (4)
- ○ Slightly concerned (5)
- ○ Moderately concerned (6)
- ○ Extremely concerned (7)

How concerned do you think the average person is about misinformation?

- ○ Extremely unconcerned (1)
- ○ Moderately unconcerned (2)
- ○ Slightly unconcerned (3)
- ○ Neither unconcerned nor concerned (4)
- ○ Slightly concerned (5)
- ○ Moderately concerned (6)
- ○ Extremely concerned (7)

How good do you think you are at detecting misinformation?

○ Extremely bad (1)

○ Moderately bad (2)

○ Slightly bad (3)

○ Neither good nor bad (4)

○ Slightly good (5)

○ Moderately good (6)

○ Extremely good (7)

How good do you think the average person is at detecting misinformation?

○ Extremely bad (1)

○ Moderately bad (2)

○ Slightly bad (3)

○ Neither good nor bad (4)

○ Slightly good (5)

○ Moderately good (6)

○ Extremely good (7)

Identifying Techniques

Cambridge researchers have identified 5 persuasion techniques that are associated with misinformation.

1. Emotional Language
2. Incoherence
3. False Dichotomy
4. Scapegoating
5. Ad Hominem Attacks

We want you to consider how good you are and how good the average person is at detecting these techniques when they encounter them online.

Identifying Techniques

Emotional language is a powerful tool of persuasion. Research shows that using emotional words, especially ones that evoke negative emotions such as fear or outrage, increases the viral potential of social media content.

How good are you at recognizing when emotional language is being used to manipulate you?

- ○ Extremely bad (1)
- ○ Moderately bad (2)
- ○ Slightly bad (3)
- ○ Neither good nor bad (4)
- ○ Slightly good (5)
- ○ Moderately good (6)
- ○ Extremely good (7)

How good do you think the average person is at recognizing when emotional language is being used to manipulate them?

- ○ Extremely bad (1)
- ○ Moderately bad (2)
- ○ Slightly bad (3)
- ○ Neither good nor bad (4)
- ○ Slightly good (5)
- ○ Moderately good (6)

○ Extremely good (7)

Sometimes misinformers put forward multiple arguments in service of a larger point, but these arguments are contradictory or rule each other out, this technique is called **incoherence**. It's a technique most commonly seen in longer discussions about a particular (usually very polarizing) topic.

How good are you at recognizing when incoherence is being used to manipulate you?

○ Extremely bad (1)

○ Moderately bad (2)

○ Slightly bad (3)

○ Neither good nor bad (4)

○ Slightly good (5)

○ Moderately good (6)

○ Extremely good (7)

How good do you think the average person is at recognizing when incoherence is being used to manipulate them?

○ Extremely bad (1)

○ Moderately bad (2)

○ Slightly bad (3)

○ Neither good nor bad (4)

○ Slightly good (5)

○ Moderately good (6)

○ Extremely good (7)

A **false dichotomy** is a logical fallacy in which a limited number of choices or sides are presented as mutually exclusive when in reality there are other reasonable options.

How good are you at recognizing when a false dichotomy is being used to manipulate you?

- ○ Extremely bad (1)
- ○ Moderately bad (2)
- ○ Slightly bad (3)
- ○ Neither good nor bad (4)
- ○ Slightly good (5)
- ○ Moderately good (6)
- ○ Extremely good (7)

How good do you think the average person is at recognizing when a false dichotomy is being used to manipulate them?

- ○ Extremely bad (1)
- ○ Moderately bad (2)
- ○ Slightly bad (3)
- ○ Neither good nor bad (4)
- ○ Slightly good (5)
- ○ Moderately good (6)
- ○ Extremely good (7)

Scapegoating is when the blame for a complex problem is cast on a single group or individual who cannot reasonably be responsible for the entire problem.

How good are you at recognizing when scapegoating is being used to manipulate you?

- ○ Extremely bad (1)
- ○ Moderately bad (2)
- ○ Slightly bad (3)
- ○ Neither good nor bad (4)
- ○ Slightly good (5)
- ○ Moderately good (6)
- ○ Extremely good (7)

How good do you think the average person is at recognizing when a false dichotomy is being used to manipulate them?

- ○ Extremely bad (1)
- ○ Moderately bad (2)
- ○ Slightly bad (3)
- ○ Neither good nor bad (4)
- ○ Slightly good (5)
- ○ Moderately good (6)
- ○ Extremely good (7)

An **ad hominem attack** is when someone attacks the person making an argument, instead of addressing the argument itself.

How good are you at recognizing when ad hominem attacks are being used to manipulate you?

- ○ Extremely bad (1)
- ○ Moderately bad (2)
- ○ Slightly bad (3)
- ○ Neither good nor bad (4)
- ○ Slightly good (5)
- ○ Moderately good (6)
- ○ Extremely good (7)

How good do you think the average person is at recognizing when an ad hominem attack is being used to manipulate them?

- ○ Extremely bad (1)
- ○ Moderately bad (2)
- ○ Slightly bad (3)
- ○ Neither good nor bad (4)
- ○ Slightly good (5)
- ○ Moderately good (6)
- ○ Extremely good (7)

Setting the scene: Inoculation

Researchers have found that you can reduce susceptibility to misinformation by informing people about how they might be misinformed. This works by showing people a series of short training videos explaining common persuasive techniques used to spread misinformation and how to refute those techniques.

In the following, we want you to consider whether you and the average person would benefit from such training.

Need for Inoculation

Do you believe you would benefit from watching training videos to make you more resistant to misinformation?

- ○ Definitely not (1)
- ○ Probably not (2)
- ○ Maybe not (3)
- ○ Might or might not (4)
- ○ Maybe yes (5)
- ○ Probably yes (6)
- ○ Definitely yes (7)

Do you believe the average person would benefit from watching training videos to make them more resistant to misinformation?

- ○ Definitely not (1)
- ○ Probably not (2)
- ○ Maybe not (3)
- ○ Might or might not (4)
- ○ Maybe yes (5)
- ○ Probably yes (6)
- ○ Definitely yes (7)

How likely are you to voluntarily watch training videos in order to help you become more resistant to misinformation?

- ○ Extremely unlikely (1)
- ○ Moderately unlikely (2)
- ○ Slightly unlikely (3)
- ○ Neither likely nor unlikely (4)
- ○ Slightly likely (5)
- ○ Moderately likely (6)
- ○ Extremely likely (7)

How likely do you think the average person is to voluntarily watch training videos in order to help them become more resistant to misinformation?

- ○ Extremely unlikely (1)
- ○ Moderately unlikely (2)
- ○ Slightly unlikely (3)
- ○ Neither likely nor unlikely (4)
- ○ Slightly likely (5)
- ○ Moderately likely (6)
- ○ Extremely likely (7)

Who do you think would benefit most from watching an inoculation video to become more resistant to misinformation? (Please select all that apply.)

- ☐ Younger people (1)
- ☐ Older people (2)

- [ ] People with low levels of education (3)
- [ ] People with high levels of education (4)
- [ ] People with liberal political views (5)
- [ ] People with conservative political views (6)
- [ ] People who consume a lot of social media (7)
- [ ] People who consume a lot of cable news (8)
- [ ] People who consume a lot of newspapers (9)
- [ ] People who consume a lot of online news websites (10)
- [ ] People who consume a lot of radio (11)
- [ ] People who consume a lot of podcasts (12)
- [ ] All people would benefit. (13)
- [ ] No one should watch. (14)

Demographics

What is your political affiliation?

- ○ Extremely liberal (1)
- ○ Liberal (2)
- ○ Slightly liberal (3)
- ○ Moderate, middle of the road (4)
- ○ Slightly conservative (5)

- ○ Conservative (6)
- ○ Extremely conservative (7)

How trustworthy do you find government institutions?

- ○ Extremely untrustworthy (1)
- ○ Moderately untrustworthy (2)
- ○ Slightly untrustworthy (3)
- ○ Neither trustworthy nor untrustworthy (4)
- ○ Slightly trustworthy (5)
- ○ Moderately trustworthy (6)
- ○ Extremely trustworthy (7)

How trustworthy do you find academic institutions?

- ○ Extremely untrustworthy (1)
- ○ Moderately untrustworthy (2)
- ○ Slightly untrustworthy (3)
- ○ Neither trustworthy nor untrustworthy (4)
- ○ Slightly trustworthy (5)
- ○ Moderately trustworthy (6)
- ○ Extremely trustworthy (7)

How trustworthy do you find the media?

- ○ Extremely untrustworthy (1)
- ○ Moderately untrustworthy (2)
- ○ Slightly untrustworthy (3)
- ○ Neither trustworthy nor untrustworthy (4)
- ○ Slightly trustworthy (5)
- ○ Moderately trustworthy (6)
- ○ Extremely trustworthy (7)

Which media sources do you consume regularly? (Please select all that apply.)

- ☐ Social Media (1)
- ☐ Newspapers (2)
- ☐ Cable News (3)
- ☐ Online News Websites (4)
- ☐ Radio (5)
- ☐ Podcasts (6)

What is your age?

- ○ Under 18 (1)
- ○ 18 - 24 (2)
- ○ 25 - 34 (3)

- ○ 35 - 44 (4)
- ○ 45 - 54 (5)
- ○ 55 - 64 (6)
- ○ 65 - 74 (7)
- ○ 75 - 84 (8)
- ○ 85 or older (9)

What is your gender?

- ○ Male (1)
- ○ Female (2)
- ○ Non-binary / Gender Non-Conforming (3)
- ○ Prefer not to say (4)

What is your highest level of education?

- ○ High School (1)
- ○ Some college (2)
- ○ Associates degree (3)
- ○ Bachelors degree (4)
- ○ Postgraduate degree (5)

Many thanks for completing the survey - your time and responses are valued.

Appendix F

Pilot Survey: Trust in Sources

Thank you for considering participating in this study. This information sheet outlines the purpose of the study and provides a description of your involvement and rights as a participant if you agree to take part.

1. What is the research about? The trustworthiness and effectiveness of various types of companies and organizations
2. Do I have to take part? It is up to you to decide whether or not to take part. You do not have to take part if you do not want to. If you do decide to take part, we will ask you to give your consent here.
3. What will my involvement be? You will rate the effectiveness and trustworthiness of a list of organizations, then you answer a few questions about yourself.
4. How do I withdraw from the study? You can withdraw from the study at any point until June 30, 2023, without having to give a reason. If any questions during the study make you feel uncomfortable, you do not have to answer them. Withdrawing from the study will have no effect on you. If you withdraw from the study, we will not retain the information you have given thus far, unless you are happy for us to do so.
5. What will my information be used for? The collected information will be used for this research project and any resulting academic papers.
6. Will my taking part and my data be kept confidential? Will it be anonymized? The records from this study will be kept as confidential as possible. Only the researcher and her supervisor will have access to the files. Your data will be anonymized – no personal identifying information will be collected. Limits to confidentiality: confidentiality will be maintained as far as it is possible, unless you tell us something which implies that you or someone you mention might be in significant danger of harm and unable to act for themselves; in this case, we may have to inform the relevant agencies of this, but we would discuss this with you first.
7. Who has reviewed this study? This study has undergone ethics review in accordance with the LSE Research Ethics Policy and Procedure.
8. Data Protection Privacy Notice The LSE Research Privacy Policy can be found at: https://info.lse.ac.uk/staff/divisions/Secretarys-Division/Assets/Documents/Information-RecordsManagement/Privacy-Notice-for-Research-v1.2.pdf?from_serp=1

The legal basis used to process your personal data will be legitimate interests. The legal basis used to process special category personal data (e.g. data that reveals racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership, health, sex life or sexual orientation, genetic or biometric data) will be for scientific and historical research or statistical purposes. To request a copy of the data held about you please contact: glpd.info.rights@lse.ac.uk

What if I have a question or complaint? If you have any questions regarding this study please contact the researcher, Alexandra Johnson at a.johnson11@lse.ac.uk If you have any concerns or complaints regarding the conduct of this research, please contact the LSE Research Governance Manager via research.ethics@lse.ac.uk.

○ I consent to take part in this study (1)

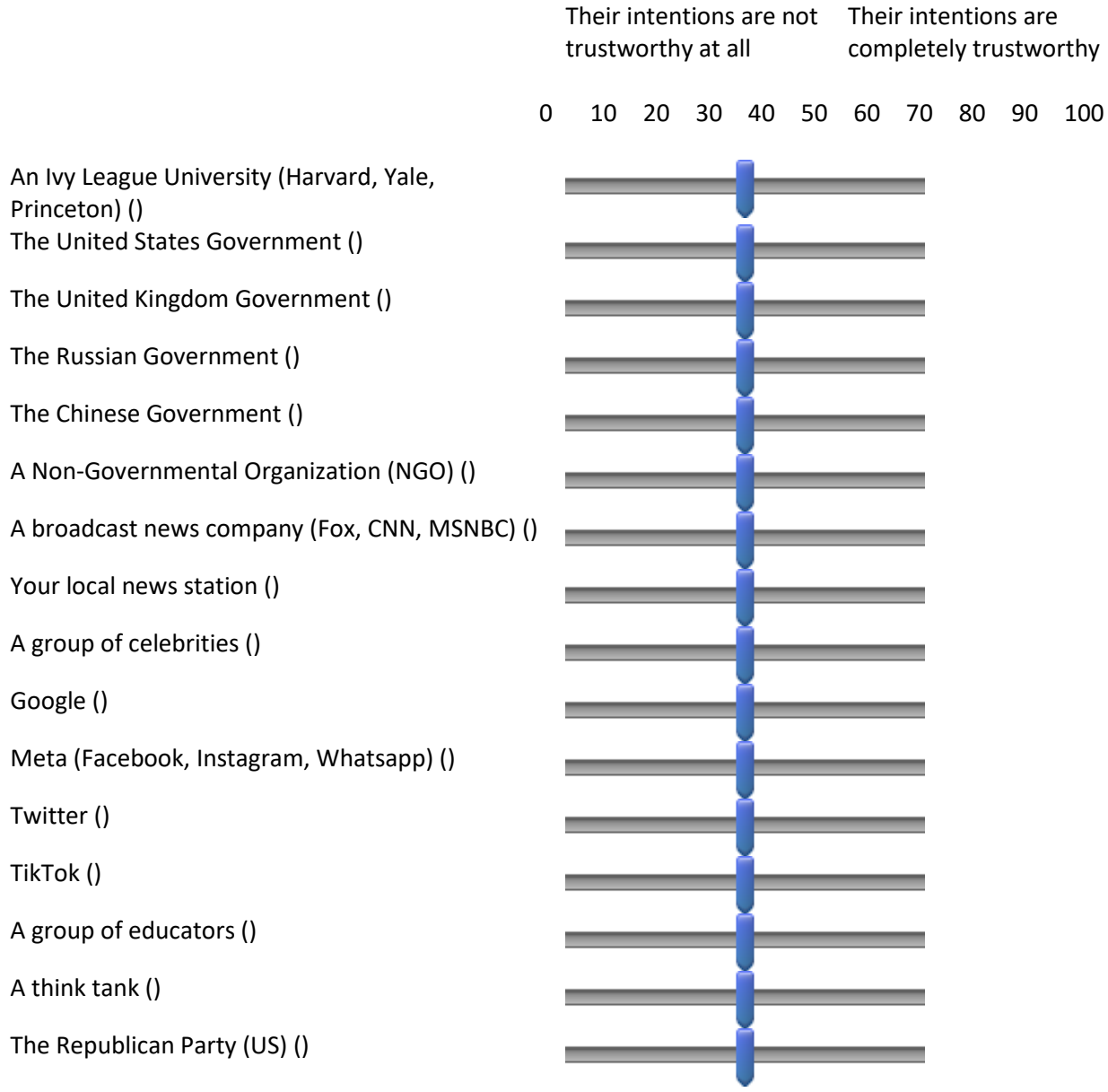
○ I do not consent (2)

Skip To: End of Survey If Thank you for considering participating in this study. This information sheet outlines the purpos... = I do not consen

Question Block

Imagine that a team of researchers has developed a series of training videos. They claim these videos are specifically designed to make viewers more resistant to the techniques used to spread misinformation.

If you were aware that the project was sponsored by one of the following organizations, how much would you trust the intentions of the videos?



The Democratic Party (US) ()

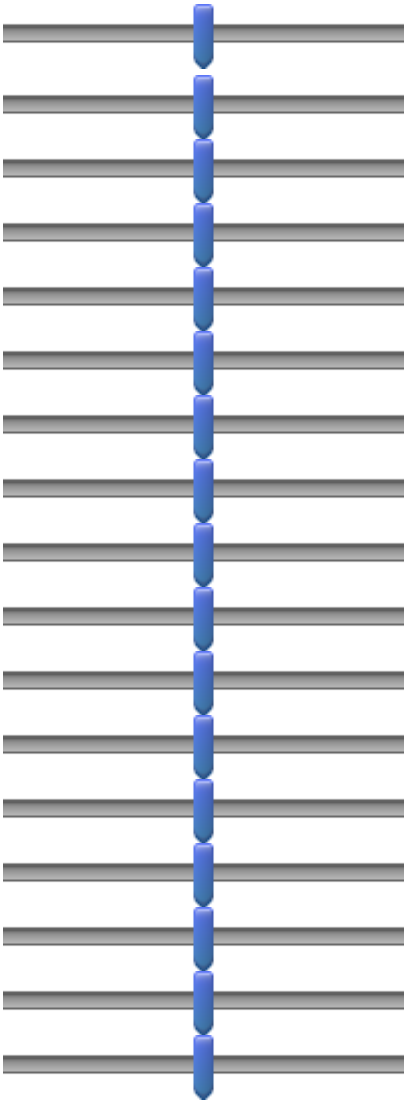
Imagine that a team of researchers has developed a series of training videos. They claim these videos are specifically designed to make viewers more resistant to the techniques used to spread misinformation.

If you were aware that the project was sponsored by one of the following organizations, how effective would you expect these videos to be at reaching their desired intentions (for better or for worse)?

Not effective at all Extremely effective

0 10 20 30 40 50 60 70 80 90 100

An Ivy League University (Harvard, Yale, Princeton) ()
The United States Government ()
The United Kingdom Government ()
The Russian Government ()
The Chinese Government ()
A Non-Governmental Organization (NGO) ()
A broadcast news company (Fox, CNN, MSNBC) ()
Your local news station ()
A group of celebrities ()
Google ()
Meta (Facebook, Instagram, Whatsapp) ()
Twitter ()
Tiktok ()
A group of educators ()
A think tank ()
The Republican Party (US) ()
The Democratic Party (US) ()



Demographics

What is your political affiliation?

- ○ Extremely liberal (1)
- ○ Liberal (2)
- ○ Slightly liberal (3)
- ○ Moderate, middle of the road (4)
- ○ Slightly conservative (5)
- ○ Conservative (6)
- ○ Extremely conservative (7)

What is your age?

- ○ Under 18 (1)
- ○ 18 - 24 (2)
- ○ 25 - 34 (3)
- ○ 35 - 44 (4)
- ○ 45 - 54 (5)
- ○ 55 - 64 (6)
- ○ 65 - 74 (7)
- ○ 75 - 84 (8)
- ○ 85 or older (9)

What is your gender?

- ○ Male (1)

- ○ Female (2)
- ○ Non-binary / Gender Non-Conforming (3)
- ○ Prefer not to say (4)

What is your highest level of education?

- ○ High School (1)
- ○ Some college (2)
- ○ Associates degree (3)
- ○ Bachelors degree (4)
- ○ Postgraduate degree (5)

Thank you for completing this survey.

Appendix G

Survey 2: Source Trust and Inoculation

Thank you for considering participating in this study. This information sheet outlines the purpose of the study and provides a description of your involvement and rights as a participant if you agree to take part.

1. What is the research about? This research is about trustworthiness and how it effects our interest in engaging with misinformation interventions
2. Do I have to take part? It is up to you to decide whether or not to take part. You do not have to take part if you do not want to. If you do decide to take part, we will ask you to give your consent here.
3. What will my involvement be? You will answer a series of questions that relate to your interest in watching misinformation training videos
4. How do I withdraw from the study? You can withdraw from the study at any point until June 30, 2023, without having to give a reason. If any questions during the study make you feel uncomfortable, you do not have to answer them. Withdrawing from the study will have no effect on you. If you withdraw from the study, we will not retain the information you have given thus far, unless you are happy for us to do so.
5. What will my information be used for? The collected information will be used for this research project and any resulting academic papers.
6. Will my taking part and my data be kept confidential? Will it be anonymized? The records from this study will be kept as confidential as possible. Only the researcher and her supervisor will have access to the files. Your data will be anonymized – no personal identifying information will be collected. Limits to confidentiality: confidentiality will be maintained as far as it is possible, unless you tell us something which implies that you or someone you mention might be in significant danger of harm and unable to act for themselves; in this case, we may have to inform the relevant agencies of this, but we would discuss this with you first.
7. Who has reviewed this study? This study has undergone ethics review in accordance with the LSE Research Ethics Policy and Procedure.
8. Data Protection Privacy Notice The LSE Research Privacy Policy can be found at: https://info.lse.ac.uk/staff/divisions/Secretarys-Division/Assets/Documents/Information-RecordsManagement/Privacy-Notice-for-Research-v1.2.pdf?from_serp=1

The legal basis used to process your personal data will be legitimate interests. The legal basis used to process special category personal data (e.g. data that reveals racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership, health, sex life or sexual orientation, genetic or biometric data) will be for scientific and historical research or statistical purposes. To request a copy of the data held about you please contact: glpd.info.rights@lse.ac.uk

What if I have a question or complaint? If you have any questions regarding this study please contact the researcher, Alexandra Johnson at a.johnson11@lse.ac.uk If you have any concerns or complaints

regarding the conduct of this research, please contact the LSE Research Governance Manager via research.ethics@lse.ac.uk.

- ○ I consent to take part in this study (1)
- ○ I do not consent (2)

Skip To: End of Survey If Thank you for considering participating in this study. This information sheet outlines the purpos... = I do not consent

In the upcoming questions, we will ask about your willingness to watch training videos on misinformation from various sources. Please assume that these videos would require 10-15 minutes of your time, but you will not be required to watch them as part of this survey.

For the purposes of this survey, we define "misinformation" as any information that is untrue or misleading. The sender of the misinformation may spread it intentionally (knowing it is false) or unintentionally (unaware of its falsehood). Regardless of intent, if the information is false, it is classified as misinformation.

Low Trust

Imagine that a team of researchers from the **Russian government** has developed a series of training videos. They claim these videos are specifically designed to make viewers more resistant to the techniques used to spread misinformation.

How likely would you be to voluntarily watch these training videos?

- ○ Extremely unlikely (1)
- ○ Moderately unlikely (2)
- ○ Slightly unlikely (3)
- ○ Neither likely nor unlikely (4)
- ○ Slightly likely (5)
- ○ Moderately likely (6)
- ○ Extremely likely (7)

Do you believe you would be better at detecting misinformation after you watched these videos?

- ○ Definitely not (1)
- ○ Probably not (2)
- ○ Maybe not (3)
- ○ Might or might not (4)
- ○ Maybe yes (5)
- ○ Probably yes (6)
- ○ Definitely yes (7)

High Trust

Imagine that a team of researchers at **Harvard University** has developed a series of training videos. They claim these videos are specifically designed to make viewers more resistant to the techniques used to spread misinformation.

How likely would you be to voluntarily watch these training videos?

- ○ Extremely unlikely (1)
- ○ Moderately unlikely (2)
- ○ Slightly unlikely (3)
- ○ Neither likely nor unlikely (4)
- ○ Slightly likely (5)
- ○ Moderately likely (6)
- ○ Extremely likely (7)

Do you believe you would be better at detecting misinformation after you watched these videos?

- ○ Definitely not (1)
- ○ Probably not (2)
- ○ Maybe not (3)
- ○ Might or might not (4)
- ○ Maybe yes (5)
- ○ Probably yes (6)
- ○ Definitely yes (7)

Medium Trust

Imagine that a team of researchers at **Meta (The parent company of Facebook, Instagram, and Whatsapp)** has developed a series of training videos. They claim these videos are specifically designed to make viewers more resistant to the techniques used to spread misinformation.

How likely would you be to voluntarily watch these training videos?

- ○ Extremely unlikely (1)
- ○ Moderately unlikely (2)
- ○ Slightly unlikely (3)
- ○ Neither likely nor unlikely (4)
- ○ Slightly likely (5)
- ○ Moderately likely (6)
- ○ Extremely likely (7)

Do you believe you would be better at detecting misinformation after you watched these videos?

- Definitely not (1)
- Probably not (2)
- Maybe not (3)
- Might or might not (4)
- Maybe yes (5)
- Probably yes (6)
- Definitely yes (7)

Partisan Trust Democrat

Imagine that a team of researchers working with the **Democratic Party** has developed a series of training videos. They claim these videos are specifically designed to make viewers more resistant to the techniques used to spread misinformation.

How likely would you be to voluntarily watch these training videos?

- Extremely unlikely (1)
- Moderately unlikely (2)
- Slightly unlikely (3)
- Neither likely nor unlikely (4)
- Slightly likely (5)
- Moderately likely (6)
- Extremely likely (7)

Do you believe you would be better at detecting misinformation after you watched these videos?

- ○ Definitely not (1)
- ○ Probably not (2)
- ○ Maybe not (3)
- ○ Might or might not (4)
- ○ Maybe yes (5)
- ○ Probably yes (6)
- ○ Definitely yes (7)

Partisan Trust Republican

Imagine that a team of researchers working with the **Republican Party** has developed a series of training videos. They claim these videos are specifically designed to make viewers more resistant to the techniques used to spread misinformation.

How likely would you be to voluntarily watch these training videos?

- ○ Extremely unlikely (1)
- ○ Moderately unlikely (2)
- ○ Slightly unlikely (3)
- ○ Neither likely nor unlikely (4)
- ○ Slightly likely (5)
- ○ Moderately likely (6)
- ○ Extremely likely (7)

Do you believe you would be better at detecting misinformation after you watched these videos?

- ○ Definitely not (1)
- ○ Probably not (2)
- ○ Maybe not (3)
- ○ Might or might not (4)
- ○ Maybe yes (5)
- ○ Probably yes (6)
- ○ Definitely yes (7)

Demographics

What is your political affiliation?

- ○ Extremely liberal (1)
- ○ Liberal (2)
- ○ Slightly liberal (3)
- ○ Moderate, middle of the road (4)
- ○ Slightly conservative (5)
- ○ Conservative (6)
- ○ Extremely conservative (7)

How trustworthy do you find government institutions?

- ○ Extremely untrustworthy (1)
- ○ Moderately untrustworthy (2)
- ○ Slightly untrustworthy (3)
- ○ Neither trustworthy nor untrustworthy (4)
- ○ Slightly trustworthy (5)
- ○ Moderately trustworthy (6)
- ○ Extremely trustworthy (7)

How trustworthy do you find academic institutions?

- ○ Extremely untrustworthy (1)
- ○ Moderately untrustworthy (2)
- ○ Slightly untrustworthy (3)
- ○ Neither trustworthy nor untrustworthy (4)
- ○ Slightly trustworthy (5)
- ○ Moderately trustworthy (6)
- ○ Extremely trustworthy (7)

How trustworthy do you find the media?

- ○ Extremely untrustworthy (1)
- ○ Moderately untrustworthy (2)
- ○ Slightly untrustworthy (3)
- ○ Neither trustworthy nor untrustworthy (4)
- ○ Slightly trustworthy (5)
- ○ Moderately trustworthy (6)
- ○ Extremely trustworthy (7)

What is your age?

- ○ Under 18 (1)
- ○ 18 - 24 (2)
- ○ 25 - 34 (3)
- ○ 35 - 44 (4)
- ○ 45 - 54 (5)
- ○ 55 - 64 (6)
- ○ 65 - 74 (7)
- ○ 75 - 84 (8)
- ○ 85 or older (9)

What is your gender?

- ○ Male (1)
- ○ Female (2)
- ○ Non-binary / Gender Non-Conforming (3)

What is your highest level of education?

- ○ High School (1)
- ○ Some college (2)
- ○ Associates degree (3)
- ○ Bachelors degree (4)
- ○ Postgraduate degree (5)

What political party are you likely to vote for in the next election?

- ○ Democratic Party (1)
- ○ Republican Party (2)
- ○ Third Party (3)
- ○ Not planning to vote (4)

Thank you for completing the survey.

Appendix H

Sample R Script (full script is available upon request)

T-Tests for Study 1

```
#frequency t test
favstats(~frequency_self, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  3      4  6   7 4.322368 1.630024 152       0

favstats(~frequency_other, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  4      5  7   7 4.947368 1.634842 152       0

t.test(diss2$frequency_self, diss2$frequency_other, paired = TRUE)

##
##  Paired t-test
##
## data:  diss2$frequency_self and diss2$frequency_other
## t = -6.1948, df = 151, p-value = 5.279e-09
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  -0.8243389 -0.4256611
## sample estimates:
## mean difference
##          -0.625

#perception of problem t test
favstats(~concern_self, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  5      6  7   7 5.513158 1.513676 152       0

favstats(~concern_other, data=diss2)

##  min Q1 median Q3 max mean       sd   n missing
##    1  3      5  5   7 4.25 1.443184 152       0

t.test(diss2$concern_self, diss2$concern_other, paired = TRUE)

##
##  Paired t-test
##
## data:  diss2$concern_self and diss2$concern_other
## t = 9.366, df = 151, p-value < 2.2e-16
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  0.9966887 1.5296271
```

```
## sample estimates:
## mean difference
##        1.263158

#benefit t test
favstats(~benefit_self, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  4      5  6   7 5.099338 1.526455 151       1

favstats(~benefit_other, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    2  5      6  7   7 5.503311 1.375375 151       1

t.test(diss2$benefit_self, diss2$benefit_other, paired = TRUE)

##
##  Paired t-test
##
## data:  diss2$benefit_self and diss2$benefit_other
## t = -4.0772, df = 150, p-value = 7.371e-05
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  -0.5997489 -0.2081981
## sample estimates:
## mean difference
##      -0.4039735

#willingness to watch t test
favstats(~watch_self, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  3      5  6   7 4.523179 1.879129 151       1

favstats(~watch_other, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  2      3  5   7 3.476821 1.712053 151       1

t.test(diss2$watch_self, diss2$watch_other, paired = TRUE)

##
##  Paired t-test
##
## data:  diss2$watch_self and diss2$watch_other
## t = 8.1355, df = 150, p-value = 1.441e-13
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  0.7922254 1.3004898
## sample estimates:
```

```
## mean difference
##        1.046358

#detection ttest
favstats(~detection_self, data=diss2)

##  min Q1 median Q3 max     mean        sd   n missing
##    2  5      5  6   7 5.230263 0.9998039 152       0

favstats(~detection_other, data=diss2)

##  min Q1 median Q3 max  mean       sd   n missing
##    1  3      4  5   7 3.625 1.296008 152       0

t.test(diss2$detection_self, diss2$detection_other, paired = TRUE)

##
##  Paired t-test
##
## data:  diss2$detection_self and diss2$detection_other
## t = 12.848, df = 151, p-value < 2.2e-16
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  1.358395 1.852132
## sample estimates:
## mean difference
##        1.605263

#emotional language ttest
favstats(~emolanguage_self, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    2  5      6  6   7 5.480263 1.054605 152       0

favstats(~emolanguage_other, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  3      4  5   7 4.065789 1.403265 152       0

t.test(diss2$emolanguage_self, diss2$emolanguage_other, paired = TRUE)

##
##  Paired t-test
##
## data:  diss2$emolanguage_self and diss2$emolanguage_other
## t = 10.396, df = 151, p-value < 2.2e-16
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  1.145649 1.683299
## sample estimates:
## mean difference
##        1.414474
```

```r
#incoherence t test
favstats(~incoherence_self, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    2  5      5  6   7 5.276316 1.174776 152       0

favstats(~incoherence_other, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  3      4  5   7 3.842105 1.456228 152       0

t.test(diss2$incoherence_self, diss2$incoherence_other, paired = TRUE)

##
##  Paired t-test
##
## data:  diss2$incoherence_self and diss2$incoherence_other
## t = 10.366, df = 151, p-value < 2.2e-16
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  1.160851 1.707570
## sample estimates:
## mean difference
##        1.434211

#dichotomy t test
favstats(~dichotomy_self, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  4      5  6   7 5.282895 1.273353 152       0

favstats(~dichotomy_other, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  2      4  5   7 3.598684 1.475001 152       0

t.test(diss2$dichotomy_self, diss2$dichotomy_other, paired = TRUE)

##
##  Paired t-test
##
## data:  diss2$dichotomy_self and diss2$dichotomy_other
## t = 11.159, df = 151, p-value < 2.2e-16
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  1.386004 1.982417
## sample estimates:
## mean difference
##        1.684211

#scapegoating t test
favstats(~scapegoat_self, data=diss2)
```

```
##  min Q1 median Q3 max     mean       sd   n missing
##    3  5      6  7   7 5.802632 1.079855 152       0

favstats(~scapegoat_other, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  3      4  5   7 4.111842 1.650002 152       0

t.test(diss2$scapegoat_self, diss2$scapegoat_other, paired = TRUE)

##
##  Paired t-test
##
## data:  diss2$scapegoat_self and diss2$scapegoat_other
## t = 10.978, df = 151, p-value < 2.2e-16
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  1.386478 1.995101
## sample estimates:
## mean difference
##        1.690789

#ad hominem attacks t test
favstats(~adhom_self, data=diss2)

##  min Q1 median Q3 max  mean       sd   n missing
##    2  5      6  7   7 5.875 1.158399 152       0

favstats(~adhom_other, data=diss2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  3      5  6   7 4.460526 1.655341 152       0

t.test(diss2$adhom_self, diss2$adhom_other, paired = TRUE)

##
##  Paired t-test
##
## data:  diss2$adhom_self and diss2$adhom_other
## t = 10.3, df = 151, p-value < 2.2e-16
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  1.143130 1.685818
## sample estimates:
## mean difference
##        1.414474

#attempt to create one variable for capacity to detect and run t test
diss2$selfskill = (diss2$detection_self + diss2$emolanguage_self + diss2$inco
herence_self + diss2$dichotomy_self + diss2$scapegoat_self + diss2$adhom_self
)/6
diss2$otherskill = (diss2$detection_other + diss2$emolanguage_other + diss2$i
```

```
ncoherence_other + diss2$dichotomy_other + diss2$scapegoat_other + diss2$adho
m_other)/6
#skill t test
favstats(~selfskill, data=diss2)

##       min       Q1 median       Q3 max     mean        sd   n missing
##  2.333333 4.833333    5.5 6.166667   7 5.491228 0.8329556 152       0

favstats(~otherskill, data=diss2)

##       min       Q1 median       Q3      max     mean       sd   n missing
##  1.166667 3.333333      4 4.833333 6.666667 3.950658 1.195226 152       0

t.test(diss2$selfskill, diss2$otherskill, paired = TRUE)

##
##  Paired t-test
##
## data:  diss2$selfskill and diss2$otherskill
## t = 13.331, df = 151, p-value < 2.2e-16
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  1.312248 1.768892
## sample estimates:
## mean difference
##         1.54057

#cohens d calculations
cohensD(diss2$frequency_self, diss2$frequency_other)

## [1] 0.3828636

cohensD(diss2$concern_self, diss2$concern_other)

## [1] 0.8541484

cohensD(diss2$selfskill, diss2$otherskill)

## [1] 1.495495

cohensD(diss2$watch_self, diss2$watch_other)

## [1] 0.5821075

cohensD(diss2$benefit_self, diss2$benefit_other)

## [1] 0.2780501
```

T Tests Study 2

```
#ttest watch vs dem
favstats(~watch_self, data=diss2)
```

```
##  min Q1 median Q3 max     mean       sd   n missing
##    1  3      5  6   7 4.523179 1.879129 151       1
```

```
favstats(~watch_dem, data=select2)
```

```
##  min Q1 median Q3 max     mean       sd   n missing
##    1  2      3  5   7 3.457143 1.894482 210       2
```

```
t.test(diss2$watch_self, select2$watch_dem, var.equal = TRUE)
```

```
##
##  Two Sample t-test
##
## data:  diss2$watch_self and select2$watch_dem
## t = 5.2917, df = 359, p-value = 2.114e-07
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  0.6698572 1.4622147
## sample estimates:
## mean of x mean of y
##  4.523179  3.457143
```

```
#ttest watch vs rep
favstats(~watch_rep, data=select2)
```

```
##  min Q1 median Q3 max     mean       sd   n missing
##    1  1      2  3   7 2.480952 1.739526 210       2
```

```
t.test(diss2$watch_self, select2$watch_rep, var.equal = TRUE)
```

```
##
##  Two Sample t-test
##
## data:  diss2$watch_self and select2$watch_rep
## t = 10.638, df = 359, p-value < 2.2e-16
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  1.664703 2.419749
## sample estimates:
## mean of x mean of y
##  4.523179  2.480952
```

```
#ttest watch vs russian
favstats(~watch_russ, data=select2)
```

```
##  min Q1 median Q3 max    mean       sd   n missing
##    1  1      1  3   7 2.22381 1.796436 210       2
```

```
t.test(diss2$watch_self, select2$watch_russ, var.equal = TRUE)
```

```
##
##  Two Sample t-test
```

```
##
## data:  diss2$watch_self and select2$watch_russ
## t = 11.767, df = 359, p-value < 2.2e-16
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  1.915076 2.683663
## sample estimates:
## mean of x mean of y
##  4.523179  2.223810

#ttest watch vs meta
favstats(~watch_meta, data=select2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  1      3  5   7 3.209524 1.930343 210       2

t.test(diss2$watch_self, select2$watch_meta, var.equal = TRUE)

##
##  Two Sample t-test
##
## data:  diss2$watch_self and select2$watch_meta
## t = 6.449, df = 359, p-value = 3.638e-10
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  0.9130637 1.7142463
## sample estimates:
## mean of x mean of y
##  4.523179  3.209524

#ttest watch vs harvard
favstats(~watch_harvard, data=select2)

##  min Q1 median Q3 max    mean       sd   n missing
##    1  3      5  6   7 4.52381 1.959373 210       2

t.test(diss2$watch_self, select2$watch_harvard, var.equal = TRUE)

##
##  Two Sample t-test
##
## data:  diss2$watch_self and select2$watch_harvard
## t = -0.0030688, df = 359, p-value = 0.9976
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.4048185  0.4035571
## sample estimates:
## mean of x mean of y
##  4.523179  4.523810

#calculate cohen's D across data sets
cohensD(diss2$watch_self, select2$watch_harvard)
```

```
## [1] 0.0003274317

cohensD(diss2$watch_self, select2$watch_meta)

## [1] 0.6880975

cohensD(diss2$watch_self, select2$watch_russ)

## [1] 1.255497

cohensD(diss2$watch_self, select2$watch_dem)

## [1] 0.564613

cohensD(diss2$watch_self, select2$watch_rep)

## [1] 1.135091

#lazy or curious t tests
favstats(~watch_russ, data=select2)

##  min Q1 median Q3 max    mean       sd   n missing
##    1  1      1  3   7 2.22381 1.796436 210       2

favstats(~benefit_russ, data=select2)

##  min Q1 median Q3 max     mean      sd   n missing
##    1  1      2  4   7 2.452381 1.60147 210       2

t.test (select2$watch_russ, select2$benefit_russ, paired = TRUE)

##
##  Paired t-test
##
## data:  select2$watch_russ and select2$benefit_russ
## t = -2.4032, df = 209, p-value = 0.01712
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  -0.4160702 -0.0410727
## sample estimates:
## mean difference
##      -0.2285714

favstats(~watch_rep, data=select2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  1      2  3   7 2.480952 1.739526 210       2

favstats(~benefit_rep, data=select2)

##  min Q1 median Q3 max     mean       sd   n missing
##    1  1      2  4   7 2.595238 1.590334 210       2

t.test (select2$watch_rep, select2$benefit_rep, paired = TRUE)
```

```
##
##  Paired t-test
##
## data:  select2$watch_rep and select2$benefit_rep
## t = -1.1321, df = 209, p-value = 0.2589
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  -0.31329167  0.08472024
## sample estimates:
## mean difference
##      -0.1142857
```

```
favstats(~watch_dem, data=select2)
```

```
##  min Q1 median Q3 max     mean       sd   n missing
##    1  2      3  5   7 3.457143 1.894482 210       2
```

```
favstats(~benefit_dem, data=select2)
```

```
##  min Q1 median Q3 max     mean       sd   n missing
##    1  2      4  5   7 3.633333 1.675558 210       2
```

```
t.test (select2$watch_dem, select2$benefit_dem, paired = TRUE)
```

```
##
##  Paired t-test
##
## data:  select2$watch_dem and select2$benefit_dem
## t = -1.8353, df = 209, p-value = 0.06788
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  -0.36544073  0.01305978
## sample estimates:
## mean difference
##      -0.1761905
```

```
favstats(~watch_meta, data=select2)
```

```
##  min Q1 median Q3 max     mean       sd   n missing
##    1  1      3  5   7 3.209524 1.930343 210       2
```

```
favstats(~benefit_meta, data=select2)
```

```
##  min Q1 median Q3 max     mean       sd   n missing
##    1  2      4  5   7 3.590476 1.715091 210       2
```

```
t.test (select2$watch_meta, select2$benefit_meta, paired = TRUE)
```

```
##
##  Paired t-test
##
## data:  select2$watch_meta and select2$benefit_meta
```

```
## t = -4.2327, df = 209, p-value = 3.457e-05
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  -0.5583802 -0.2035245
## sample estimates:
## mean difference
##      -0.3809524
```

```
favstats(~watch_harvard, data=select2)
```

```
##  min Q1 median Q3 max    mean       sd   n missing
##    1  3      5  6   7 4.52381 1.959373 210       2
```

```
favstats(~benefit_harvard, data=select2)
```

```
##  min Q1 median Q3 max    mean       sd   n missing
##    1  4      5  6   7 4.82381 1.547464 210       2
```

```
t.test (select2$watch_harvard, select2$benefit_harvard, paired = TRUE)
```

```
##
##  Paired t-test
##
## data:  select2$watch_harvard and select2$benefit_harvard
## t = -3.359, df = 209, p-value = 0.0009297
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  -0.4760692 -0.1239308
## sample estimates:
## mean difference
##            -0.3
```

ANOVAs Political party and partisan sources

```
#anova dem political party
favstats(~watch_dem, Q29, data=select2)
```

```
##             Q29 min  Q1 median  Q3 max     mean       sd   n missing
## 1    [Democrat]   1 3.0      4 5.0   7 4.152000 1.708876 125       0
## 2  [Not Voting]   1 1.5      2 3.5   6 2.526316 1.466986  19       0
## 3  [Republican]   1 1.0      1 2.0   6 1.895833 1.417813  48       0
## 4 [Third Party]   2 2.0      4 5.0   7 3.941176 1.784327  17       0
```

```
demparty.ANOVA <- aov(watch_dem ~ Q29, data = select2)
summary(demparty.ANOVA)
```

```
##              Df Sum Sq Mean Sq F value   Pr(>F)
## Q29           3  197.8   65.93   24.74 1.05e-13 ***
## Residuals   205  546.3    2.66
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 3 observations deleted due to missingness
```

```r
TukeyHSD(demparty.ANOVA, conf.level=.95)
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = watch_dem ~ Q29, data = select2)
##
## $Q29
##                                  diff         lwr        upr     p adj
## [Not Voting]-[Democrat]    -1.6256842 -2.66683554 -0.5845329 0.0004290
## [Republican]-[Democrat]    -2.2561667 -2.97414584 -1.5381875 0.0000000
## [Third Party]-[Democrat]   -0.2108235 -1.30384609  0.8821990 0.9590768
## [Republican]-[Not Voting]  -0.6304825 -1.77653467  0.5155698 0.4852320
## [Third Party]-[Not Voting]  1.4148607  0.00325171  2.8264697 0.0492334
## [Third Party]-[Republican]  2.0453431  0.85197065  3.2387156 0.0000864
```

```r
# ***significant
#anova rep political party
favstats(~watch_rep, Q29, data=select2)
```

```
##             Q29 min   Q1 median Q3 max     mean       sd   n missing
## 1    [Democrat]   1 1.00      1  3   7 2.136000 1.647794 125       0
## 2  [Not Voting]   1 1.00      2  3   5 2.315789 1.249561  19       0
## 3  [Republican]   1 1.75      3  4   7 3.041667 1.725384  48       0
## 4 [Third Party]   1 2.00      4  5   7 3.705882 2.084607  17       0
```

```r
repparty.ANOVA <- aov(watch_rep ~ Q29, data = select2)
summary(repparty.ANOVA)
```

```
##              Df Sum Sq Mean Sq F value   Pr(>F)
## Q29           3   56.0  18.660   6.662 0.000259 ***
## Residuals   205  574.2   2.801
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 3 observations deleted due to missingness
```

```r
TukeyHSD(repparty.ANOVA, conf.level=.95)
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = watch_rep ~ Q29, data = select2)
##
## $Q29
##                                 diff         lwr      upr     p adj
## [Not Voting]-[Democrat]    0.1797895 -0.88768372 1.247263 0.9721431
## [Republican]-[Democrat]    0.9056667  0.16953590 1.641797 0.0089619
## [Third Party]-[Democrat]   1.5698824  0.44922655 2.690538 0.0020263
## [Republican]-[Not Voting]  0.7258772 -0.44914893 1.900903 0.3808292
## [Third Party]-[Not Voting] 1.3900929 -0.05720368 2.837389 0.0648072
## [Third Party]-[Republican] 0.6642157 -0.55932704 1.887758 0.4969523
```