

White Paper: The Effects of Online Disinformation Detection Training for Older Adults

Ryan C. Moore
Jeffrey T. Hancock
Stanford University

Recent research has identified older adults as a demographic group especially susceptible to disinformation online. During the 2016 U.S. presidential campaign, people 65 and older were twice as likely to be exposed to fake news on Twitter and seven times more likely to share fake news on Facebook than 18-29 year olds (Grinberg et al., 2019; Guess et al., 2019). One possible explanation for this phenomenon is that older adults are less digitally literate compared to younger individuals (Brashier & Schacter, 2020). For that reason, organizations have begun to develop programs for older adults which focus on the skills and knowledge needed to identify disinformation online. Here, we report the results of our collaboration with MediaWise, a non-profit journalism organization who ran such a course for older adults (aged 50+) in the lead up to the 2020 U.S. presidential election (Span, 2020).

Methods

From September 24 - October 26, 2020, 145 older adults recruited by MediaWise completed MediaWise's 1-hour course and both our pre- and post-course surveys ($M_{age} = 66.9$, 69% female, 84.8% white). MediaWise's course was

a one-hour, self-directed series of interactive modules which focused on how to identify disinformation online. From October 1 - October 10, 227 older adults recruited from online survey purveyor Lucid also completed both our pre and post surveys, without taking MediaWise's course ($M_{age} = 63.3$, 61% female, 89.2% white). The Lucid respondents served as a control group to compare to the MediaWise course enrollee group.

Of primary interest in our surveys was a deception detection task for news headlines. In both the pre and post surveys, individuals were asked to rate the veracity of 6 distinct headlines from 1: definitely false - 7: definitely true. Each survey contained 3 true and 3 false news headlines. Per survey, one false (true) headline was Republican-congruent, one false (true) headline was consistent with Democrat-congruent, and one false (true) headline was more non-partisan in nature (see Table 1). All 12 headlines were taken from articles or posts fact-checked by Snopes. After providing veracity judgements on the headlines in each survey, respondents were asked if they did any research online to inform their judgement of the veracity of each headline.

In addition, we measured levels of skill on the concepts and skills taught in the course important for being able to identify disinformation online. We adopted a widely-used measure of

internet skills to measure respondents' level of skill for these techniques and concepts (Hargittai & Hsieh, 2011), in which individuals are asked to rate their understanding of internet-related terms (e.g., firewall) from 1:no understanding - 5:full understanding. We replaced Hargittai & Hsieh's terms with 6 terms taught in MediaWise's course and important for detecting disinformation online (lateral reading, click restraint, reverse image searching, Wikipedia page features, search engine keyword optimization, search engine filters; Wineburg & McGrew, 2019). We also measured respondents' political ideology from 1:very liberal - 5:very conservative.

Preliminary Results

We preregistered our analyses on the Open Science Framework:¹ https://osf.io/jv8hk?view_only=51e12172bc8542ee86211d58ae150bdb.

To evaluate individuals' ability to accurately judge the veracity of news headlines, we estimated mixed effects logistic regression models in which the DV was a binary variable indicating if a respondents' veracity judgement for a particular headline was correct or incorrect. To create that DV, we dichotomized respondents' 7-point veracity judgements such that, for true headlines, ratings of 5-7 were coded "1" for correct and ratings of 1-3 were coded "0" for incorrect. For false

headlines, ratings of 1-3 were coded "1" while ratings of 5-7 were coded "0". Neutral ratings of 4 were excluded from analysis. The IVs included a binary indicator variable for whether judgements came from the MediaWise course enrollee group or from the control group, a binary indicator of whether judgements came from the posttest or pretest survey, and our key variable of interest was the interaction of those two variables. Subjects and each of the news headlines were modeled as random effects (see Baayen et al., 2008).

As can be seen in Table 2, we obtained a positive and significant interaction between the course enrollee and posttest indicator variables for all news headlines, as well as both true and false headlines separately (All news: $\beta = 1.145$, $SE = 0.165$, $p < .01$; True news: $\beta = 1.478$, $SE = 0.236$, $p < .01$; False news: $\beta = 0.941$, $SE = 0.251$, $p < .01$). This interaction suggests that improvement in the ability to accurately judge the veracity of news headlines among the MediaWise enrollee group from pretest to posttest was significantly greater than the change in ability among the control group. Models 2, 4, and 6 show that this effect holds even when controlling for respondents' political ideology. To better interpret this interaction, we created predicted probability plots (see Figure 1). MediaWise course enrollees rose from a pretest probability of accurately judging the veracity of a headline of 63% to a

¹ Not all preregistered analyses are presented here in this short white paper.

posttest probability of 87% (Figure 1, Among all news). The control group did not experience a significant increase (pretest probability = 57%; posttest probability = 59%).

In addition to more accurately being able to judge the veracity of news headlines, MediaWise enrollees also became more likely to report doing research online to inform their judgement of the headlines in the survey. Pretest, the average rate of researching headlines prior to making judgements was 2.9% and posttest the average rate jumped to 69.6%. Because we do not observe this pattern in the control group (their pretest average researching rate = 2.7%; posttest rate = 2%), it is unlikely this effect in the MediaWise enrollee group was driven by priming in the survey instrument. Finally, the average level of skill on the six terms important for identifying disinformation online increased significantly among the MediaWise group from pretest to posttest, while no significant increase was observed among the control group (see Figure 2).

Significance/Next Steps

The findings reported here indicate that a relatively brief disinformation detection program can significantly improve older adults' abilities to detect disinformation. It will be crucial to assess the scalability of this program and to test its effects on larger, more representative samples of older adults. Next steps with the data we have collected include

understanding which changes in specific disinformation detection skills from pretest to posttest best explain improvements in the ability to detect disinformation.

Table 1: News headlines used in deception detection task

	True News	False News
Republican congruent	<p>Donald Trump Sends \$10,000 to Hero Bus Driver after Driver Saves Suicidal Woman from Jumping off Bridge Bus driver Darnell Barton took a detour from his normal route in order to stop a woman from jumping off an overpass. Trump said he was moved by the gesture and rewarded Barton with a \$10,000 check.</p>	<p>Joe Biden Waves at Empty Field as He Departs Plane in Tampa The 77-year-old was caught waving to an empty field after departing a plane in Tampa on Tuesday. He was in Tampa holding a veterans roundtable.</p>
	<p>Child with Rare Ailment Rescued Aboard Trump's Private Jet Donald Trump's private jet carried a critically ill 3-year-old Jewish boy from California to New York for medical treatment after commercial airlines refused to carry the boy.</p>	<p>Biden Caught Using Teleprompter During Interview Democratic presidential nominee Joe Biden is caught red-handed using a teleprompter during a recent interview with Telemundo anchor Jose Diaz-Balart.</p>
Democrat congruent	<p>Trump Administration Secretly Withheld Millions from FDNY 9/11 Health Program The Trump administration has secretly siphoned nearly \$4 million away from a program that tracks and treats FDNY firefighters and medics suffering from 9/11 related illnesses.</p>	<p>Semi Truck Bearing the Words "All Aboard the Trump Train" Crashes Into Overpass The truck wedged itself under the Mamaroneck Avenue Overpass in New York on Monday.</p>
	<p>Republican Candidate Made Unbelievable Statement About Rape Clayton Williams, former Republican candidate for Texas Governor, likened rape to bad weather, stating, "Rape is kinda like the weather. If it's inevitable, relax and enjoy it." Williams made the remark to reporters at his ranch in West Texas.</p>	<p>Trump Refuses to Send Wildfire Aid to CA, Offers it to Putin Donald Trump has refused to provide federal assistance to California to help them fight against September 2020 wildfires. In July, however, Trump offered US aid to Russian President Vladimir Putin to help fight against fires that broke out in Russia.</p>
Neither Republican nor Democrat congruent	<p>Netflix Releases Film Poster Portraying Young Girls in Sexualized Manner The movie, titled "Mignonnes", follows an 11-year-old Senegalese Muslim girl who is caught up in the clash of her traditional family values and modern, internet culture.</p>	<p>Dozens of Countries Ordered COVID-19 Tests in 2018 Data displayed on the World Bank's World Integrated Trade Solution website in September 2020 proved that dozens of nations imported or exported COVID-19 Test Kits in 2018 — more than a year before the pandemic occurred.</p>
	<p>Walmart Customer's Change Donated Without Consent In July, a Walmart customer in Massachusetts had the change from her purchase donated to charity without her consent. The customer says a Walmart cashier refused to give her change with no advanced warning.</p>	<p>Adolf Hitler Found to Have Invented the Inflatable Sex Doll Hitler's Borghild Project, which began in late 1940, was a secretive attempt to stop the spread of syphilis by providing Nazi soldiers with inflatable sex dolls.</p>

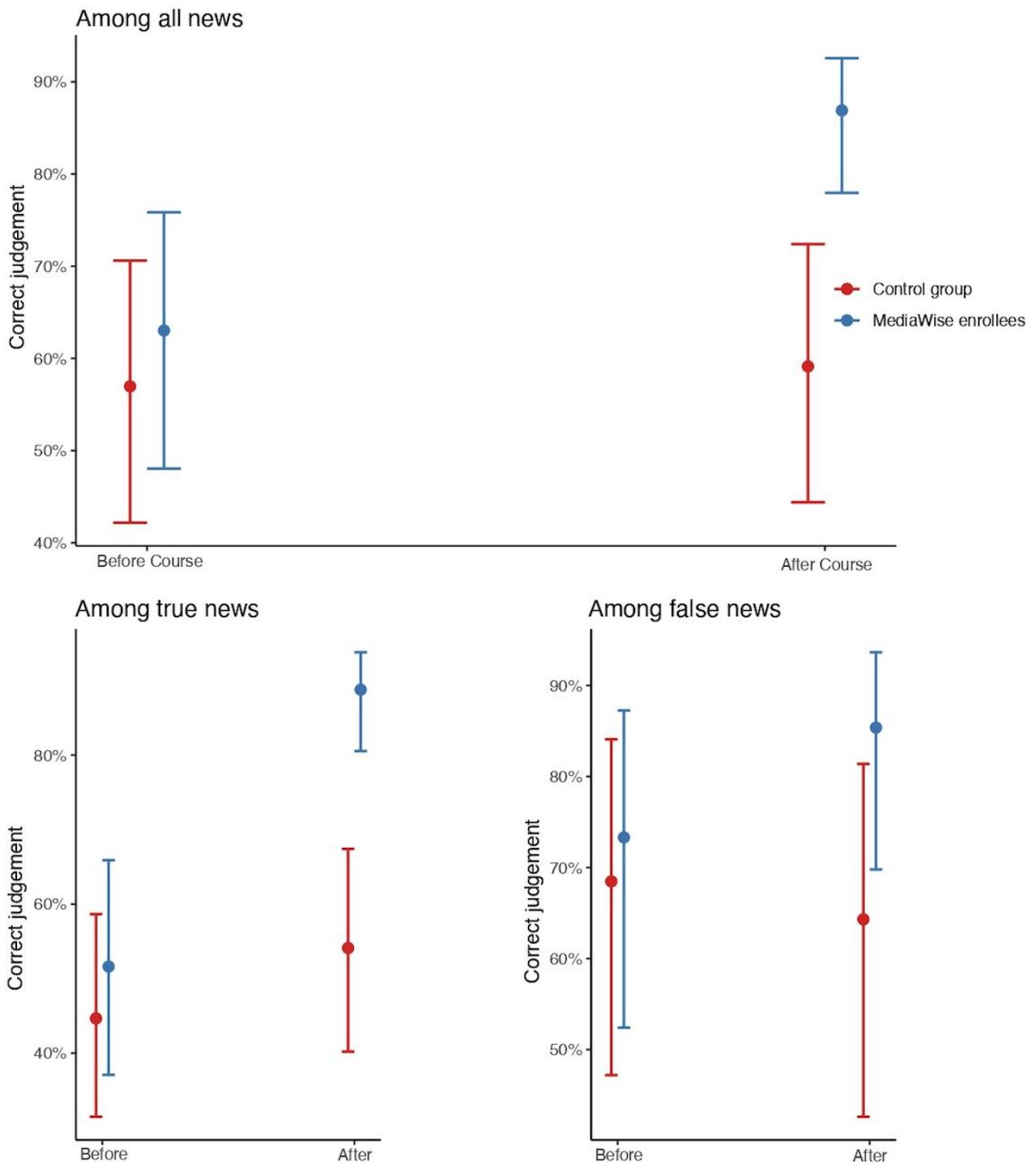
Table 2: Correctly judging news headline veracity

	<i>DV: Correct Judgement of Headline Veracity</i>					
	All news		True news		False news	
	(1)	(2)	(3)	(4)	(5)	(6)
MediaWise Course	0.348*** (0.113)	0.253** (0.119)	0.342** (0.160)	0.279* (0.168)	0.364** (0.169)	0.234 (0.178)
Posttest	0.085 (0.423)	0.089 (0.429)	0.378 (0.395)	0.379 (0.404)	-0.194 (0.631)	-0.187 (0.640)
Political Ideology		-0.087*** (0.033)		-0.062 (0.050)		-0.117** (0.049)
MediaWise Course*Posttest	1.145*** (0.165)	1.270*** (0.175)	1.478*** (0.236)	1.625*** (0.252)	0.839*** (0.239)	0.941*** (0.251)
Constant	0.248 (0.300)	0.538* (0.324)	-0.239 (0.281)	-0.031 (0.332)	0.732 (0.447)	1.124** (0.482)
Observations	3,626	3,504	1,799	1,737	1,827	1,767

* p<0.1; ** p<0.05; *** p<0.01

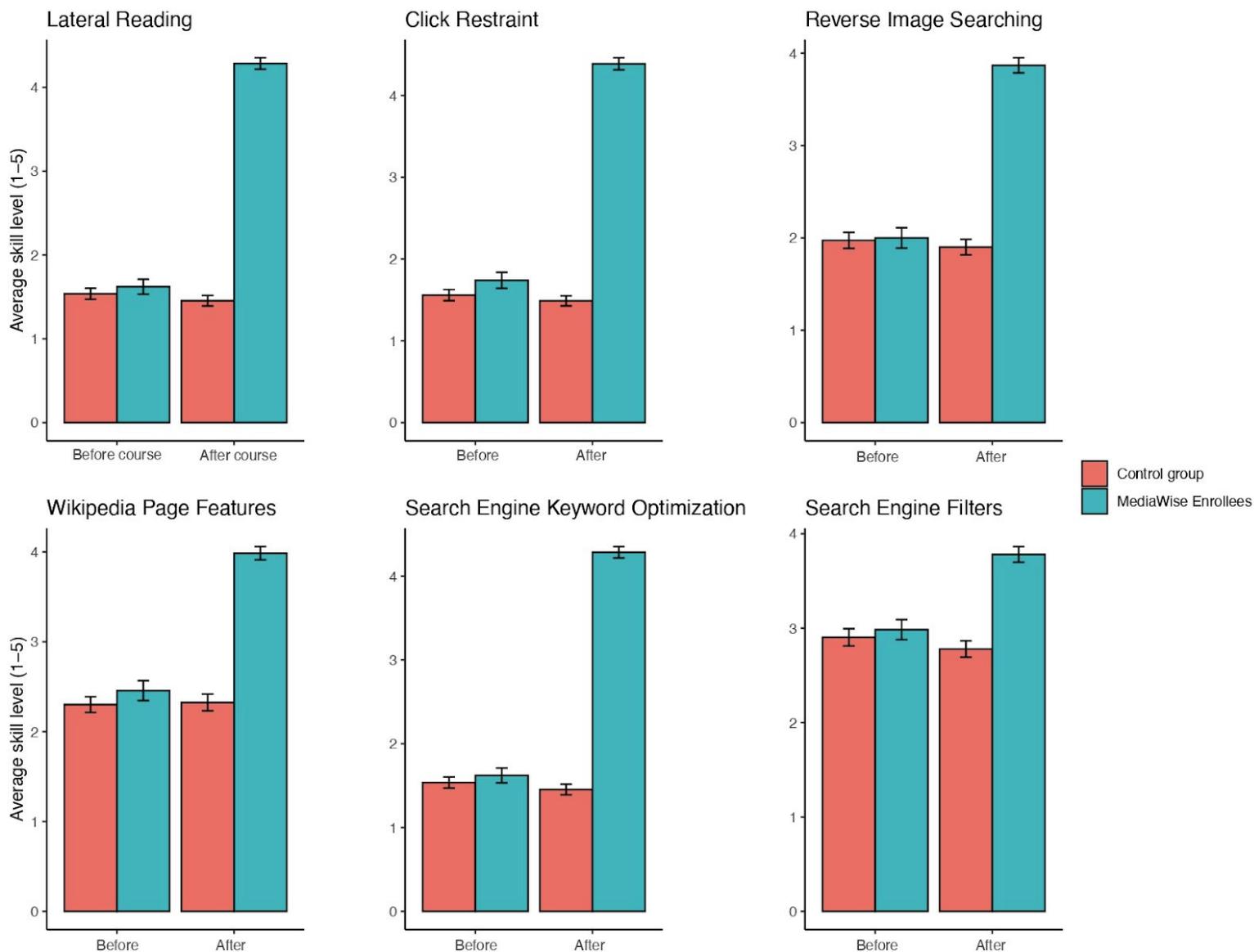
Note: "MediaWise Course" variable: control group = 0; MediaWise course enrollee group = 1. "Posttest" variable: post survey = 1; pre survey = 0. "Political Ideology" variable: Very liberal = 1; Liberal = 2; Moderate = 3; Conservative = 4; Very conservative = 5. Regression coefficients are shown with standard errors in parentheses. Subjects and news headlines are modeled as random effects in all models (Baayen et al., 2008).

Figure 1: Predicted probabilities of correctly judging news headline veracity



Note: Estimated predicted probability of accurately judging the veracity of news headlines broken down by all news headlines, among only true news headlines, and among only false news headlines (Table 2 Models 2, 4, and 6, respectively). Higher values indicate greater predicted probability of correctly judging the veracity of a given headline. Bars are 95% confidence intervals.

Figure 2: Levels of skill on techniques important for identifying disinformation online



Note: Bars represent the average level of reported skill (ranging from 1-5) on each of 6 skills important for identifying misinformation online that were taught in the course. Error bars represent standard errors. “Before” indicates that the average level of skill was computed from pretest measurements and “After” indicates that the average level of skill was computed from posttest measurements. Blue bars represent those in the MediaWise enrollee group and red bars represent those in the control group.

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