HACKING YOUR MIND

Formative Evaluation Report

May 2019

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Executive Summary

On October 1, 2015, Oregon Public Broadcasting (OPB) was awarded a 3-year grant of 2.7 million dollars from the National Science Foundation (NSF) to fund the project Hacking Your Mind (award number 1515520). The Portland office of RMC Research was contracted by OPB to conduct the accountability evaluation, the formative evaluation, and the research study. This report describes the methods, results, and recommendations for the formative evaluation only. For the formative evaluation OPB created tag lines (which are brief dramatic or memorable phrases to hook potential viewers) and 5-minute video clips from the television show that could later be used during a social media marketing campaign. OPB and RMC met on May 16, 2019 to discuss the results of the evaluation and next steps.

Evaluation Participant Characteristics

This evaluation captured responses from survey participants in nearly every state of the United States. A total of **1,010 individuals** began the survey; **769 (76%)** both (a) are in the "target audience" (i.e., aged 15–50) and (b) completed all questions in Section 1 of the survey and **comprise the primary analytic sample**. The sample size was sufficient to conduct all analytic tests. The primary analytic sample was analyzed in aggregate ($n = 769$), as well as by subgroup. Subgroup comparisons include: **Age comparisons**: Teens (aged 15-18; $n = 153$), Millennials (aged 19–34; $n = 223$), and Gen-Xers (aged 35–50; $n = 393$); **Gender comparisons**: females ($n = 463$) and males ($n = 220$); **Race/ethnicity comparisons:** "underrepresented in science race" (i.e., "UR," $n = 247$) and ("non-UR," $n = 439$). There were significant differences in the distributions of gender and race/ethnicity among age groups in the primary analytic sample: (a) there are more females than males and more female Gen-Xers than female Teens or Millennials, and (b) the younger the age group, the larger the percentage of UR.

Television Habits

For the primary analytic sample, respondents reported watching public television, that TV was the most popular television viewing device, and that Netflix is the most popular way to watch TV. There were differences in television habits by age group: (a) public television viewership appears to increase by age, (b) Teens and Millennials are most likely to watch shows on Netflix, and (c) Gen-Xers are more likely to watch TV via cable or antenna. There were no differences in television habits by gender. There were differences in television habits by underrepresented race (UR) vs. non-underrepresented race (non-UR): (a) UR watch more public television than non-UR race, (b) UR are more likely to watch TV on a phone and gaming console than non-UR race, and (c) UR more likely to watch TV via Netflix and YouTube than non-UR race.

Science Interest

Using the Science Interest scale to categorize respondents, 56% ($n = 390$) are categorized as "science people" (i.e., Science Interest score > 0.5 on a scale from 0 to 1). There were significant differences between science people and non-science people: (a) science people are most likely to be Millennials or male, (b) science people watch more public television than non-science people, (c) science people are more likely to watch TV on a phone and laptop/desktop than non-science people, and (d) science people are more likely to watch TV via Hulu, Amazon, and YouTube than non-science people.

Tag Line Findings

There were differences in tag line preferences among age groups, UR vs. non-UR, and science vs. non-science people. There were no significant differences by gender. The 3 most popular tag lines overall were:

1. How can you save the planet? ($M = 3.24$)
2. How do social media companies hack your mind? ($M = 3.14$)
3. How do cops treat black people differently than white people? ($M = 3.10$)

The 3 least popular tag lines overall were:

1. Who's more tribal? Monkeys or humans? ($M = 2.45$)
2. Are dogs smarter than people? ($M = 2.76$)
3. Even if you're not racist, can race be used to change how you vote? ($M = 2.79$)

At the meeting on May 19, 2019 OPB shared that they were surprised but excited that the tag lines had a broad appeal across audiences and that in particular UR groups and younger audiences were interested in the series' topics.

Hook Findings

Survey participants were presented with 4 hooks. The hook types included (1) a **close-up picture** from the video, (2) a **picture of the host**, (3) a **stylized science** image, and a (4) **dramatic stock art** photograph. The top six hooks are shown in Exhibit 1. Of the top hooks selected, 3 of the 6 were the dramatic stock art photograph; 2 were the stylized science image; and 1 was a close-up picture.

Exhibit 1: Top-Rated Hooks
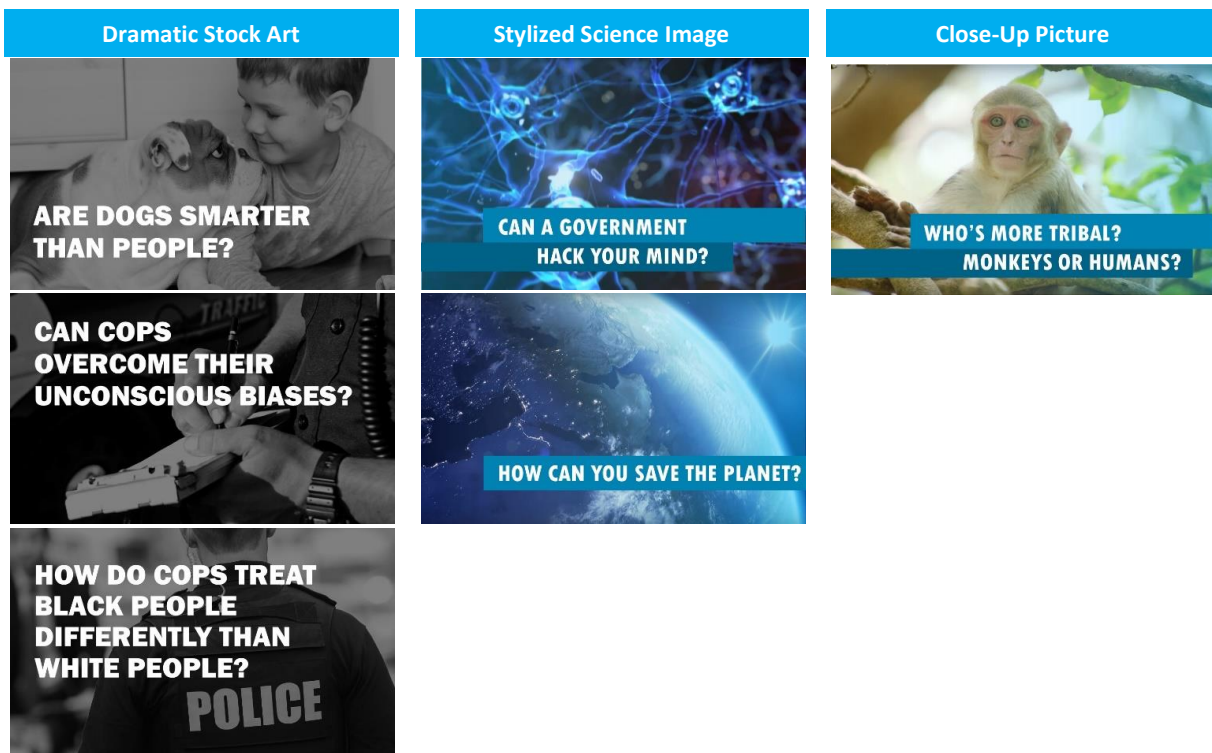
Recommendations

In terms of marketing the show to **appeal to the largest audience**, OPB should consider:

- Using the top 3 **tag lines** that appealed to the widest group of individuals. OPB could also use any tag lines that received at least a mean of 3 or higher.
- Using the very general **tag line**, "What new discoveries are being made in the social, behavioral, and economic sciences?" because it surprisingly ranked quite high compared to the more topic-specific tag lines.
- Developing more interesting **tag lines** for the tag lines with the lowest ratings.
- Using the top-rated **hooks/images** that utilize **dramatic stock art** (dramatic black and white stock photo with bold white text overlaid) or a **stylized science** image (a dramatic science image still shot with a blue filter overlaid) along with the tag line to increase the likelihood that someone will click on the social media clip. OPB should not include photographs of the host or people within the video as a hook.
- Creating **hooks/images** to go with each social media clip that utilize either the **dramatic stock art** approach or **stylized science images** (i.e., an edited image created specifically for marketing purposes).
- Pairing the highest rated image for, "Can a government hack your mind?" with the higher rated tag line, "How do social media companies hack your mind?"

At the meeting on May 16, 2019 OPB noted they will consider all of these findings when developing their marketing efforts.

To attract a **younger and more diverse audience** to HYM OPB might consider:

- Distributing the series via a streaming service, especially Netflix or YouTube, to reach a younger audience. At the meeting on May 16, 2019 OPB shared that they are deliberating which approach is the best for streaming the series.
- Rolling out separate social media campaigns that are targeted to each age group using the top-rated tag lines for that group. **Teens'** top 3 tag lines were: (a) can a government hack your mind, (b) how do social media companies hack your mind, and (c) how can you save the planet. **Millennials'** top 3 tag lines were: (a) how can you save the planet, (b) how do social media companies hack your mind, and (c) what new discoveries are being made in the social, behavioral, and economic sciences. **Gen-Xers'** top 3 tag lines were: (a) how can you save the planet, (b) can cops overcome their unconscious biases, and (c) what new discoveries are being made in the social, behavioral, and economic sciences.
- Rolling out a separate social media campaign to attract non-science people using the highest rated tag lines per group: **Non-science people'**s top 3 tag lines were: (a)how can you save the planet, (b) how do social media companies hack your mind, and (c) what new discoveries are being made in the social, behavioral, and economic sciences.

To **broaden access** to and engagement in STEM learning the HYM project has focused on those underrepresented in STEM including females, underrepresented race/ethnicity (UR), and non-science people. Surprisingly there were few differences in findings by gender. Therefore, there are no recommendations to OPB regarding increased engagement with females, and gender likely will not be a focus in the upcoming research study. Those UR and non-science people exhibited preferences for certain tag lines and hooks. If OPB aims to increase viewership by underrepresented groups, OPB should consider a targeted marketing approach specifically for UR and non-science people. To **broaden access**

to STEM learning, RMC will consider the best research design to assess outcomes for underrepresented groups.

The primary question for the **upcoming research study** is, "Does a person who engages in low doses of the treatment experience similar learning and interest gains as someone who engages in high doses of the treatment?" In the research study participants will be assigned to 1 of 3 conditions: (1) no exposure to HYM, (2) brief videos, and (3) full episode. There are two hypotheses.

- **Hypothesis 1.** People in the high-dose treatment group (full episode) will experience the greatest gains in awareness, understanding, and interest in STEM compared to the other study groups.
- **Hypothesis 2.** People in the low-dose treatment group (short videos) will experience significant gains in their awareness, understanding, and interest in STEM.

During the meeting on May 16, 2019 OPB presented some potential additional hypotheses: 1) The clips will perform better with non-science people and 2) the clips will perform better with a younger audience. The formative evaluation results will inform the research study. For the **research study** RMC Research will:

- Use only the highest rated clips and tag lines. The lower-rated tag lines and the associated clips will not be included in the research study. RMC may narrow the study to the top 3 tag lines. At the meeting on May 19, 2019 OPB and RMC decided that OPB would use the information from this formative evaluation to create new tag lines. OPB and RMC noticed that the top 3 tag lines all started with the word 'how' which could be a good approach to revising all lower performing tag lines. Any tag lines that referenced animal were rated much lower than tag lines that didn't mention animals. So, any references to animals will likely be excluded from the tag lines.
- Use only 3 episodes. During the meeting on May 19, 2019 OPB and RMC decided the 3 top rated videos would be used in the research study including episode 4 (saving the planet), 3 (social media companies hacking) and 1 (bias).
- Use the Science Interest scale created during this evaluation to assess pre-post change. RMC may use the longer original scale for the research study.
- Consider examining further what people mean when they say they watch public television. Does this survey question need to be revised? What does the term "public television" mean to people?
- Consider focusing the study on a younger target audience. Teens were the most interested in the HYM topics, followed by Millennials, and then Gen-Xers. RMC may narrow the focus of the research study to Teens and analyze the data by gender, underrepresented race/ethnicity, and science interest. Another possibility would be to do one study with Teens and another with Millennials, since Millennials had such a high proportion of science people. Regardless of age, RMC will place a strong emphasis on recruiting those in the underrepresented race/ethnicity group. Underrepresented race/ethnicity individuals were significantly more interested in the HYM topics than non-underrepresented race/ethnicity individuals. At the meeting on May 19, 2019 OPB and RMC decided to focus on two target audiences including the typical PBS viewer who is 55 and older and then a younger target audience. In the upcoming months, OPB and RMC will discuss the specific parameters of both target audiences.
- Develop a content assessment with OPB for the research study. At the meeting on May 19, 2019 OPB and RMC discussed potential items to include on the content assessment. The

structure will likely be an open-ended question rather than close ended to capture increases in knowledge regarding the big ideas of the show.

- Discuss with OPB any lingering questions that OPB wants RMC to address in the research study. All lingering questions were discussed at the meeting on May 19, 2019.

Introduction

On October 1, 2015, Oregon Public Broadcasting (OPB) was awarded a 3-year grant of 2.7 million dollars from the National Science Foundation (NSF) under the Research on Learning in Formal and Informal Settings division of the Advancing Informal STEM Learning (AISL) program (program solicitation NSF 15-593; STEM is an abbreviation for science, technology, engineering, and mathematics) to fund the project Hacking Your Mind (award number 1515520). According to the 2019 program solicitation, the AISL program,

> "…seeks to advance new approaches to and evidence-based understanding of the design and development of STEM learning opportunities for the public in informal environments; provide multiple pathways for broadening access to and engagement in STEM learning experiences; advance innovative research on and assessment of STEM learning in informal environments; and engage the public of all ages in learning STEM in informal environments." Page 1

A major public and social media project, Hacking Your Mind (HYM) plans to engage Americans with the new discoveries being made in the social, behavioral, and economic (SBE) sciences and the remarkable insights these discoveries offer into how each of us makes a vast array of judgments and decisions every day and what impact this highly personal phenomenon has on almost every aspect of our lives. The logic model in **Appendix A** shows the Hacking Your Mind resources, activities, intermediate outcomes, and long-term impacts. OPB plans to provide 3 primary products:

- A riveting, 4-part primetime public television special featuring top names in the social, behavioral, and economic sciences field.
- A social media campaign to attract new and younger audiences.
- An experimental research study that will increase understanding of how participants learn in different informal settings and how learning varies by participant type.

To attract and engage a broader and younger audience to this informal science education project, OPB will create short, lively videos of average Americans making decisions and disseminate them via social media platforms, enticing more people to connect on an emotional level and then, via mobile devices or online, view the television series or engage with one of the project's more participatory components.

To date OPB is in the final editing stages of the 4-part primetime public television series. Information conducted for this formative evaluation will inform the OPB social media campaign to attract new and younger audiences. The experimental research study is planned for summer or fall of 2019.

STEM Careers

> *Informal STEM learning environments and experiences provide a unique opportunity to spark interest and engagement in STEM that could lead to STEM careers.*

According to a 2017 report from the U.S. Bureau of Labor Statistics, there were nearly 8.6 million STEM jobs in 2015. Although wages for STEM occupations greatly vary, the national average for all STEM occupations was $87,570--nearly double the national average for non-STEM occupations ($45,700). Between 2009 and 2015 STEM occupations grew by 10.5%.

Underrepresented Groups

> *Both women and certain racial and ethnic groups are underrepresented in STEM careers.*

According to the 2017 *Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017* NSF report:

"The representation of certain groups of people in science and engineering (S&E) education and employment differs from their representation in the U.S. population. Women, persons with disabilities, and three racial and ethnic groups—blacks, Hispanics, and American Indians or Alaska Natives—are underrepresented in S&E. While women have reached parity with men among S&E degree recipients overall, they constitute disproportionally smaller percentages of employed scientists and engineers than they do of the U.S. population. Blacks, Hispanics, and American Indians or Alaska Natives have gradually increased their share of S&E degrees, but they remain underrepresented in educational attainment and the S&E workforce. By contrast, Asians are overrepresented among S&E degree recipients and employed scientists and engineers." Page 2

While the 2017 NSF report identified three underrepresented racial and ethnic groups in science and engineering specifically—blacks, Hispanics, and American Indians or Alaska Natives—other sources (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2011) include Pacific Islanders.

HYM Impacts on the Informal STEM Learning Field

As shown in the Hacking Your Mind logic model (**Appendix A**), the project aims to make 2 overall contributions to the field: (a) broadening access to and engagement in STEM learning and (b) enhancing learning in informal STEM. This project plans to produce formative evaluation findings and research study findings of practical importance for informal science educators to understand how much exposure is needed to produce meaningful participant gains and avenues to attract a broader audience to informal STEM. Hacking Your Mind will publish the results of the research and evaluation to help public media producers of informal science content and the organizations that promote and disseminate the content better understand what works. In the evolving landscape of social media and new platforms, as audiences who became digital natives in their childhood mature into adults, this project's findings will help producers determine what they can do to ensure they capture and dialogue with this audience.

HYM Broader Impacts

Hacking Your Mind will expose large public audiences to new social, behavioral, and economic sciences research, which has direct and clear applications in numerous aspects of their own lives. By so doing Hacking Your Mind will create increased public scientific literacy and increased public understanding of the importance of scientific research to all Americans and the necessity of continued public support for such research. In addition, the project will expose both youth in general and underserved youth in

particular to the relevance of social, behavioral, and economic sciences research to their own lives and to the far-more-fascinating-than-expected profession that has produced that research, thereby helping to increase the potential that the youth exposed to Hacking Your Mind will choose the social, behavioral, and economic sciences as a career. The project will also give Americans of all ages who participate in public life additional tools that will contribute to their effectiveness as voters and as advocates for more effective public policies that incorporate social, behavioral, and economic sciences insights into how Americans make decisions. Finally, by exposing policymakers themselves and the thought-leaders who make up a sizeable portion of the Public Broadcasting System (PBS) audience to these new discoveries, Hacking Your Mind has the potential to directly contribute to the creation of more effective laws and policies and to greater understanding by those policymakers of the critical importance of scientific research to American life.

Research and Evaluation

The Portland office of RMC Research was contracted by OPB to conduct the accountability evaluation, the formative evaluation, and the research study. This report describes the methods, results, and recommendations for the formative evaluation only. For the formative evaluation OPB created tag lines which are brief dramatic or memorable phrases to engage potential viewers and 5-minute video clips from the television show that could later be used during a social media marketing campaign.

Methods and Design

RMC Research conducted the **formative evaluation** in March and April 2019 to address the primary evaluation question.

> **Primary Question**: *How can the project increase participant engagement in informal STEM learning?*

The **purpose of the formative evaluation** is to ensure the **tag lines** and the **social media clips** created by OPB engage the target audiences. OPB will use the data from this evaluation to a) decide on the best approach to engage viewers and increase the likelihood that a diverse audience will view Hacking Your Mind (HYM); and improve their social media outreach strategies to increase participant engagement in informal STEM learning. **OPB, please note** that the focus of this evaluation is primarily assessing interest (i.e., which topics interest which target audience), and then comparing and contrasting the most effective **hooks** (i.e., attention-grabbing images) to encourage viewers to watch HYM. OPB will use the formative evaluation findings to make changes to the **tag lines**, **social media clips**, and **hooks**. OPB will use the updated tag lines, social media clips and hooks in their social media campaign that will occur immediately prior to or during the launch of the show. The "TV programs" will <u>not</u> change based on these results. RMC will use the hooks that tested well, and the social media videos associated with the hooks, in the research study in summer or fall of 2019.

Timeline

The timeline for the formative evaluation is shown in Exhibit 2.

Exhibit 2: Formative Evaluation Timeline

Date	Activity	Description
February 2019	Production	▶ OPB completed the filming of the series and is currently in editing. OPB completed 6 five-minute social media videos.
February 2019	Formative	▶ RMC Research and OPB collaborated on the evaluation plan and survey. ▶ RMC Research created Facebook ads.
March/April 2019	Formative	▶ RMC Research conducted a formative evaluation (Facebook study).
April/May 2019	Formative	▶ RMC Research analyzed data and provided OPB with a brief.
May 2019	Formative	▶ RMC Research and OPB review the formative results. ▶ RMC Research and OPB make decisions that affect the research study.
June 2019	Production	▶ OPB will complete editing of the series.
Summer/Fall 2019	Research Study	▶ RMC Research conducts the research study.

Target Audience

The primary target audience for the Hacking Your Mind (HYM) television series is the PBS primetime television viewing audience. According to the PBS Research Audience Insight 2016 Annual Report, the PBS primetime audience is older (median age of 65) and college educated (43% have a 4-year degree). To broaden participation beyond the typical PBS viewer, the formative evaluation included 3 study

groups: (1) Teens aged 15–18, (2) Millennials aged 19–34, and (3) Gen-Xers aged 35–50. Within the targeted study groups for this evaluation, RMC Research aimed for equal representation of groups underrepresented in STEM (i.e., females and/or an underrepresented racial/ethnic group [American Indian or Alaska Native, Black or African American, Native Hawaiian or Pacific Islander, or Hispanic]).

Instrument Development

RMC Research and OPB collaborated in February 2019 to create the online formative survey. The final survey is included in **Appendix B: Hacking Your Mind Online Formative Survey**. The survey includes 5 sections.

Section 1: Tag Lines and Interest in Show Sub-Topics

Results from Section 1 of the survey indicate which of the show subtopics and tag lines are of most interest for each target audience. These data serve two main functions. First, these data will assist OPB in later marketing efforts for the younger target audiences. If for example, teens are only interested in the implicit bias videos, and not the others, then the OPB marketing team could focus solely on developing and distributing marketing materials aimed at teens for this episode and not for the episodes that were of less interest. Second, these data will help RMC Research hone the focus of the research study. For example, if younger audiences are overwhelmingly interested in the tribal video and dog video, but not interested at all in the other videos, then only the tribal and dog videos will be tested with the younger audiences during the research study.

Section 2: Best Hook/Image to Engage Younger Audience

The target audiences were presented with 4 hooks and the survey question, "Below are some images associated with the new television show. For each question, please select the image that makes you most interested in watching the show." The hook types included 1) a close-up picture from the video, 2) a picture of the host, 3) a stylized science image, and a 4) dramatic stock art photograph. These data provide information regarding which type of hook may be the best approach to engage the younger audiences in this science content and increase the likelihood that they will watch the 5-minute video or the full show. OPB will be able to use the most successful hooks from this evaluation, or develop similar hooks based on these results when promoting the show via social media.

Section 3: Television Habits

There were 3 questions regarding television habits. These data provide descriptive information regarding how these target audiences engage with television. One of the questions in this section is whether or not the participant watches public television. Originally, the intent was to create a variable for the analyses to present the results by public television viewers vs. those who do not watch public television. Based on the age of the target audiences and published estimates of national PBS viewership, the research team predicted there would be few public television viewers; however, the distribution in responses to this survey question differ considerably from the expected distributions, suggesting that "public television" may have been interpreted more broadly than "PBS" by survey respondents (see Exhibit 3 below; 67% of the target audience responded that they watch public television *sometimes* or *often*). For example, some audiences may have considered shows viewed via antenna television as "public television." In the future the evaluation team will need to more carefully craft this type of survey item. Therefore, results by "public television viewers" should be interpreted with caution.

Exhibit 3: Aggregated Responses to "Do you watch public television?"

Target Audience	7%	26%	42%	25%
	Never	Rarely	Sometimes	Often
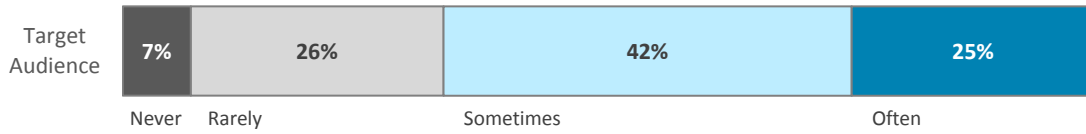
Note. n = 709.

Section 4: Science Interest

An important part of informal science evaluation is studying science interest. While this evaluation doesn't try to change the participants' interest in science, data were gathered to determine if the participant is someone who has a high informal science interest or not. These data will provide useful findings to help engage individuals in science activities who do not consider themselves a "science person." To identify a scale for this evaluation, the evaluation team searched the resources in https://www.informalscience.org/ and located the Cornell Lab of Ornithology 2014 Adult Interest in Science Scale. The original scale included 12 items with 5 response options (*strongly disagree, disagree, neutral, agree, and strongly agree*). Due to the brief nature of the Hacking Your Mind online survey, the evaluation team selected 5 of the 12 items and used 4 response options (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*). These items were used to create the Science Interest scale:

1. I do science related hobbies in my free time,
2. I want to understand how processes in science work,
3. I enjoy learning about new scientific discoveries,
4. Other people would describe me as a 'science person, and
5. I am very interested in science.

RMC Research combined the 5 science interest survey items into a Science Interest Scale ranging from 0 to 1: response options for each item were coded numerically and then summed and normalized using the following formula:

$$z_i = \frac{x_i - \min(x)}{\max(x) - \min(x)}$$

The minimum value in this case would be 5 responses of *strongly disagree* (coded value of 1 x 5 = **5**) and the maximum value would be 5 responses of *strongly agree* (coded value of 4 x 5 = **20**). For example, if an individual responded to the 5 scale items as follows—(1) *disagree*, (2) *agree*, (3) *agree*, (4) *strongly agree*, (5) *agree*—that person's scale score would be calculated as:

$$z_i = \frac{(2 + 3 + 3 + 4 + 3) - 5}{20 - 5} = 0.67$$

Cronbach's alpha was used to determine the reliability and internal consistency for this scale. Cronbach's alpha scores range from 0 to 1: the higher the score, the higher the reliability of the scale. In general, Cronbach's alpha should be 0.70 or higher (a Cronbach's alpha of 0.70 indicates that the scale may be 70% reliable and 30% unreliable). Cronbach's alpha for the Science Interest scale was 0.89 (*n* = 756). The Science Interest scale was used in the analyses to report differences by those high and low on the scale. Later, during the research study, when the 5-minute videos are shown to participants we hope to see increased Science Interest Scale scores pre to post.

Section 5: Demographics

This section gathered demographic data for the evaluation. RMC Research created the variable "age" by using the age variable to create the 3 study groups: Teens, Millennials, and Gen-Xers. As noted above, findings are reported separately for each target audience. The research team created the variable "underrepresented in science gender" by coding females as 1 and males as 0 (those who skipped this item or gave multiple responses and those who responded "transgender" or "other" were coded as missing). Data are reported separately by this variable. The evaluation team created the variable "underrepresented in science race" by coding those identifying as American Indian or Alaska Native, Black or African American, Native Hawaiian or Other Pacific Islander, or Hispanic as 1 and all others as 0; those who provided multiple responses were coded as underrepresented race (noted as UR throughout the report) if at least 1 choice was UR; those who provided multiple responses of both White and Asian were coded as non-underrepresented race (non-UR); and those who skipped this item or who only selected "other" but wrote in a non-response (e.g., "Not your business") were coded as missing.

Recruitment

The goal in recruitment was to capture an adequate sample size for the most specific subgroups (subgroups by age, gender, and race/ethnicity) to allow for RMC Research to conduct the planned analyses. Prior to initiating the recruitment phase, RMC Research conducted power analyses using G*Power and at least 140 participants are necessary to achieve the desired power of 0.95 and an alpha of 0.05 with a medium effect size to assess differences among groups (see Exhibit 4). Therefore, the minimum number of participants needed is 140 per group so the targeted recruitment number should exceed 140 to account for attrition (e.g., people clicking on survey and only completing part of it, ineligibility, etc.). This means a minimum of 420 respondents are required to meet sampling targets (3 age groups x 140 participants = 420 participants).

> For the analyses, at least 140 respondents are needed for each subgroup shown in Exhibit 4.

Exhibit 4: Study Group Sample Size Targets

Study Groups	Target	Actual
Teens aged 15–18	$n = 140$	*TBD*
Millennials aged 19–34	$n = 140$	*TBD*
Gen-Xers aged 35–50	$n = 140$	*TBD*
Females	$n = 140$	*TBD*
Males	$n = 140$	*TBD*
Underrepresented race (UR)	$n = 140$	*TBD*
Non-underrepresented race (Non-UR)	$n = 140$	*TBD*

Formative evaluation participants were recruited across the United States via Facebook ads. In March 2019 RMC prepared for the Facebook campaign by creating an initial set of ads (see **Appendix C**). Different ads were created for the 3 target audiences: Teens (aged 15–18), Millennials (aged 19–34), and Gen Xers (aged 35–50), and ads were created to target groups underrepresented in STEM (e.g., Black, Hispanic). RMC Research launched the ads on March 11, 2019 and concluded the campaign on April 2, 2019. Participants clicked on an ad, saw the consent information, and then decided whether or not to proceed to the anonymous Survey Monkey link and complete the survey (**Appendix B**).

RMC Research had to pay each time a participant clicks on the ad, even if the participant didn't complete a survey. Therefore, the campaign was monitored on a daily basis by a social media task lead. This task lead adjusted the ads (e.g., removed poorly performing ads, created new ads, edited ad images and copywriting based on ad performance, allotted more funds to high performing ads) and the method for targeting audiences (e.g., ads targeted by city, zip code, or other variables) on a daily basis. The total costs for the ads was $9000; the total number of clicks 7,784; and total number of post engagements (likes, comments, and link clicks) was 334.

Data Collection

As noted, data were collected for approximately 3 weeks. It is estimated the survey took approximately 15 minutes to complete. To abide by the National Science Foundation guidelines, RMC Research did not randomly select participants to receive a gift card. Instead one $25 was selected for every 75 surveys, and three $100 gift cards were selected every 75 surveys at the conclusion of the evaluation. Contact information was collected from participants in a separate Survey Monkey survey (see **Appendix D**) to ensure anonymity of the evaluation survey responses. Gift cards were emailed to survey respondents. **Appendix E: Human Subjects Protections** describes how RMC Research complied with research ethics and online data collection laws.

Analytic Sample

The primary analytic sample consists of the 769 respondents who (a) consented to participate in the survey, (b) fall into the "target audience" (i.e., are at least 15 years old but not older than 50 years old), and (c) responded to all of the Section 1 items on the survey (i.e., those who completed at least Section 1 of the survey were considered a participant). The bullet points below show attrition from those who began the survey to those who comprise the final analytic sample.

- A total of **1,010 individuals** entered and responded to initial consent question, "Do you agree to participate in the TV Survey?".
- **983 (97%)** responded affirmatively and progressed to the survey.
- **967 (96%)** consenting individuals responded to the first survey question (age), and of those,
    - **3** were under age 15 and therefore ineligible to participate.
    - **57** respondents were older than age 50.
    - These **60** respondents whose age was outside the range for the target audience were excluded from the analytic sample.
    - **138** left the survey after answering this age question.
- **769 (76%)** completed all questions in Section 1 of the survey and **comprise the primary analytic sample**.

The primary analytic sample was analyzed in aggregate (n = 769), as well as by subgroup. Subgroup comparisons include:

- **Age comparisons**: Teens (aged 15-18; n = 153), Millennials (aged 19–34; n = 223), and Gen Xers (aged 35–50; n = 393). The subgroup analytic sample size for age is ***n* = 769**.
- **Gender comparisons**: The research team created the variable "underrepresented in science gender" by coding females as 1 (n = 463) and males as 0 (n = 220); those who responded "transgender," "other," gave multiple responses, or skipped this item were excluded from sub analyses by gender (n = 86; 11%). The subgroup analytic sample size for gender is ***n* = 683**.

- **Race/ethnicity comparisons:** The research team created the variable "underrepresented in science race" (i.e., "UR") by coding those identifying as American Indian or Alaska Native, Black or African American, Native Hawaiian or Other Pacific Islander, or Hispanic as 1 (*n* = 247) and all others as 0 ("non-UR," *n* = 439); those who skipped this item or who only selected "other" but wrote in a non-response (e.g., "Not your business") were excluded from sub analyses by gender (*n* = 73; 9%). The subgroup analytic sample size for race/ethnicity comparison is ***n* = 696**.

A total of 1,010 individuals started the survey. After attrition and ineligible survey participants, the primary analytic sample consists of 769 individuals. As shown below in Exhibit 5, the sample size for each subgroup in the final analytic sample exceeds the target of 140 per subgroup.

Exhibit 5: Study Group Sample Size Targets

> The sample size for each subgroup exceeds the target of 140 per subgroup.

Study Groups	Target	Actual	Percentage of Target
Teens aged 15–18	*n* = 140	*n* = 153	109%
Millennials aged 19–34	*n* = 140	*n* = 223	159%
Gen-Xers aged 35–50	*n* = 140	*n* = 393	281%
Females	*n* = 140	*n* = 463	331%
Males	*n* = 140	*n* = 220	157%
Underrepresented race (UR)	*n* = 140	*n* = 247	176%
Non-underrepresented race (Non-UR)	*n* = 140	*n* = 439	314%

ITEM-LEVEL ATTRITION AND NON-RESPONSE BIAS

> There were no evident patterns of non-response bias i.e., patterns of certain groups (e.g., females) not answering questions or exiting the survey at a certain point.

All survey respondents in the analytic sample who progressed beyond the age filtering item responded to all Section 1 items--there was no item-level attrition within Section 1. Most respondents who left the survey prior to completing it dropped out in Section 2 (testing different hooks)—a total of 56 individuals left the survey before completing Section 2 (7% of the analytic sample). Four people dropped out prior to completing Section 3 (TV habits) and 7 more dropped out between Section 3 and Section 4 (science interest). However, everyone who started Section 4 completed it (*n* = 702; 91% of the analytic sample). Although gender or race/ethnicity may have been intentionally skipped by some respondents, 701 individuals responded to the request for zipcode at the end of Section 5 (demographics); therefore, an estimated 91% of the analytic sample completed the survey.

A Chi-squared test to compare the distribution of age groups among respondents at the beginning and the end of the survey revealed that there is not strong evidence of a particular group exiting the survey prior to completing it. In other words, there is not clear evidence of an association between the age of the respondent and their decision to exit the survey early. Since the other demographic questions are asked at the end of the survey (gender, race/ethnicity), it is not possible to analyze non-response bias by those variables. Research (Steele et al, 1997, Spencer et al. 1999, and Steel et all, 1995) has shown it is best practice to place demographic questions at the end of survey to avoid "stereotype threat." For example, if a woman was completing the survey and answered the gender demographic question at the

beginning of the survey and then completed the science interest questions, she is likely to apply the stereotype to herself that "women are not interested in science" and answer the questions differently.

Analytic Plan

Only findings from the primary analytic sample are summarized in this report. Responses are summarized descriptively in aggregate (n = 769) and also broken out by participant subgroups (age: n = 769; gender: n = 683; race/ethnicity: n = 696). In the analyses, RMC Research used Mann-Whitney U tests, independent t-tests, chi-squared tests, Kruskal-Wallis tests (an extension of Mann-Whitney for more than 2 categories), and one-way ANOVA. The statistical tests used for each analysis are noted within the exhibit notes and detailed information is included in **Appendix F: Data Tables**. For all tests differences were deemed significant at $p < 0.05$. Bonferroni corrections were applied to post-hoc analyses to mitigate Type I (i.e., "false positive") error rates.

Limitations

A random sampling approach is generally considered more rigorous, because it typically results in a more demographically representative sample. For this formative evaluation, it would not be possible to draw a random sample from the entire population of individuals within the United States within the target audiences and only have the selected individuals complete the survey. Given the difficulty of the randomized approach, social media can be a cost-effective way to reach a representative sample and reach groups underrepresented in STEM. The evaluation team understands that this approach is a form of convenience sampling; therefore, the results may be biased and cannot be generalized to the entire population.

Survey Findings

This chapter has three parts. The first part describes survey participant demographics, television habits, and science interests. The second part provides the results of the tag line testing by age, gender, race/ethnicity, and science interest. The third part provides the results of the hook testing by age, gender, race/ethnicity, and science interest.

Part 1: Participant Characteristics

This evaluation captured responses from survey participants in nearly every state of the United States (at least 1 respondent from all states except Hawaii, Idaho, and North Dakota; see Exhibit 6). The highest concentration of respondents live in Florida (n = 118), California (n = 117), and New York (n = 94).

Exhibit 6: Survey Respondents' Geographic Location

The evaluation captured responses from survey participants in nearly every state of the United States.
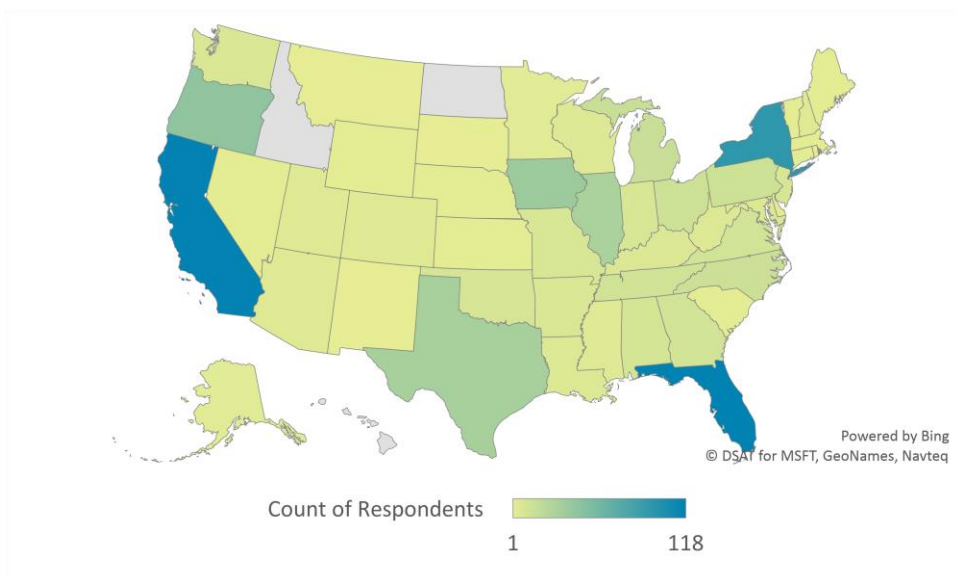
Note. n = 700. Darker shading corresponds to a higher concentration of respondents.

Exhibit 7 shows the subgroup distribution within the primary analytic sample. There were significant differences in the distributions of gender and race/ethnicity among age groups (p < 0.001 in both cases, using chi-squared tests). Overall, there are more females than males in the primary analytic sample: the primary analytic sample is approximately 61% female and 28% male. Approximately a quarter of the primary analytic sample are female Gen Xers (26% of respondents who provided responses for age, race, and gender). Differences in race/ethnicity show that the younger the age group, the larger the percentage of UR (Teens: 50% UR; Millennials: 39% UR; Gen Xers: 31% UR).

Exhibit 7: Primary Analytic Sample Subgroup Distribution

> *There were significant differences in the distributions of gender and race/ethnicity among age groups in the primary analytic sample: (a) there are more females than males and more female Gen-Xers than female Teens or Millennials and (b) the younger the age group, the larger the percentage of UR (Teens: 50% UR; Millennials: 39% UR; Gen-Xers: 31% UR).*

	Female UR	Female Non-UR	Male UR	Male Non-UR
Teens n = 134	40%	30%	10%	20%
Millennials n = 202	23%	34%	14%	29%
Gen-Xers n = 347	22%	51%	8%	19%
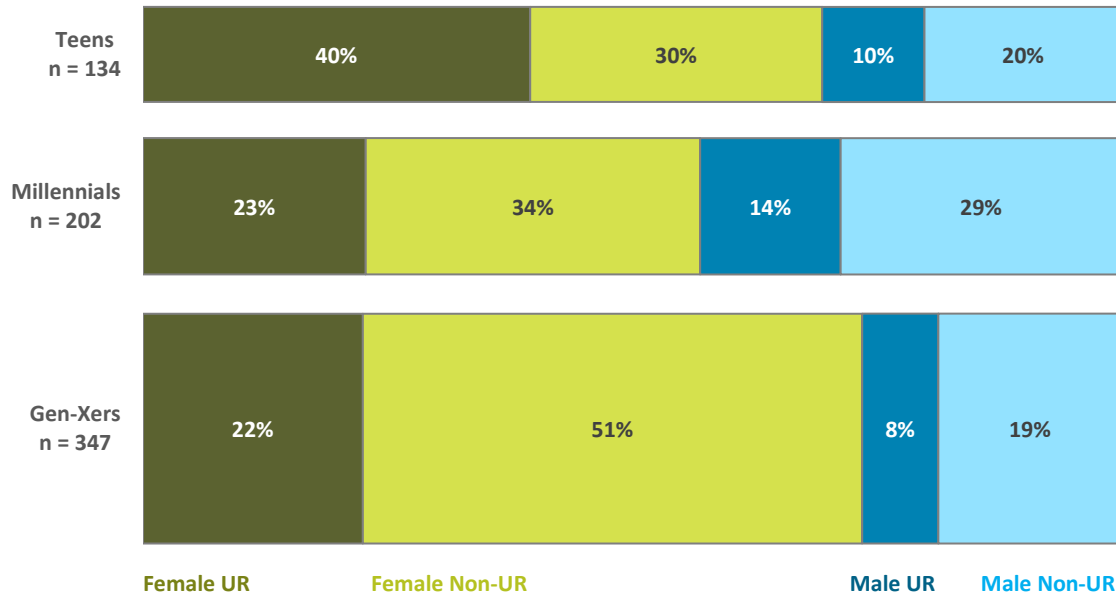
Note. n = 683. This exhibit includes individuals who provided (1) age, (2) gender, and (3) race/ethnicity. In the primary analytic sample n = 769; there were 86 individuals who did not provide the required demographic data and these individuals are not included in this exhibit. Differences assessed using chi-squared tests and deemed significant for $p < 0.05$.

Television Habits

There were 3 questions regarding television habits: (1) "What type of device do you watch TV on?" (2) "How do you watch television programs?" and (3) "Do you watch public television?" These data provide descriptive information regarding how these target audiences engage with television.

> *For the primary analytic sample, respondents reported watching public television, that TV was the most popular television viewing device, and that Netflix is the most popular way to watch TV.*

Age

There were many differences in finding by age (see Exhibit 8). Overall, public television viewership appears to increase by age, which is consistent with the literature on public television viewership; however, the distribution in responses differ considerably in magnitude from the expected distributions, suggesting that "public television" may have been interpreted more broadly than "PBS" by survey respondents (67% of the target audience responded that they watch public television *sometimes* or *often*). Therefore, results by "public television viewers" should be interpreted with caution.

In this evaluation Teens reported watching public television significantly less frequently than Gen-Xers, but there is less of a difference between Teens and Millennials. Of the Gen-Xers 70% noted *sometimes* or *often* watching public television compared to 67% of Millennials and 63% of Teens. Of the Gen-Xers 7% had never watched public television compared to 5% of Millennials, and 10% of Teens.

Across age groups, TV was the most popular television viewing device (Teens: 85%; Millennials: 90%; Gen-Xers: 90%) followed by mobile phone (Teens: 76%; Millennials: 63%; Gen-Xers: 42%). The least popular viewing platform was a gaming console (Teens: 20%; Millennials: 20%; Gen-Xers: 11%). Gen-Xers were significantly less likely to watch TV on their phone, computer, or gaming console than either Teens or Millennials. Teens were also significantly more likely to watch TV on their phones than Millennials.

For Teens (85%) and Millennials (78%) Netflix is the most popular way that respondents watch TV, and for Gen-Xers cable or dish is most popular (58%). The least popular viewing platform across ages was antenna tv (Teens: 13%; Millennials: 21%; Gen-Xers: 29%). Teens and Millennials are significantly more likely to watch TV on Netflix or YouTube than Gen-Xers. Teens were also significantly more likely to watch TV on YouTube than Millennials. Teens are significantly less likely to watch on antenna than Millennials or Gen-Xers and also significantly less likely to watch on cable than Gen-Xers. Millennials are significantly more likely to watch on Hulu or Amazon than either Teens or Gen-Xers.

Recommendation for OPB. **OPB might consider distributing the series via a streaming service, especially Netflix or YouTube, to reach a younger audience. At the meeting on May 19, 2019 OPB noted they plan to stream the series and are researching the various options.**

Gender

There were no significant differences by gender (see Exhibit 9). Of the Male respondents, 70% noted sometimes or often watching public television compared to 66% of Female respondents. TV was the most popular television viewing device (Female: 89%; Male: 88%). The least popular viewing platform was a gaming console (Female: 15%; Male: 15%). Netflix is the most popular way that respondents watch TV (Female: 69%; Male: 65%). The least popular viewing platform was antenna tv (Female: 23%; Male: 23%).

Question for OPB: **Is OPB surprised that there are no significant differences by gender? At the meeting on May 19, 2019 OPB noted they were surprised that there were not gender differences.**

Underrepresented

There were many differences in finding by UR and non-UR (see Exhibit 10). In this evaluation UR report viewing public television significantly more frequently than non-UR race. Of the UR 72% noted *sometimes* or *often* watching public television compared to 65% of non-UR race/ethnicity. Of the UR 5% had never watched public television compared to 8% of non-UR race/ethnicity. TV was the most popular television viewing device (UR: 90%; non-UR: 88%) followed by mobile phone (UR: 65%; non-UR: 51%). UR are significantly more likely to watch TV on a phone than non-UR (UR: 65%; non-UR: 51%). The least popular viewing platform was a gaming console (UR: 20%; non-UR: 13%). Despite being the least popular

platform, UR are significantly more likely to watch TV via a gaming console than non-UR. Netflix is the most popular way that respondents watch TV (UR: 72%; non-UR: 66%). The least popular viewing platform was antenna TV (UR: 26%; non-UR: 23%). UR are significantly more likely to watch on YouTube than non-UR.

Exhibit 8: Television Habit Comparisons by Age Group

Do you watch public television? *Public television viewership appears to increase by age.*

Age Group	Never	Rarely	Sometimes	Often
Teens	10%	27%	46%	17%
Millennials	5%	29%	41%	26%
Gen-Xers	7%	23%	42%	28%
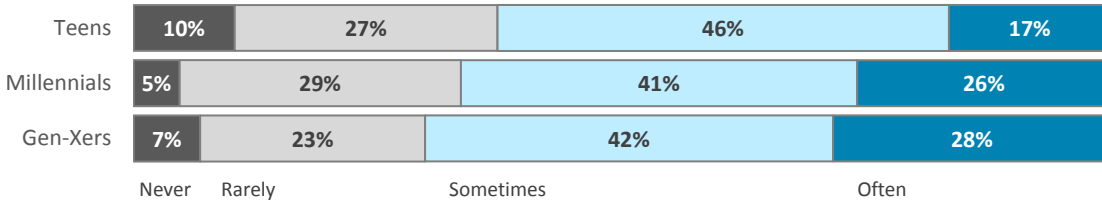
What type of device do you watch TV on? *TV is the most popular device across age groups.*

Device	Teens	Millennials	Gen-Xers
TV	85%	90%	90%
Mobile phone	76%	63%	42%
laptop/desktop	61%	53%	35%
gaming console	20%	20%	11%
other	5%	6%	6%
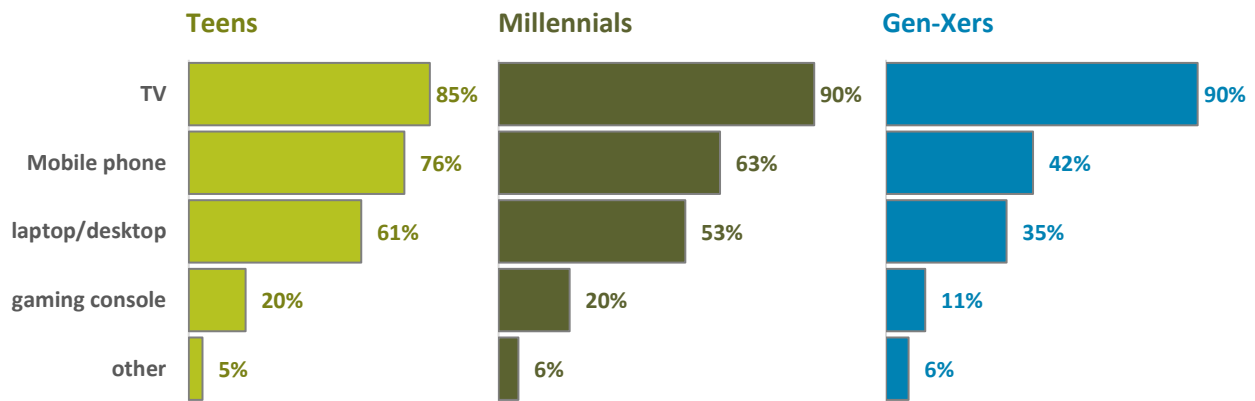
How do you watch television programs? *Teens and Millennials are most likely to watch shows on Netflix. Gen-Xers are more likely to watch TV via cable or antenna.*

	Teens	Millennials	Gen-Xers
Netflix	85%	78%	55%
YouTube	79%	63%	45%
Cable/Dish	46%	50%	58%
Hulu	38%	56%	32%
Amazon	30%	44%	31%
Antenna TV	13%	21%	29%
Other	8%	4%	9%
Don't watch TV	1%	0%	0%
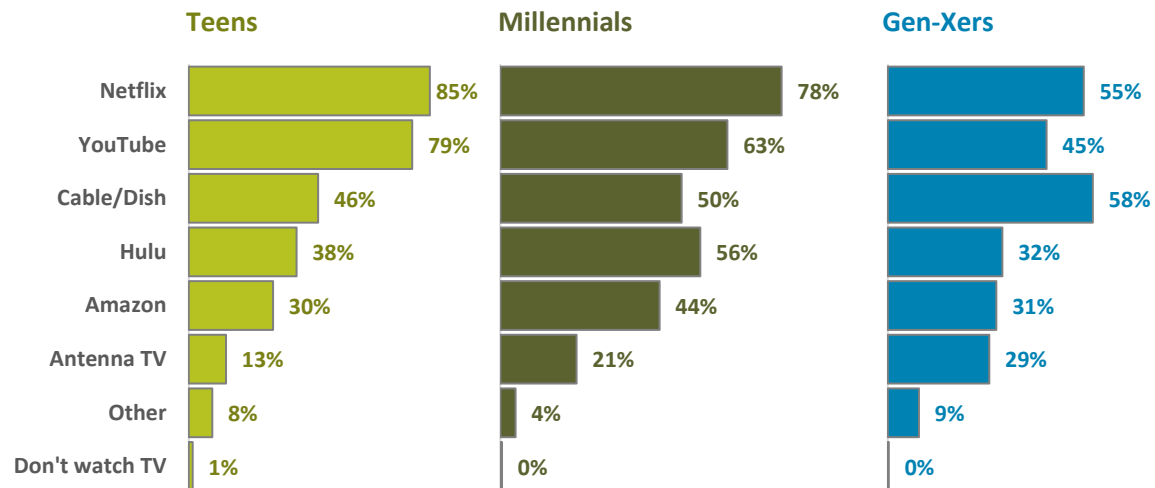
Note. Teens: *n* = 145. Millennials: *n* = 212. Gen Xers: *n* = 352–354. Differences assessed using Mann-Whitney U test (for "Do you watch public television?") and chi-squared tests (for "What type of device do you watch TV on?" and "How do you watch television programs?"). Differences were deemed significant for $p < 0.05$.

Exhibit 9: Television Habit Comparisons by Gender

Do you watch public television? *Females reported viewing public television slightly less frequently than males, but the difference was not significant.*

	Never	Rarely	Sometimes	Often
Females	7%	27%	41%	25%
Males	8%	22%	44%	26%

Never   Rarely   Sometimes   Often
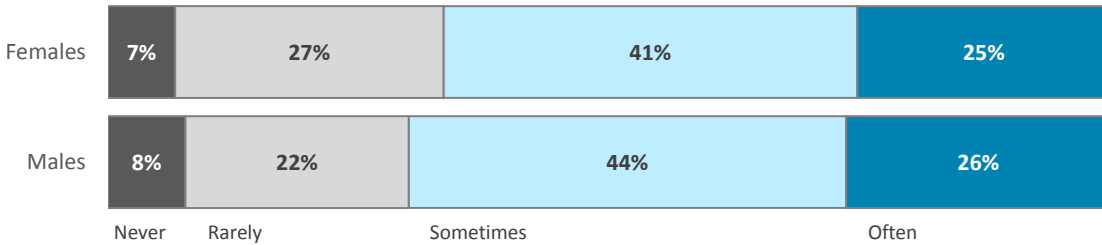
What type of device do you watch TV on? *There were no differences by gender.*

Females

Device	%
TV	89%
Mobile phone	53%
laptop/desktop	44%
gaming console	15%
other	5%

Males

Device	%
TV	88%
Mobile phone	60%
laptop/desktop	48%
gaming console	15%
other	6%
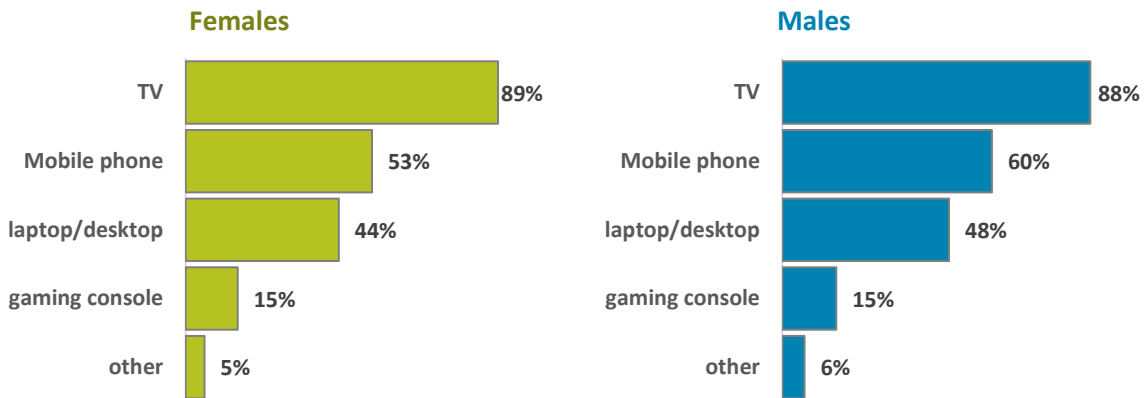
How do you watch television programs? *There were no differences by gender.*

Females

Program	%
Netflix	69%
YouTube	55%
Cable/Dish	51%
Hulu	39%
Amazon	33%
Antenna TV	23%
Other	8%
Don't watch TV	0%

Males

Program	%
Netflix	65%
YouTube	60%
Cable/Dish	58%
Hulu	42%
Amazon	38%
Antenna TV	23%
Other	5%
Don't watch TV	1%
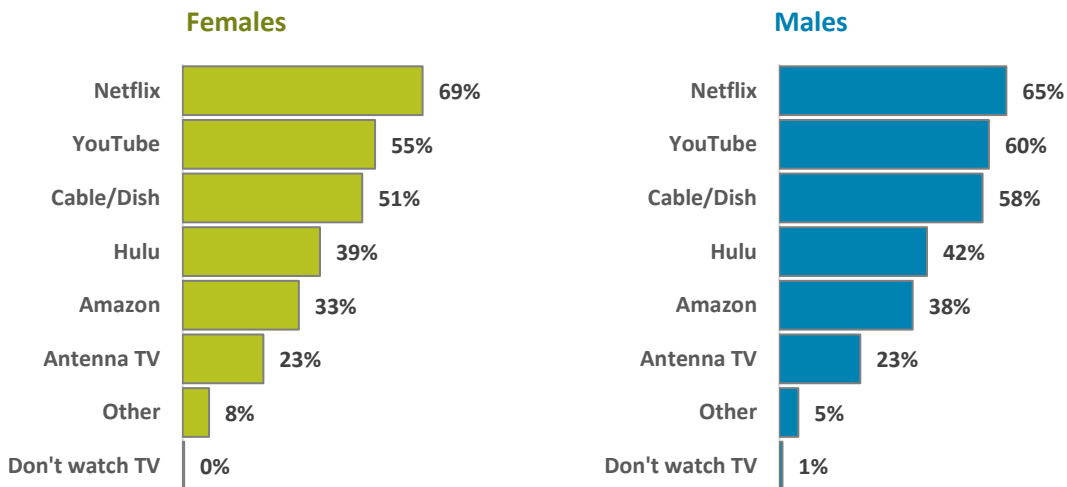
Note. Females: n = 463. Males: n = 220. Differences assessed using Mann-Whitney U test (for "Do you watch public television?") and chi-squared tests (for "What type of device do you watch TV on?" and "How do you watch television programs?"). Differences were deemed significant for $p < 0.05$.

Exhibit 10: Television Habit Comparisons by Race/Ethnicity

Do you watch public television? *UR watch more public television than non-UR race.*

	Never	Rarely	Sometimes	Often
UR	5%	23%	43%	29%
Non-UR	8%	27%	42%	23%
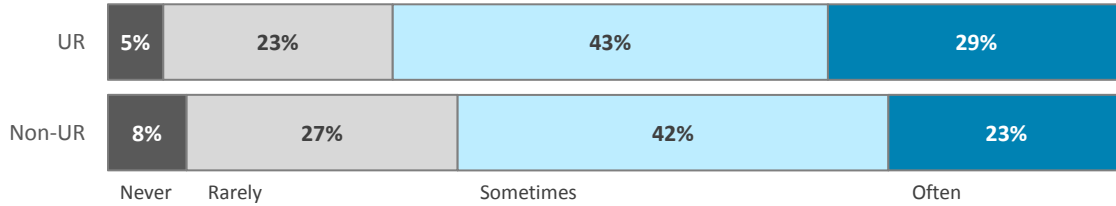
What type of device do you watch TV on? *UR are more likely to watch TV on a phone and gaming console than non-UR race.*

UR

Device	%
TV	90%
Mobile phone	65%
laptop/desktop	48%
gaming console	20%
other	5%

Non-UR

Device	%
TV	88%
Mobile phone	51%
laptop/desktop	44%
gaming console	13%
other	7%
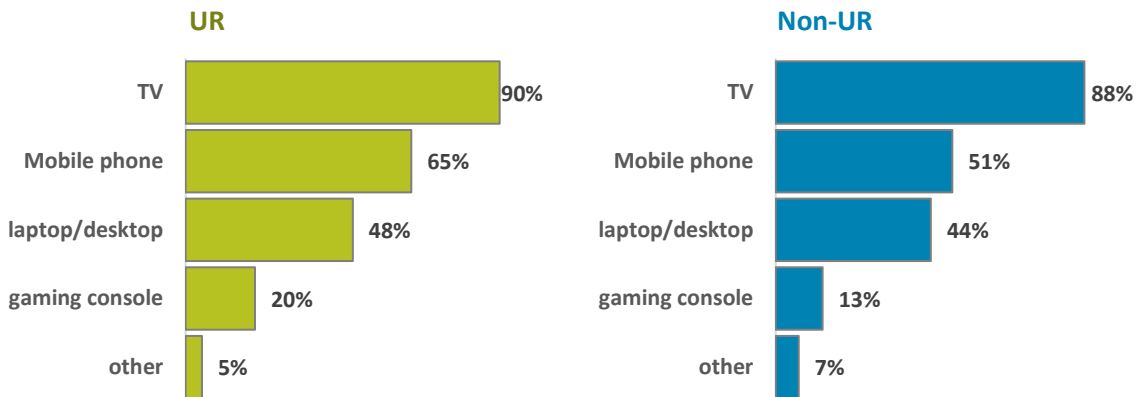
How do you watch television programs? *UR more likely to watch TV via Netflix and YouTube than non-UR race.*
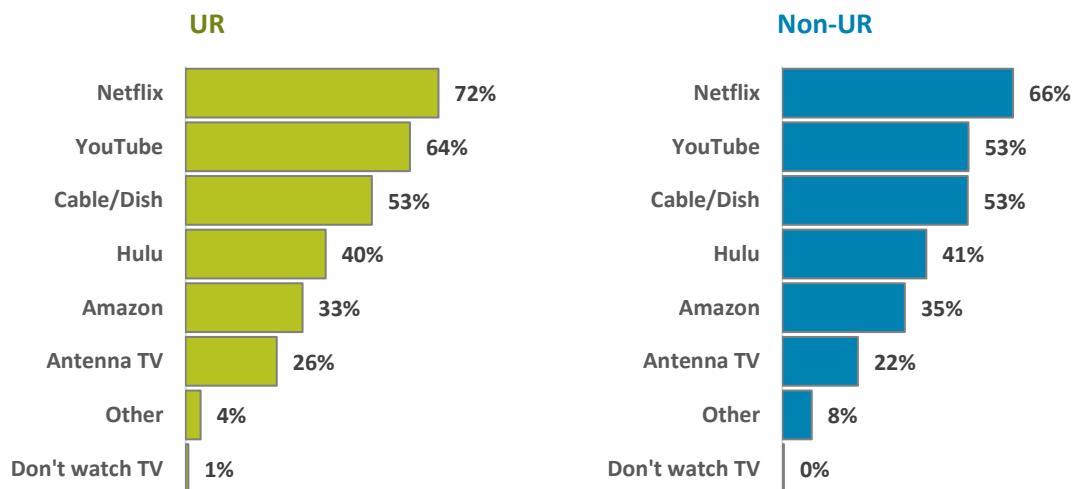
UR

Program	%
Netflix	72%
YouTube	64%
Cable/Dish	53%
Hulu	40%
Amazon	33%
Antenna TV	26%
Other	4%
Don't watch TV	1%

Non-UR

Program	%
Netflix	66%
YouTube	53%
Cable/Dish	53%
Hulu	41%
Amazon	35%
Antenna TV	22%
Other	8%
Don't watch TV	0%

Note. UR: *n* = 257. Non-UR: *n* = 439. Differences assessed using Mann-Whitney U test (for "Do you watch public television?") and chi-squared tests (for "What type of device do you watch TV on?" and "How do you watch television programs?"). Differences were deemed significant for $p < 0.05$.

Science Interest

An important part of informal science evaluation is studying science interest. While this evaluation doesn't try to change the participants' interest in science, data were gathered to determine if the participant is someone who has a high informal science interest or not. Using the Science Interest scale to categorize respondents, 56% (n = 390) are categorized as "science people" (i.e., Science Interest score > 0.5 on a scale from 0 to 1). There were significant differences in Science Interest scale scores by age group and by gender (see left side of Exhibit 11). Millennials (M = 0.56) rated significantly higher on the Science Interest scale than other age groups (Teens: M = 0.51; Gen-Xers: M = 0.50). Males (M = 0.55) also rated higher on the Science Interest scale than females (M = 0.50). Descriptively, non-UR (M = 0.53) rated higher on the Science Interest scale than UR (M = 0.50), but the difference was not statistically significant.

These patterns are consistent when comparing the percentages of science people to non-science people among subgroups (see right side of Exhibit 11). Significantly more Millennials (63%) defined themselves as a science person compared to Teens (50%) or Gen-Xers (54%). Significantly more males (62%) defined themselves as a science person compared to females (52%). Descriptively, more non-UR (58%) defined themselves as a science person compared to UR (51%), but the difference was not significant.

Exhibit 11: Science Interest Among Subgroups

Science people are most likely to be Millennials or male.

Science Interest Scale Scores

All	0.52
Teens	0.51
Millennials	0.56
Gen-Xers	0.50
Females	0.50
Males	0.55
UR	0.50
Non-UR	0.53

0.0   0.5   1.0

Percentage of Science People by Subgroup

All	56%
Teens	50%
Millennials	63%
Gen-Xers	54%
Females	52%
Males	62%
UR	51%
Non-UR	58%
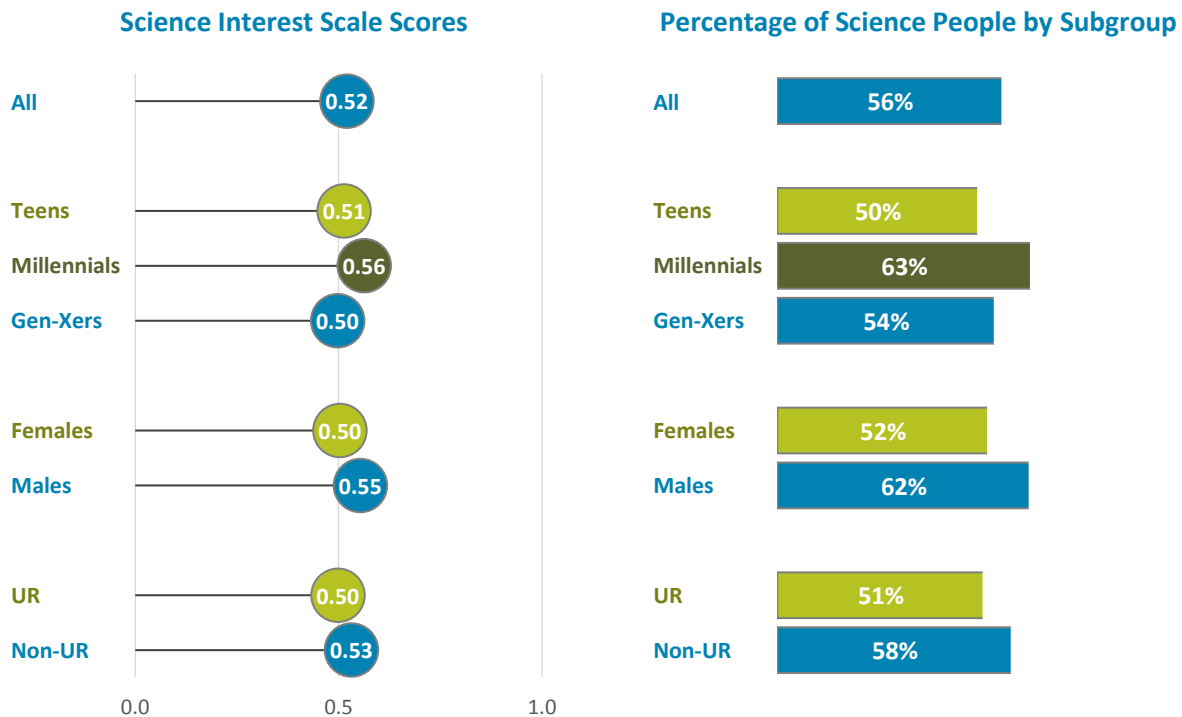
Note. All: n = 702. Teens: n = 141. Millennials: n = 211. Gen-Xers: n = 350. Females: n = 463. Males: n = 220. UR: n = 257. Non-UR: n = 439. Differences assessed using ANOVA and independent *t*-tests (for Science Interest Scale) and chi-squared tests (for percentages of science people). Differences were deemed significant for $p < 0.05$.

There were many differences in television habits by science interest (see Exhibit 12), including a significant difference in public television viewership. Of the science people 70% noted *sometimes* or *often* watching public television compared to 64% of the non-science people. There were minimal

differences in terms of never watching public television: of the science people 7% never watch public television compared to 6% of the non-science people.

For both groups, TV was the most popular television viewing device (Non-Science: 90%; Science: 88%) followed by mobile phone (Non-Science: 51%; Science: 59%). The least popular viewing platform was a gaming console (Non-Science: 14%; Science: 17%). Science people are significantly more likely to watch on their phone, laptop, or desktop than non-science people.

For both groups Netflix (Non-Science: 65%; Science: 71%) is the most popular and antenna tv (Non-Science: 22%; Science: 28%) is the least popular way that respondents watch TV. Science people are significantly more likely to watch on Hulu, Amazon, or YouTube than non-science people.

Recommendation for OPB. OPB might consider these findings when developing the social media campaign. For example, OPB may more easily find viewership with males and Millennials to watch HYM but will need to develop a more targeted approach to attract Teens, Gen-Xers, and Females. At the meeting on May 19, 2019 OPB noted they will consider this during marketing efforts.

Consideration for Research Study: Does the research aim to compare results of science people to non-science people, or are other comparisons more of interest? RMC will discuss this question with OPB. Millennials scored highest on the Science Interest scale and may be an interesting group to study further in the research study. At the meeting on May 19, 2019 OPB noted they are pleased to see non-science people are interested in the content but the comparison between science and non-science groups are of less interest for them during the research study. The comparison between science and non-science people may be a topic of interest for NSF. RMC will contemplate how to include this in the research study.

Exhibit 12: Television Habit Comparisons by Science/Non-Science

Do you watch public television? *Science people watch more public television than non-science people.*

	Never	Rarely	Sometimes	Often
nonScience	7%	29%	44%	20%
Science	6%	23%	41%	29%
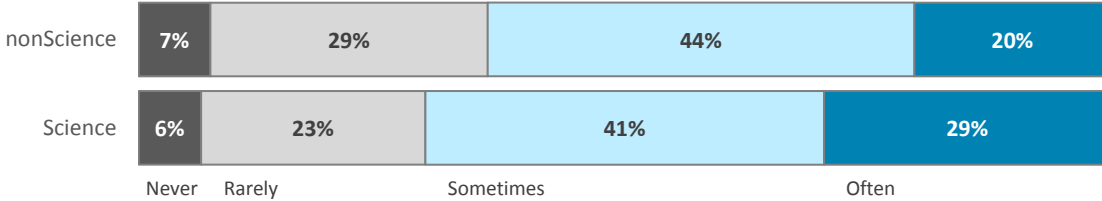
What type of device do you watch TV on? *Science people are more likely to watch TV on a phone and laptop/desktop than non-science people.*

Non-Science

TV	90%
Mobile phone	51%
laptop/desktop	38%
gaming console	14%
other	7%

Science

TV	88%
Mobile phone	59%
laptop/desktop	52%
gaming console	17%
other	5%
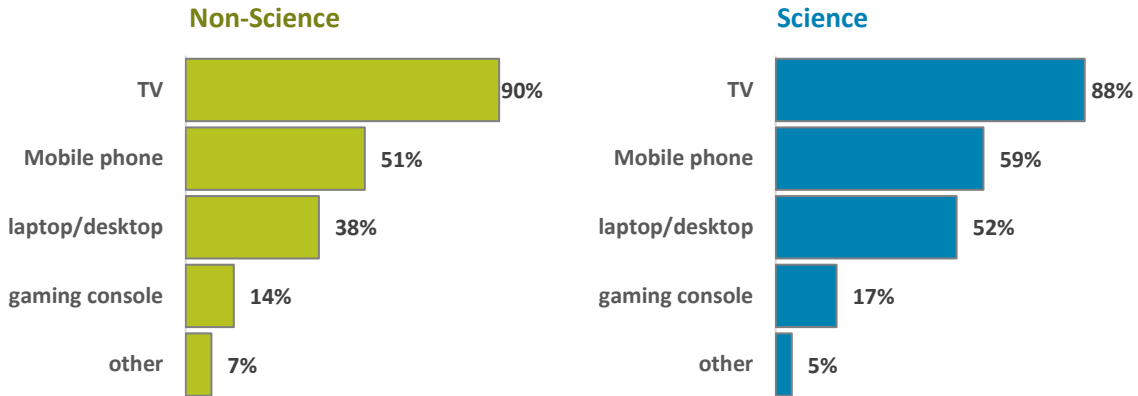
How do you watch television programs? *Science people are more likely to watch TV via Hulu, Amazon, and YouTube than non-science people.*

Non-Science

Netflix	65%
YouTube	48%
Cable/Dish	55%
Hulu	35%
Amazon	28%
Antenna TV	22%
Other	8%
Don't watch TV	0%

Science

Netflix	71%
YouTube	65%
Cable/Dish	52%
Hulu	45%
Amazon	40%
Antenna TV	24%
Other	6%
Don't watch TV	1%
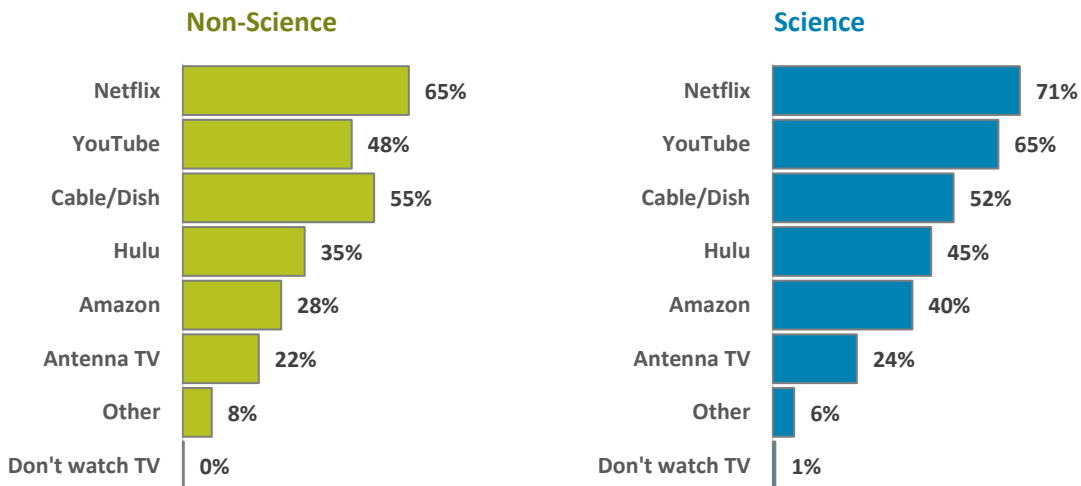
Note. Non-Science: n = 312. Science: n = 390. Differences assessed using Mann-Whitney U test (for "Do you watch public television?") and chi-squared tests (for "What type of device do you watch TV on?" and "How do you watch television programs?"). Differences were deemed significant for $p < 0.05$.

Part 2: Tag Lines

Results from Section 1 of the survey indicate which of the tag lines are of most interest for each target audience (see Exhibit 13). Each tag line was rated on a 5-point scale from *not at all interested* (1) to *extremely interested* (5), with *somewhat interested* as a mid-point. Overall, tag lines were rated as *somewhat* interesting.

The 3 **most popular** tag lines overall were:

1. How can you save the planet? (*M* = 3.24)
2. How do social media companies hack your mind? (*M* = 3.14)
3. How do cops treat black people differently than white people? (*M* = 3.10)

The 3 **least popular** tag lines overall were:

1. Who's more tribal? Monkeys or humans? (*M* = 2.45)
2. Are dogs smarter than people? (*M* = 2.76)
3. Even if you're not racist, can race be used to change how you vote? (*M* = 2.79)

Exhibit 13: Overall Tag Line Ranking

> *Overall, tag lines were rated as "somewhat interesting."*

	Tag Line	Clips	M
1	How can you save the planet?	Cialdini and "hacking social proof?	3.24
2	How do social media companies hack your mind?	Social Media with Tim Wu	3.14
3	How do cops treat black people differently than white people?	Eberhardt's study of police body camera footage	3.10
4	What new discoveries are being made in the social, behavioral, and economic sciences?	Pertains to all clips	3.09
5	Can cops overcome their unconscious biases?	Cops training with Eberhardt	3.07
6	Why can't we agree on facts?	Dunham experiment with kids	3.02
7	Can a government hack your mind?	China clip	2.98
8	Is what you buy or how much you eat or how happy you are literally contagious?	Social networks with Christakis	2.94
9	Can we overcome sexism?	POSSIBLE ADDITION OF BANAJI AND RCHESTRA	2.91
10	Even if you're racist, can race be used to change how you vote?	Rise of Trump Study	2.79
11	Are dogs smarter than people?	Dogs and Kids	2.76
12	Who's more tribal? Monkeys or humans?	Monkey Island	2.45

Note. n = 769. Response options: 1 = *not at all interested*; 2 = *slightly interested*; 3 = *somewhat interested*; 4 = *very interested*; 5 = *extremely interested*.

Question for OPB: Why does OPB think people rated their interest in the mid-range? Why weren't people *very interested* in these topics? This could be a good area to explore in the research study. At the meeting on May 19, 2019 OPB shared that they had hoped the ratings would be higher.

Question for OPB: Is OPB surprised by the order of the tag line rankings? At the meeting on May 19, 2019 OPB shared that they were surprised by the order of the tag line rankings.

Recommendation for OPB. In terms of marketing the show to a broader audience, OPB should using the top 3 tag lines that appealed to the widest group of individuals. OPB could also use any tag lines that received at least a mean of 3 or higher. Because people exhibited the most interest in the tag lines that addressed the environment, government hacking, and cops' treatment of different racial groups, OPB should consider investing marketing efforts more heavily in these content areas. At the meeting on May 19, 2019 OPB shared that they will consider this during marketing efforts.

Recommendation for OPB. The very general tag line, "What new discoveries are being made in the social, behavioral, and economic sciences?" was included on the survey, and it surprisingly ranked quite high compared to the more topic-specific tag lines. In terms of marketing, OPB could use the highest-rated topic-specific tag lines but also the more general tag line to attract a broad range of viewers. At the meeting on May 19, 2019 OPB shared that they plan to use this general tag line and will likely use it to replace some of the lower rated tag lines.

Consideration for Research Study: Based on these results the evaluation team will consider using only the top 3 clips and tag lines in the research study. The lower-rated tag lines and the associated clips will not be included in the research study. The evaluation team will discuss this with OPB. At the meeting on May 19, 2019 OPB and RMC decided to use the top 3 clips and associated videos for the research study.

Differences by Subgroups: Age

There were differences in preferences among age groups. The top 3 tag lines for each age group are listed below. There were significant differences among the 3 age groups for 5 of the 12 tag lines (see Exhibit 14, significance noted with blue text). Post-hoc comparisons showed that the Gen-Xers were significantly less interested in 5 of the 12 tag lines compared to Teens and/or Millennials. **Gen-Xers** showed less interest than both Teens and Millennials for the tag lines, "Can a government hack your mind?" "Even if you're racist, can race be used to change how you vote?" and "How do social media companies hack your mind?". **Teens** showed the most interest in the tag line, "How do cops treat black people differently than white people?" and the difference was significant when compared to Gen-Xers (non-significant when compared to Millennials). **Millennials** showed the most interest in the tag line, "Can we overcome sexism?" and the difference was significant when compared to Gen-Xers (non-significant when compared to Teens).

Teens' top 3 tag lines were:

1. Can a government hack your mind? (M = 3.48)
2. How do social media companies hack your mind? (M = 3.48)

3. How can you save the planet? (*M* = 3.38)

Millennials' top 3 tag lines were:

1. How can you save the planet? (*M* = 3.32)
2. How do social media companies hack your mind? (*M* = 3.24)
3. What new discoveries are being made in the social, behavioral, and economic sciences? (*M* = 3.10)

Gen-Xers' top 3 tag lines were:

1. How can you save the planet? (*M* = 3.14)
2. Can cops overcome their unconscious biases? (*M* = 2.98)
3. What new discoveries are being made in the social, behavioral, and economic sciences?? (*M* = 2.98)

Exhibit 14: Tag Lines Preferences by Age Group

Teens exhibited the most interest in tag lines overall, while Gen-Xers exhibited the least interest.
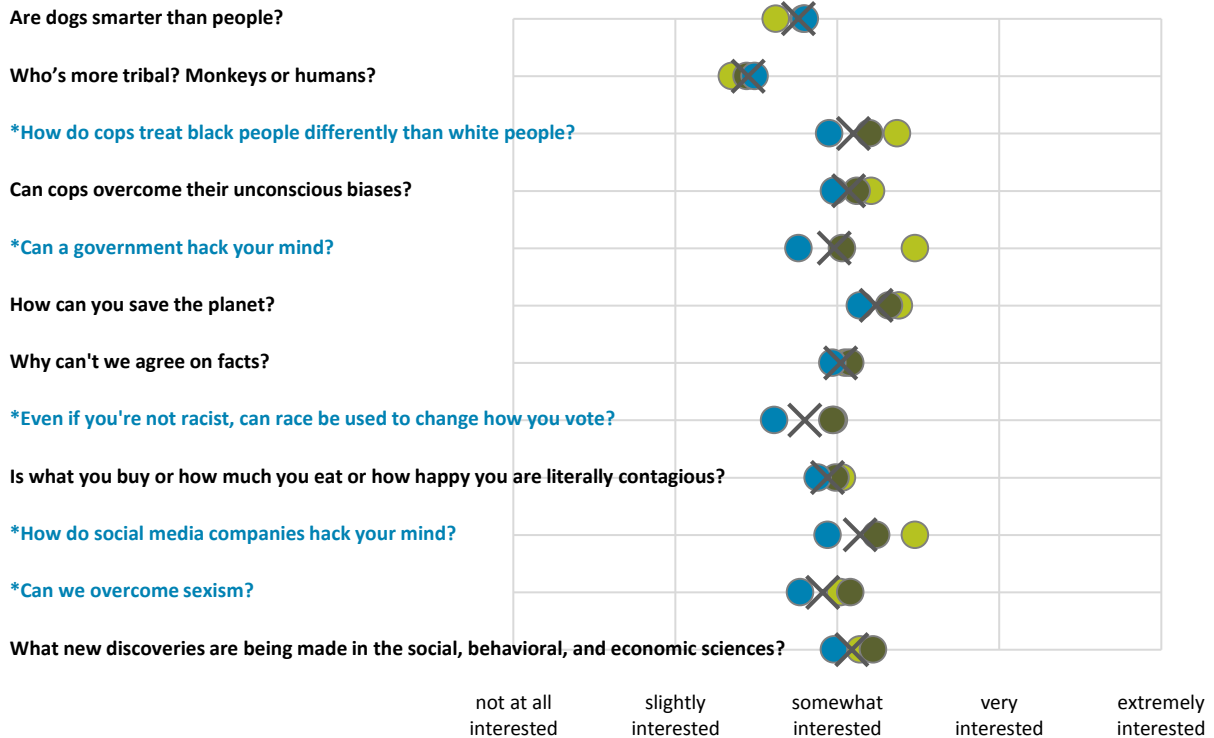
Note. **X All:** *n* = 769. ●**Teens:** *n* = 153. ●**Millennials:** *n* = 223. ●**Gen-Xers:** *n* = 393.
Comparisons across 3 age groups conducted using one-way ANOVA.
Post-hoc pairwise comparisons conducted using independent *t*-tests.
*Differences deemed significant if *p* < 0.05.

Question for OPB: Is OPB surprised that Teens exhibited the most interest in tag lines overall, while Gen-Xers exhibited the least interest? Recommendation for OPB: To attract a younger and more diverse audience to HYM, consider rolling out separate social media campaigns targeted to each age group using the highest rated tag lines per group. At the meeting on May 19, 2019 OPB shared they were pleasantly surprised that the teens were the most interested in these topics.

Differences by Subgroups: Gender

Exhibit 15 shows the tag line findings by gender. Similar to the prior patterns in the data, there were no significant differences by gender.

Exhibit 15: Tag Lines Preferences by Gender

There were no significant differences by gender.
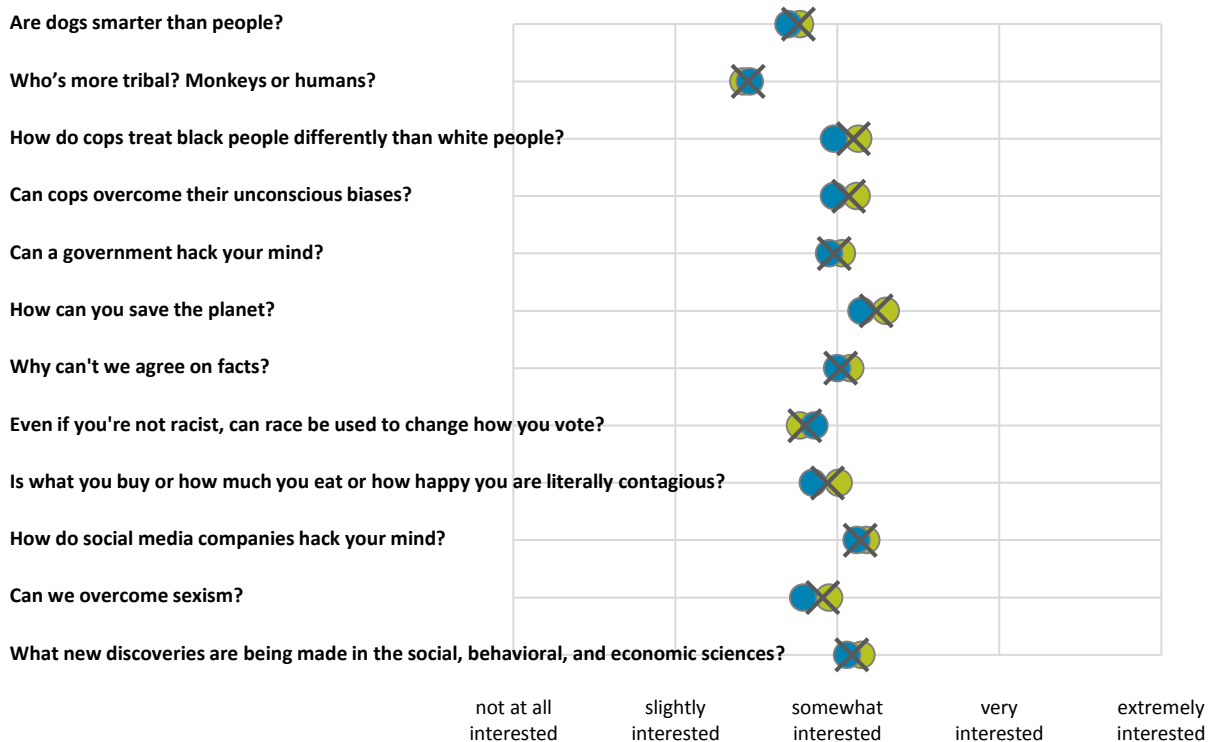
Note. **X All:** *n* = 769. ●**Females:** *n* = 463. ●**Males:** *n* = 220.
Comparisons conducted using independent *t*-tests.
***Differences deemed significant if *p* < 0.05.*

Question for OPB: Is OPB surprised there are no significant differences by gender? At the meeting on May 19, 2019 OPB shared that they were surprised there were no differences by gender and had expected the results to skew towards males.

Differences by Subgroups: UR

There were differences in preferences among UR and non-UR groups. The top 3 tag lines for each group are listed below. For 10 of the 12 tag lines, UR were significantly more interested in the tag lines than non-UR (see Exhibit 16, significance noted with blue text). Though the tag line, "Can cops overcome their unconscious biases?" was rated more interesting by UR (M = 3.48) than non-UR (M = 2.87), it was less popular than the similar tag line, "How do cops treat black people differently than white people?" (UR: M = 3.63; non-UR M = 2.79).

URs' top 3 tag lines were:

1. How do cops treat black people differently than white people? (M = 3.63)
2. Can cops overcome their unconscious biases? (M = 3.48)
3. How can you save the planet? (M = 3.44)

Non-UR's top 3 tag lines were:

1. How can you save the planet? (M = 3.16)
2. What new discoveries are being made in the social, behavioral, and economic sciences?? (M = 3.04)
3. How do social media companies hack your mind? (M = 3.02)

Exhibit 16: Tag Lines Preferences by Race/Ethnicity

UR were more interested in the tag lines than non-UR.
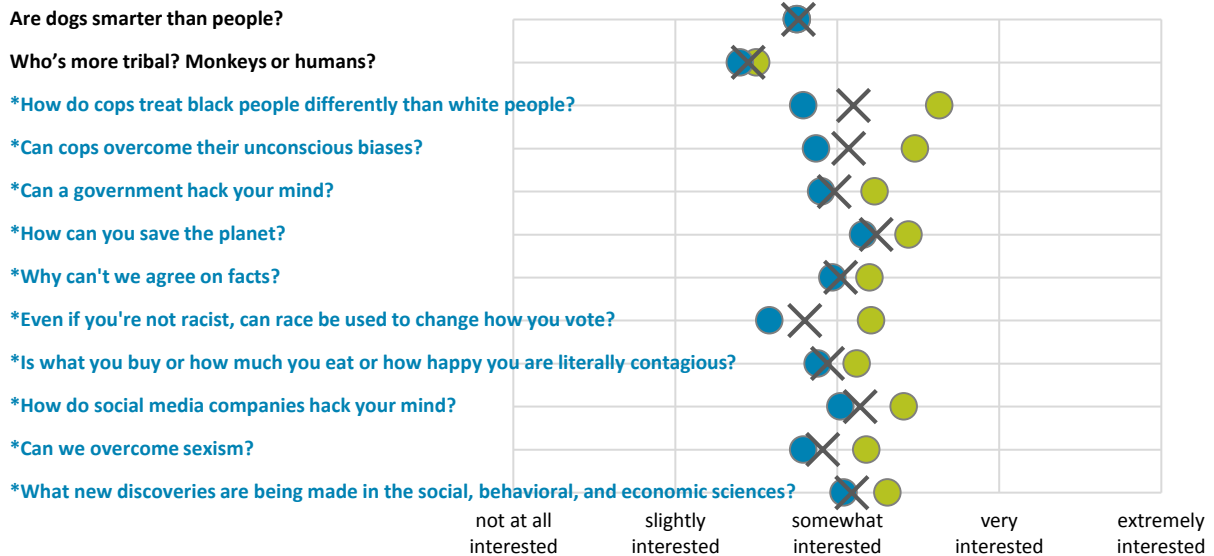
Note. **X All:** *n* = 769. ●**UR:** *n* = 257. ●**Non-UR:** *n* = 439.
Comparisons conducted using independent *t*-tests.
*Differences deemed significant if $p < 0.05$.

Differences by Subgroups: Science Interest

Using the Science Interest score to categorize respondents as science people or non-science people, science people rated all tag lines as significantly more interesting than non-science people (Exhibit 17). However, the preference rankings were fairly consistent between the two groups: the exception is the tag line, "What new discoveries are being made in the social, behavioral, and economic sciences?" which ranked as the second most popular tag line among science people, which was the seventh most popular among non-science people. The top-rated tag lines by group are noted below.

Science people's top 3 tag lines were:

1. How can you save the planet? (*M* = 3.50)
2. What new discoveries are being made in the social, behavioral, and economic sciences? (*M* = 3.46)
3. How do social media companies hack your mind? (*M* = 3.35)

Non-science people's top 3 tag lines were:

1. How can you save the planet? (*M* = 2.96)
2. How do social media companies hack your mind? (*M* = 2.93)
3. What new discoveries are being made in the social, behavioral, and economic sciences? (*M* = 2.87)

Exhibit 17: Tag Lines Preferences by Science vs. Non-Science People

Science people were significantly more interested in all tag lines, compared to non-science people.
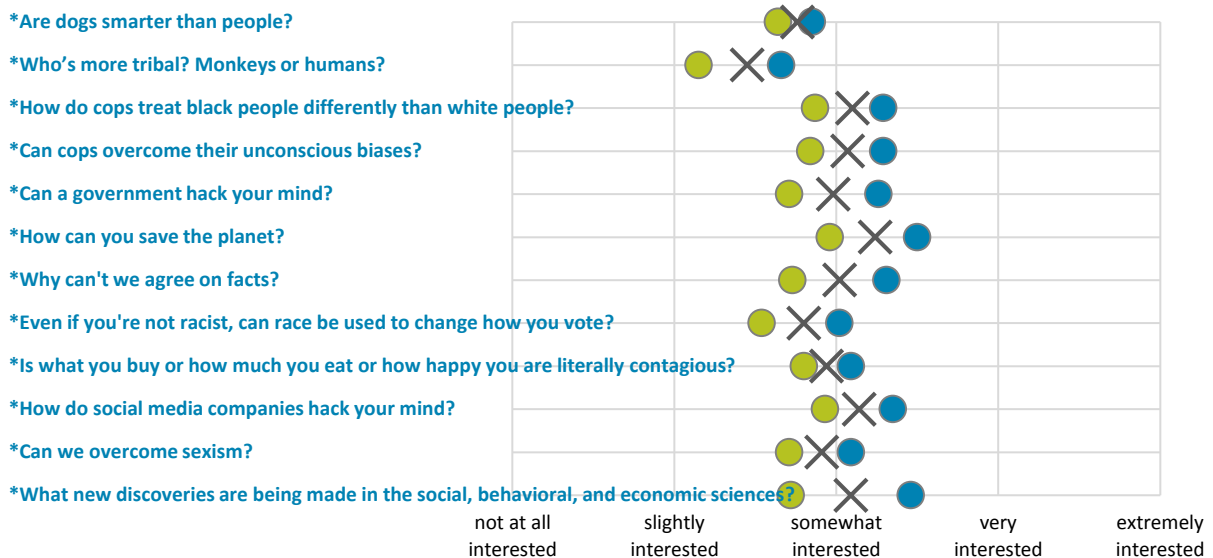
Note. **X All:** *n* = 769. ●**Non-Science:** *n* = 312. ●**Science:** *n* = 390.
Comparisons conducted using independent *t*-tests.

> **Recommendation for OPB.** OPB might consider the preferences of non-science people in developing marketing materials to appeal to this audience. At the meeting on May 19, 2019 OPB shared that they will consider this during marketing efforts.

Part 3: Hooks

The target audiences were also presented with 6 "hooks" (i.e., attention-grabbing image) and the survey question, "Below are some images associated with the new television show. For each question, please select the image that makes you <u>most interested</u> in watching the show." The hook types included (1) a **close-up picture** from the video, (2) a **picture of the host**, (3) a **stylized science** image (a dramatic science image still shot with a blue filter overlaid), and a (4) **dramatic stock art** photograph (dramatic black and white stock photo with bold white text overlaid). The top six hooks are shown in Exhibit 18. Overall, there was agreement about the preferred image for each tagline. Dramatic stock art photographs were the most popular hooks, followed by stylized science image. Respondents exhibited preference for crisp, simpler images (though "cute" images [e.g., the monkey] also performed well). For tag lines where the stylized science image was selected, the stock art photo ranked second. Very few respondents chose a picture of the host as the preferred image.

The following pages are organized from highest-ranking to lowest-ranking tagline and show the subgroup preferences for the 6 hooks. Although subgroup differences exist, there is no clear pattern.

Of the top hooks selected, 3 of the 6 were the dramatic stock art photograph; 2 were the stylized science image; and 1 was a close-up picture from the video.

Exhibit 18: Top-Rated Hooks

| Dramatic Stock Art | Stylized Science Image | Close-Up Picture |
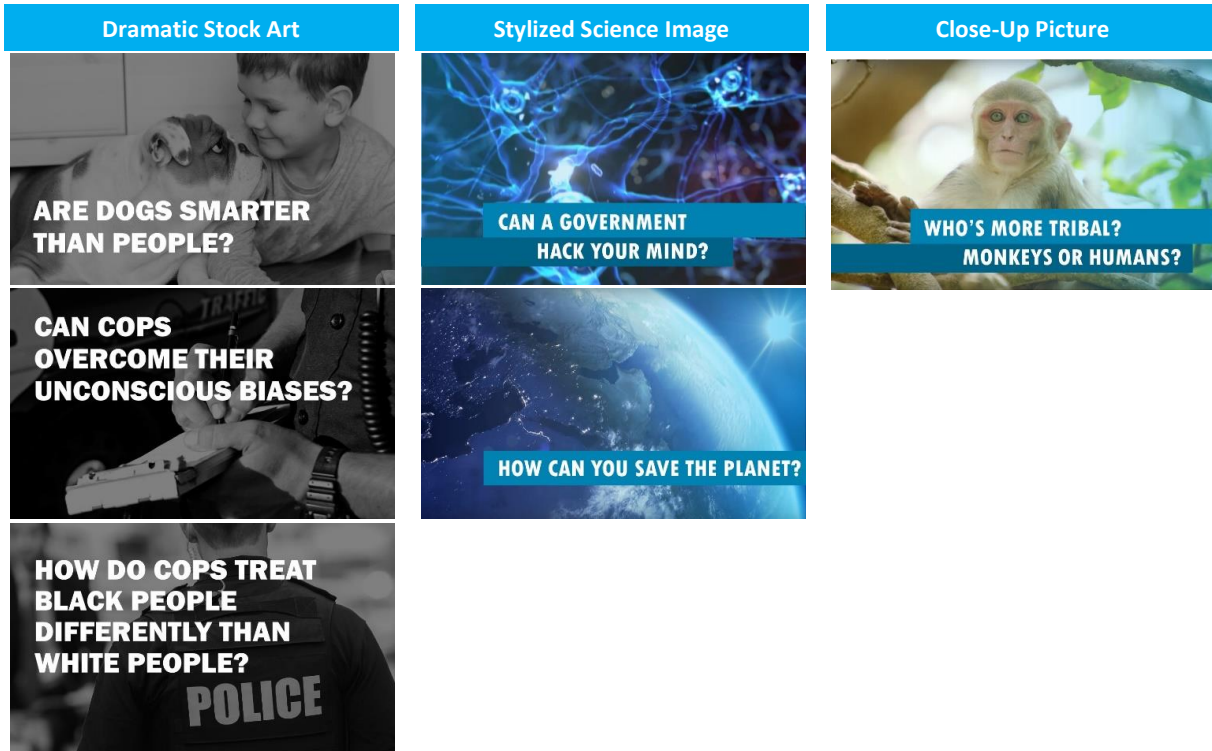
Recommendation for OPB. In terms of marketing, OPB should not include photographs of the host or people within the video as a hook. To increase the likelihood that someone will click on the social media clip, OPB should consider using the dramatic stock art approach or stylized science images along with the tag line (i.e., an edited image created specifically for marketing purposes At the meeting on May 19, 2019 OPB shared that they will use these findings to drive their marketing efforts.

How can you save the planet?

This was the highest-ranking tag line. The highest rated hook for this tag line was a **stylized science** image (outlined in blue) with 57% of the survey respondents selecting this hook as the top image. This image was overwhelmingly the favorite across all subgroups. There were no differences in hook preference by age, gender, or science interest. There was a statistically significant difference in preference between UR and non-UR, but this difference is related to the strength of the second choice (37% UR chose the dramatic stock art photograph vs. 29% non-UR).

Exhibit 19: Hook Preferences: "How can you save the planet?"
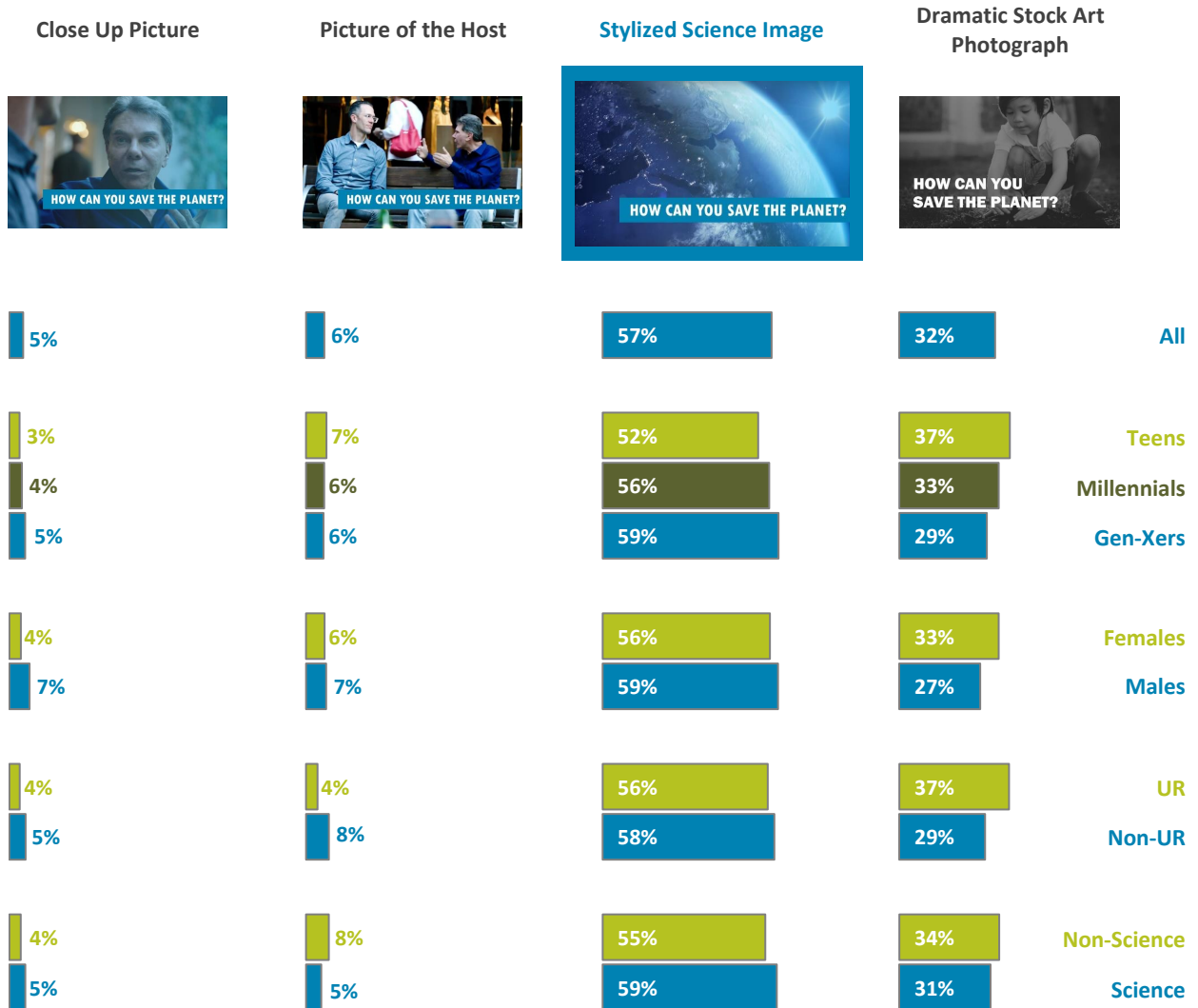
Close Up Picture	Picture of the Host	Stylized Science Image	Dramatic Stock Art Photograph	
5%	6%	57%	32%	All
3%	7%	52%	37%	Teens
4%	6%	56%	33%	Millennials
5%	6%	59%	29%	Gen-Xers
4%	6%	56%	33%	Females
7%	7%	59%	27%	Males
4%	4%	56%	37%	UR
5%	8%	58%	29%	Non-UR
4%	8%	55%	34%	Non-Science
5%	5%	59%	31%	Science

Note. All: n = 713. Teens: n = 145. Millennials: n = 212. Gen-Xers: n = 356. Females: n = 463. Males: n = 220. UR: n = 257. Non-UR: n = 350. Non-science: n = 312. Science: n = 390. Differences assessed using chi-squared tests and deemed significant for $p < 0.05$.

Recommendation. Because this was the highest rate tag line and there was agreement on the hook, this topic may be a strong candidate for the research study.

How do cops treat black people differently than white people?

This was the third highest-ranking tag line overall, and this tag line was rated significantly more interesting by UR. The highest rated hook for this tag line was a **dramatic stock art** photograph (outlined in dark blue) with 44% of the survey respondents selecting this hook as the top image. This is the only hook where subgroups did not agree on the top-rated image. There were significant differences by age, gender, and race/ethnicity. Teens more strongly preferred the **dramatic stock art** image. Males preferred the **stylized science** image. Twice as many UR as non-UR chose the **close-up picture**.

Exhibit 20: Hook Preferences: "How do cops treat black people differently than white people?"

Close Up Picture	Picture of the Host	Stylized Science Image	Dramatic Stock Art Photograph	
10%	14%	32%	44%	**All**
8%	7%	33%	52%	**Teens**
13%	16%	32%	39%	**Millennials**
9%	16%	32%	43%	**Gen-Xers**
11%	12%	29%	48%	**Females**
8%	18%	40%	34%	**Males**
15%	12%	31%	42%	**UR**
7%	15%	33%	45%	**Non-UR**
10%	14%	32%	44%	**Non-Science**
10%	14%	33%	43%	**Science**

Note. All: *n* = 731. Teens: *n* = 149. Millennials: *n* = 216. Gen-Xers: *n* = 366. Females: *n* = 463. Males: *n* = 220. UR: *n* = 257. Non-UR: *n* = 439. Non-Science: *n* = 312. Science: *n* = 390. Differences assessed using chi-squared tests and deemed significant for *p* < 0.05.

Can cops overcome their unconscious biases?

This was the fifth-ranking tag line. The highest rated hook for this tag line was **dramatic stock art** photograph (outlined in blue) but there was also less agreement among respondents' selection of the most appealing hook with only 37% of the survey respondents selecting this hook as the top image. There were no significant differences in hook preference by age, gender, or science interest. There was a significant difference between UR and non-UR: UR were more likely to choose the **picture of the host** as their second choice, whereas non-UR were more likely to select the **stylized science** (police lights).

Exhibit 21: Hook Preferences: "Can cops overcome their unconscious biases?"

Close Up Picture	Picture of the Host	Stylized Science Image	Dramatic Stock Art Photograph	
13%	23%	28%	37%	**All**
9%	23%	31%	38%	**Teens**
16%	23%	21%	39%	**Millennials**
12%	23%	30%	35%	**Gen-Xers**
11%	25%	27%	37%	**Females**
14%	19%	31%	37%	**Males**
10%	28%	23%	39%	**UR**
13%	20%	31%	36%	**Non-UR**
11%	23%	29%	37%	**Non-Science**
13%	23%	27%	37%	**Science**

Note. All: *n* = 720. Teens: *n* = 146. Millennials: *n* = 214. Gen-Xers: *n* = 360. Females: *n* = 463. Males: *n* = 220. UR: *n* = 257. Non-UR: *n* = 439. Non-Science: *n* = 312. Science: *n* = 390. Differences assessed using chi-squared tests and deemed significant for $p < 0.05$.

Can a government hack your mind?

This was the seventh-highest-ranking tag line. The highest rated hook for this tag line was a **stylized science** image (outlined in blue) with 51% of the survey respondents selecting this hook as the top image. This image was overwhelming the favorite across all subgroups. There were no differences in hook preference by gender or UR. There was a significant difference by age group: Teens were more likely to like this image than older respondents (both Millennials and Gen-Xers). There was also a significant difference by science vs. non-science people: science people were more likely to like this image than non-science people.

Exhibit 22: Hook Preferences: "Can a government hack your mind?"
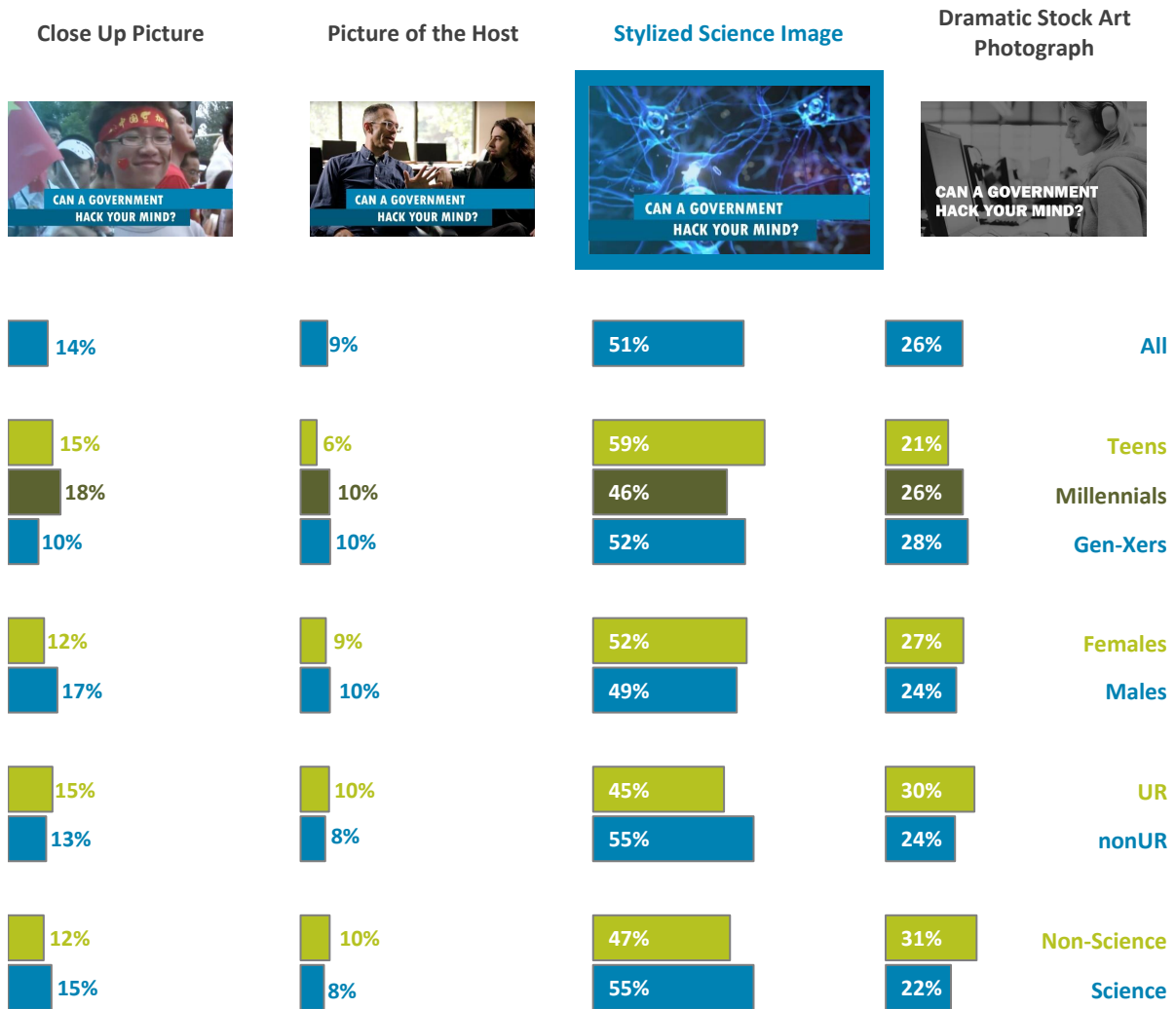
Close Up Picture	Picture of the Host	Stylized Science Image	Dramatic Stock Art Photograph	
14%	9%	51%	26%	**All**
15%	6%	59%	21%	**Teens**
18%	10%	46%	26%	**Millennials**
10%	10%	52%	28%	**Gen-Xers**
12%	9%	52%	27%	**Females**
17%	10%	49%	24%	**Males**
15%	10%	45%	30%	**UR**
13%	8%	55%	24%	**nonUR**
12%	10%	47%	31%	**Non-Science**
15%	8%	55%	22%	**Science**

Note. All: *n* = 713. Teens: *n* = 145. Millennials: *n* = 212. Gen-Xers: *n* = 356. Females: *n* = 463. Males: *n* = 220. UR: *n* = 257. Non-UR: *n* = 439. Non-Science: *n* = 312. Science: *n* = 390. Differences assessed using chi-squared tests and deemed significant for *p* < 0.05.

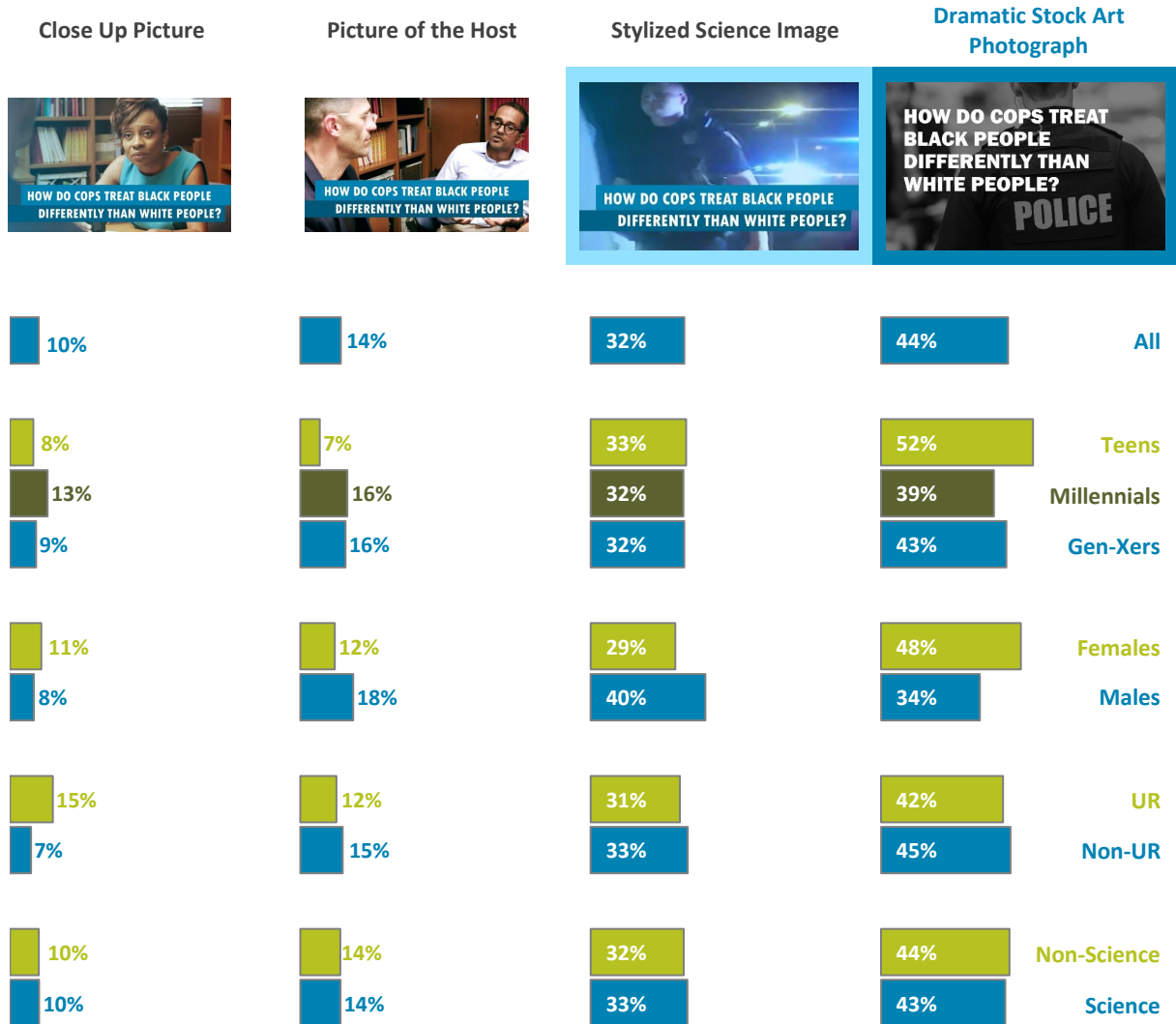**Recommendation.** OPB might consider pairing the selected hook for this tag line with the more popular tag line, "How do social media companies hack your mind?"

Are Dogs Smarter Than People

This was the second to lowest ranked tag line. The highest rated hook for this tag line was a **dramatic stock art** photograph with 44% of the survey respondents selecting this hook as the top image. This image was overwhelming the favorite across all subgroups. For this hook the only difference among subgroups was gender: 49% of the females selecting this hook verses only 37% of the males.

Exhibit 23: Hook Preferences: "Are dogs smarter than people?"

Close Up Picture	Picture of the Host	Stylized Science Image	Dramatic Stock Art Photograph	
27%	9%	20%	44%	**All**
33%	8%	19%	40%	**Teens**
24%	11%	18%	47%	**Millennials**
26%	9%	22%	44%	**Gen-Xers**
27%	8%	17%	49%	**Females**
24%	12%	26%	37%	**Males**
22%	10%	23%	46%	**UR**
28%	8%	19%	44%	**Non-UR**
27%	8%	16%	49%	**Non-Science**
25%	10%	24%	41%	**Science**

Note. All: *n* = 755. Teens: *n* = 151. Millennials: *n* = 219. Gen-Xers: *n* = 385. Females: *n* = 463. Males: *n* = 220. UR: *n* = 257. Non-UR: *n* = 439. Non-Science: *n* = 312. Science: *n* = 390. Differences assessed using chi-squared tests and deemed significant for *p* < 0.05.

Who's more tribal? Monkeys or humans?

This was the lowest ranking tag line. The highest rated hook for this tag line was a **close-up picture** from the video (outlined in blue) with 58% of the survey respondents selecting this hook as the top image. There were no subgroup differences for gender or UR. There were differences by age and science vs. non-science people. Teens were less likely to select this image than older age groups (both Millennials and Gen-Xers). Science people were more likely to select this image than non-science people.

Exhibit 24: Hook Preferences: "Who's more tribal? Monkeys or humans?"

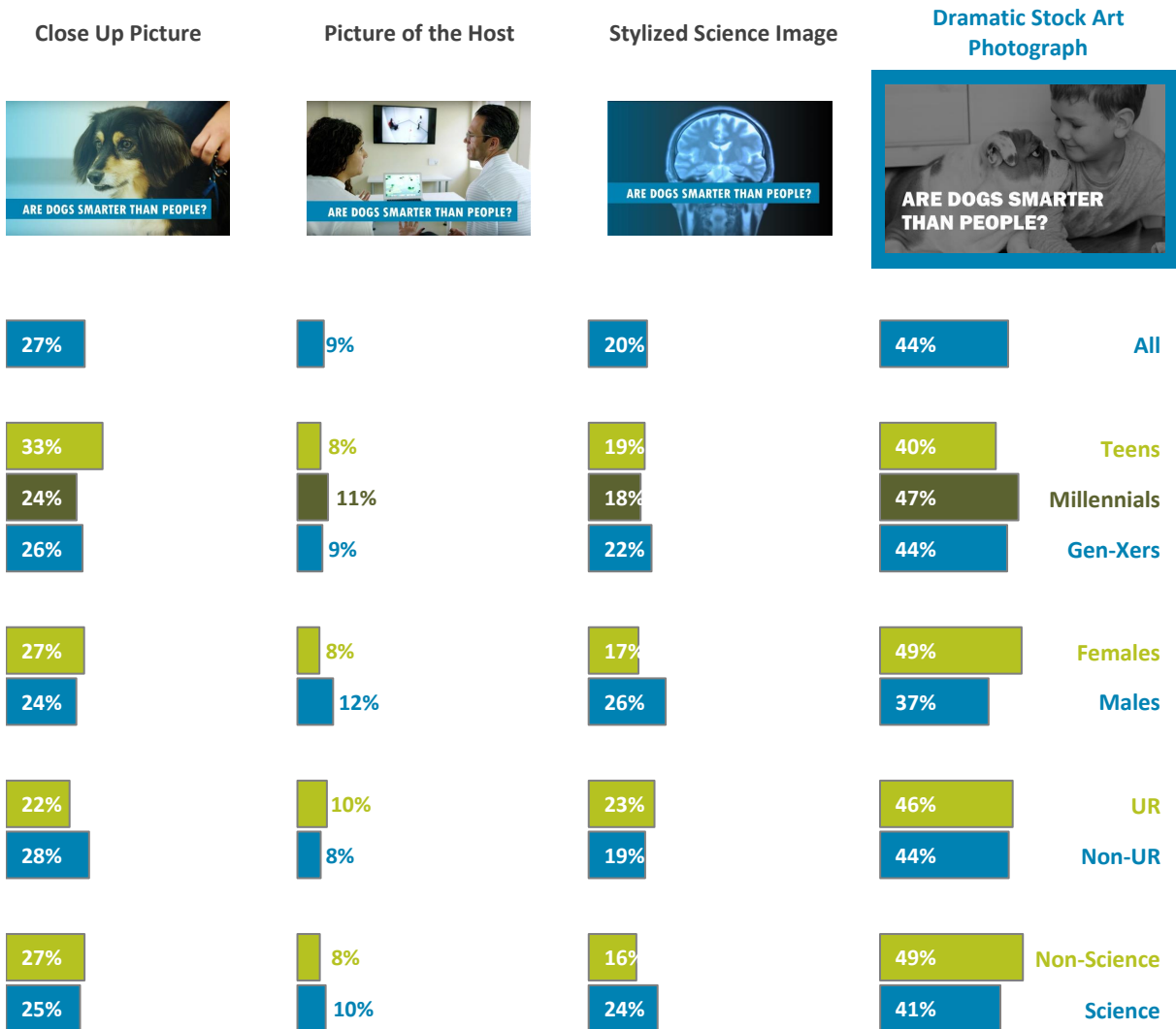| Close Up Picture	Picture of the Host	Stylized Science Image	Dramatic Stock Art Photograph	
58%	10%	20%	12%	**All**
51%	9%	31%	9%	**Teens**
60%	10%	22%	8%	**Millennials**
59%	11%	14%	16%	**Gen-Xers**
59%	10%	18%	13%	**Females**
59%	10%	23%	9%	**Males**
54%	9%	23%	14%	**UR**
60%	11%	18%	10%	**Non-UR**
55%	9%	19%	17%	**Science**
61%	11%	21%	8%	**Non-Science**
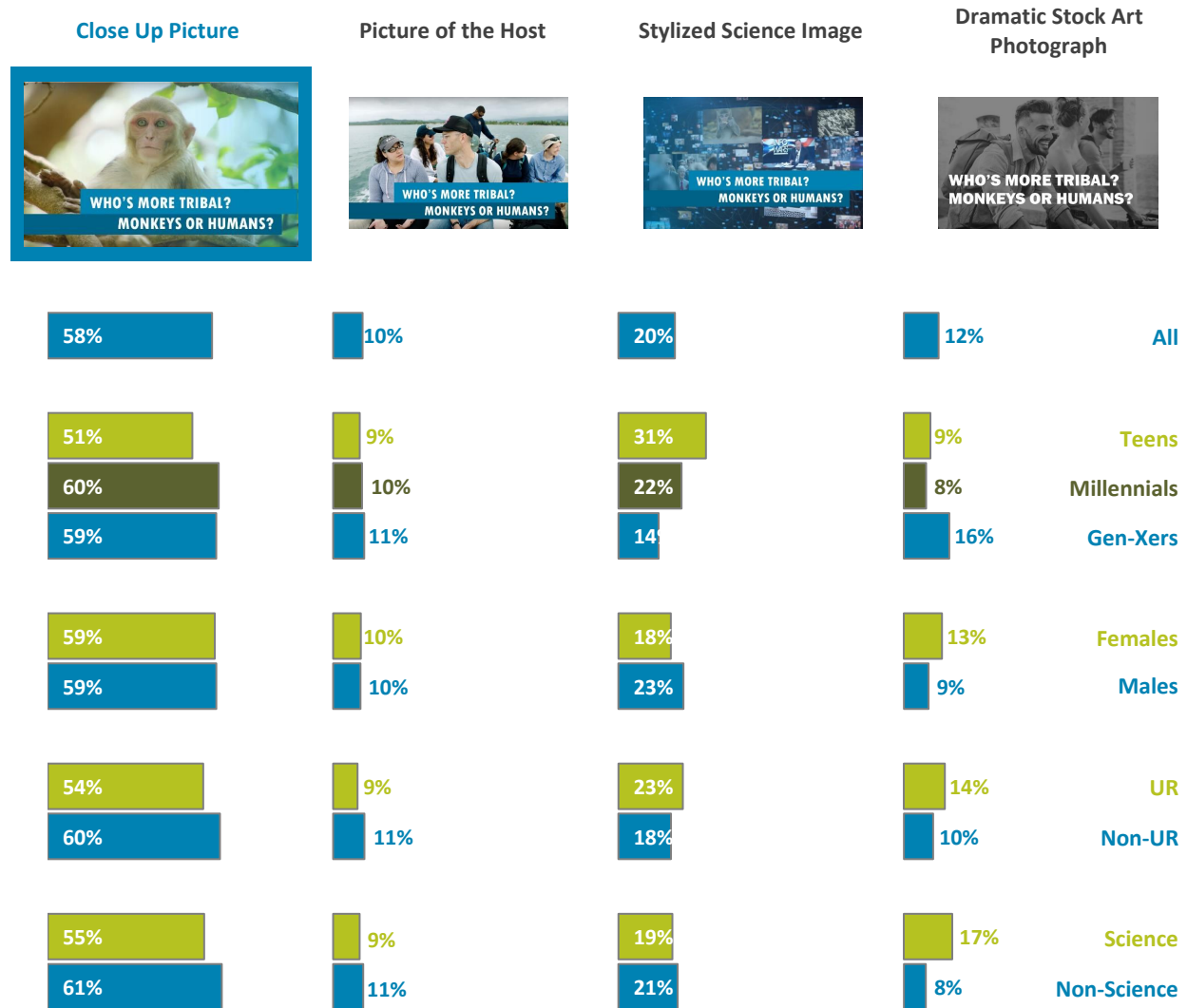
Note. All: *n* = 743. Teens: *n* = 150. Millennials: *n* = 217. Gen-Xers: *n* = 376. Females: *n* = 463. Males: *n* = 220. UR: *n* = 257. Non-UR: *n* = 439. Non-Science: *n* = 312. Science: *n* = 390. Differences assessed using chi-squared tests and deemed significant for *p* < 0.05.

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Appendix A: Logic Model

Resources

Activities

Intermediate Outcomes

Long-Term Impacts

Social Media Strategist

Advisory Board
- Baruch Fischhoff, Senior Advisor
- Bob Kurzban, Senior Advisor
- BJ Casey
- David Rand
- Brian Wansink
- Bart Wilson

Leadership Team
- PI: David Davis, OPB
- Co PI: Carl Byker, Red Hill Farms
- Co PI: Miles O'Brien

Production Team
- OPB
- Red Hill Farms
- 4 scientists
  BJ Casey
  Brian Wansink
  David Rand
  Bart Wilson

Research and Evaluation Team
Develops instruments and collects data to address the formative evaluation, summative evaluation, and research questions.

Multimedia Product Development
Conduct a formative evaluation to develop and pilot test the appeal of the various informal science settings and social media outreach strategies to determine how to improve these components to increase participant engagement.

Hacking Your Mind TV Series
Development of a 4-part primetime public television special that describes the research of leading cognitive scientists who examined aspects of human decision-making.

Innovative Participatory Science Component
People can participate in highly interactive informal science education at any time and at any location (e.g., via phones, tablets, or computers) to discover first hand, in a personally meaningful way, the science behind their own behavior.
- The project will film 90-second videos intended to inspire people to engage with the topic or other project components.
- The project will film 3-minute videos intended to increase awareness, understanding, and interest; and inspire people to engage with the topic or other project components.
- The project will use games already developed by researchers to engage people in games and discover first hand, in a personally meaningful way, the science

Social Media Campaign
The project will employ outreach activities (e.g., Facebook, Twitter) to engage a wide variety of audiences in the TV series and the participatory science components. People may participate in one, all, or any combination of the informal learning settings (i.e., view one episode, all episodes, only watch a YouTube clip,

Project Monitoring and Improvement
Conduct an accountability evaluation to determine if the project met its targets with regard to the project activities. Conduct a formative evaluation to determine how the project can improve the informal science settings and social media campaign.

Participant Outcomes
If participants engage with the TV series or participatory components participants will:

- Increase their awareness that there is a scientific field that studies human decision making.
- Increase their understanding of human decision making.
- Increase their understanding of how research findings on human decision making is related to their own life,
- Increase their interest in pursuing STEM content through informal science settings.
- Increase their awareness of STEM careers.

Increased Access and Diversity
The participatory science website will engage a broad and diverse range of participants including younger participants and those not typically engaged in informal science education.

Generate Findings
Experimental Study: Addresses the questions, "Which informal science setting is the most effective in terms of increasing participants' awareness, understanding, and interest in STEM?"; "Does a person who engages in low doses of the treatment experience similar learning and interest gains as someone who engages in high doses of the treatment?"; and "Is the participatory science component an effective tool to engage people who are traditionally not involved in informal STEM activities?" Summative Evaluation: Conduct an evaluation to determine the effectiveness of the social media campaign.

Dissemination of Research Findings
Disseminate the findings from the research through conference presentations, publications, and informalscience.org.

Better Decisions
Increased ability to apply the findings from the research studies to improve the quality of the decisions they make in their daily life.

Contribution to the Field

Broaden Access to and Engagement in STEM Learning
Other projects will be able to use the findings from the research to broaden access to and engagement in STEM learning.

Enhance Learning in Informal STEM
Other projects will be able to use the findings related to the efficacy of various informal settings to increase participant learning gains.

Appendix B: Hacking Your Mind Online Formative Survey

[Text that will appear on first page of the Hacking Your Mind Survey. This is the consent to participate.]

The TV Survey collects information from people across the nation to find out what they think about a new television show.

- The survey will take **15 minutes**.

- The survey is **voluntary**.

- Your answers are confidential and only used for the purposes of this evaluation.

- RMC Research Corporation will use the information you provide to help increase the appeal of the show to a large audience.

- You will be given the option to provide your email address to win a $25 or $100 gift card. Your email address will be stored separately from your survey responses.

- If you have any questions or concerns about the survey, please contact RMC Research Corporation at hymsurvey@rmcres.com or call Chandra Lewis at 1-800-788-1887.

    ❑ Yes, I agree to participate.   ❑ No, I do not agree to participate.

[If participants click 'yes' they will be directed to the survey. If participants click 'no' they will not be directed to the survey.]

Survey Question	Response Options	Construct
Section 1: Interest in Show Topics (Participants will not see these headers)		

Survey Question	Response Options	Construct
Below are some messages associated with the new television show. Please rate your interest in watching each episode. 1. Are dogs smarter than people? 2. Who's more tribal? Monkeys or humans? 3. How do cops treat black people differently than white people? 4. Can cops overcome their unconscious biases? 5. Can a government hack your mind? 6. How can you save the planet? 7. Why can't we agree on the facts? 8. Even if you're not racist, can race be used to change how you vote? 9. Is what you buy or how much you eat or how happy you are literally contagious? 10. How do social media companies hack your mind? 11. Can we overcome sexism? 12. What new discoveries are being made in the social, behavioral, and economic sciences? *(text from the proposal, included to show the importance of tag lines vs. simply stating the main idea of the show).*	▶ Not at all interested ▶ Slightly interested ▶ Somewhat interested ▶ Very interested ▶ Extremely interested	▶ Interest (stand-alone topic)

Section 2: Best Hook (Participants will not see these headers)

13. Below are some images associated with the new television show. For each question, please select the image that makes you most interested in watching the show.

Image 1

Image 2

Image 3

▶ Image 1 ▶ Image 2 ▶ Image 3 ▶ Image 4	Interest *(best approach to hook people to watch more)*	
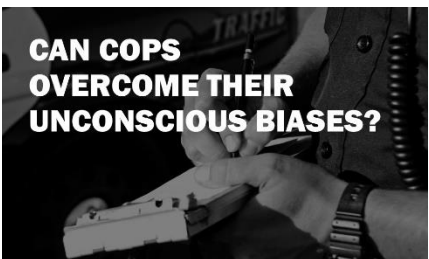
Image 4

Survey Question	Response Options	Construct
14. Below are some images associated with the new television show. For each question, please select the image that makes you most interested in watching the show.	▶ Image 1 ▶ Image 2 ▶ Image 3 ▶ Image 4	Interest

Image 1

Image 2

Image 3

Image 4

Survey Question	Response Options	Construct
15. Below are some images associated with the new television show. For each question, please select the image that makes you most interested in watching the show.	▶ Image 1 ▶ Image 2 ▶ Image 3 ▶ Image 4	Interest

Image 1

Image 2

Image 3

Image 4

Survey Question	Response Options	Construct
16. Below are some images associated with the new television show. For each question, please select the image that makes you most interested in watching the show.	▶ Image 1 ▶ Image 2 ▶ Image 3 ▶ Image 4	Interest

Image 1

Image 2

Image 3

Image 4

Survey Question	Response Options	Construct
17. Below are some images associated with the new television show. For each question, please select the image that makes you most interested in watching the show.	▶ Image 1 ▶ Image 2 ▶ Image 3 ▶ Image 4	Interest

Image 1

Image 2

Image 3

Image 4

Survey Question	Response Options	Construct
18. Below are some images associated with the new television show. For each question, please select the image that makes you <u>most interested</u> in watching the show.	▶ Image 1 ▶ Image 2 ▶ Image 3 ▶ Image 4	Interest

Image 1

Image 2

Image 3

Image 4
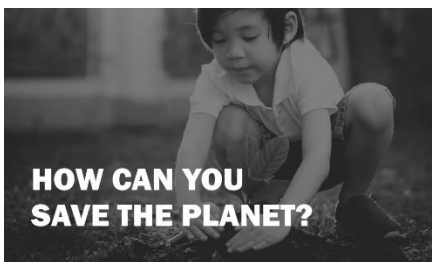
Section 3: Television Habits (Participants will not see these headers)		
19. What type of device do you watch TV on? Please check all that apply.	▶ Mobile phone ▶ TV ▶ Laptop/Desktop ▶ Gaming Console ▶ Other (please describe)	Device

Survey Question	Response Options	Construct
20. How do you watch television programs? Please check all that apply	▶ Netflix ▶ Hulu ▶ Amazon ▶ Cable/Dish ▶ Antenna TV ▶ YouTube ▶ Other (please describe) ▶ I don't watch any television programs	Method
21. Do you watch public television?	▶ Often ▶ Sometimes ▶ Rarely ▶ Never	Public Television Viewer
Section 4: Science Interest (Participants will not see these headers)		
22. I do science-related hobbies in my free time.	▶ Strongly disagree ▶ Disagree ▶ Agree ▶ Strongly Agree	Interest in Science *(Modified interest scale from Cornell Lab of Ornithology 2014. I selected a subset of 5 items)*
23. I want to understand how processes in science work	▶ Agreeability response options	
24. I enjoy learning about new scientific discoveries	▶ Agreeability response options	
25. Other people would describe me as a "science person."	▶ Agreeability response options	
26. I am very interested in science.	▶ Agreeability response options	
Section 5: Demographics(Participants will not see these headers)		
27. What is your age	▶ (fill in the blank)	▶ Age/Target Audience
28. What is your race? (Check all that apply)	▶ American Indian or Alaska Native ▶ Asian ▶ Black or African American ▶ Native Hawaiian or Other Pacific Islander ▶ White ▶ Hispanic ▶ Other (please describe _____)	▶ Race/Underrepresented in STEM

Survey Question	Response Options	Construct
29. How do you identify?	▶ Female ▶ Male ▶ Transgender ▶ Other	▶ Gender/Underrepresented in STEM
30. What is your zip code	▶ Open-ended	▶ Location

[Text that appears on final page of the HYM Survey.]

Thank you for completing the TV Survey. **If you want to be a chance to win a $25 or $100 gift card**, please click here:

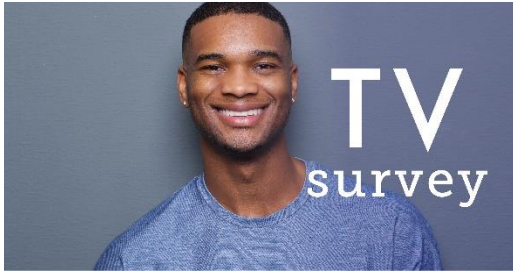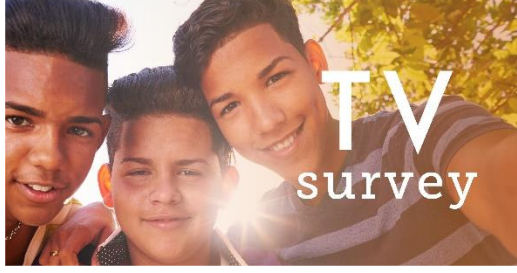https://www.surveymonkey.com/r/HYMSurveyContactInfo.

Pass along the survey link to your friends! https://www.surveymonkey.com/r/HYMSurvey
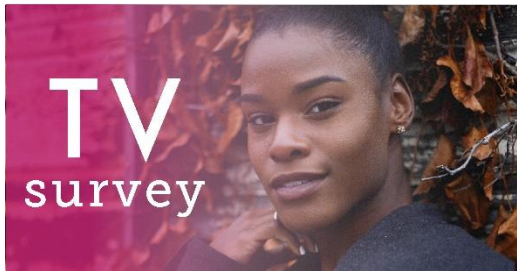
Appendix C: Initial Suite of Facebook Ads

Teen (Age 15–18)

Millennial (Age 19–34)
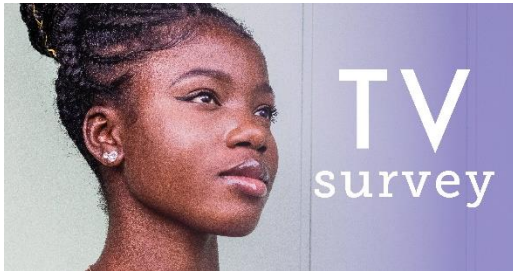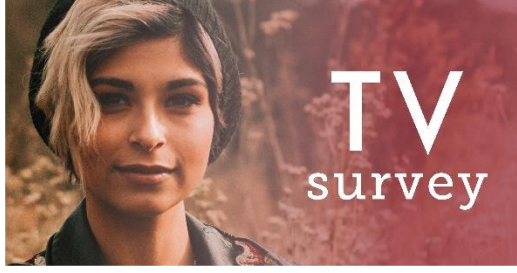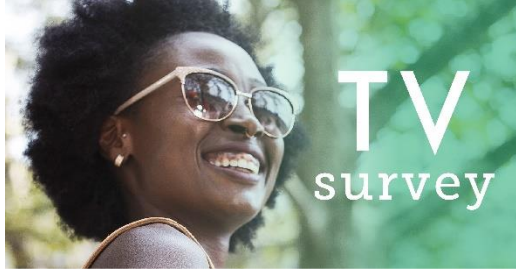
Gen X (Age 35–50)
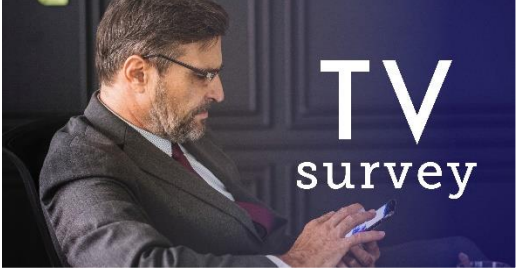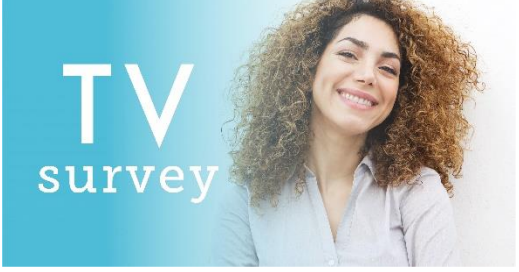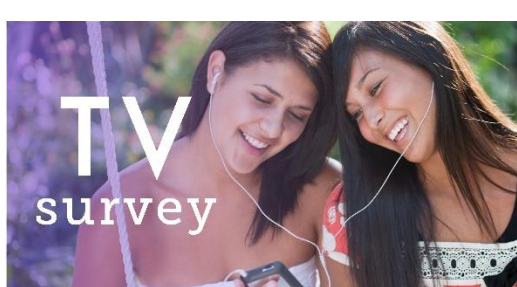
Appendix D: Hacking Your Mind Gift Card Survey

After participants complete the Hacking Your Mind Survey, there will be a link to this survey to collect contact information for the survey gift card.

You are eligible for a $25 or $100 gift card. One $25 winner will be drawn every 75 surveys, and three $100 gift card winners will be drawn when the survey is over later this month. Duplicate entries will be discarded. **Your contact information for the drawing will be saved in a separate location and can never be linked to your survey data.** We will never send you spam or sell your name to anyone else.

Question	Response Options
31. What is your email address?	[Open text field]
32. If you win a gift card, what kind of gift card would you like to receive?	▶ Target gift card ▶ Amazon gift card

[Text that appears on final page of the Contact Information Survey.]

Thank you again for completing the TV Survey. An RMC Research Corporation staff member will email you if you win a $25 or $100 gift card.

As a reminder, your participation in the TV survey is confidential. Your name or contact information will not be linked to your survey answers in any way. Your name and contact information will only be used if you win the drawing. If you have any questions or concerns about the survey, please contact Chandra Lewis at RMC Research Corporation at hymsurvey@rmcres.com).

Please pass along the survey link to your friends! (survey link)

Appendix E: Human Subjects Protections

Human Subject Protections

RMC Research has a Human Protection Administration (HPA) committee that develops internal procedures to ensure that all data collection efforts conducted by RMC Research protect participant confidentiality and prevent harm and determines whether an outside institutional review board review is required. The HPA committee documents indicate that the formative evaluation will not require an external review for the following reasons:

- This formative evaluation is not considered research.
- RMC Research will not store nor analyze identifiable data.
- Although the evaluation does meet the criteria for gathering data from human subjects, it does not gather data that represents greater than a minimal risk.
- Although the data are gathered from a vulnerable population (i.e., youth), the research is exempt from an institutional review board review based on federal regulations 45 CFR §46.101(b)(3)[1] and 21 CFR §56.

Studies deemed exempt from an institutional review board review are still required to adhere to basic principles regarding the ethical treatment of participants and their data. The RMC Research project director designed the study so that risks to participants are minimized and justified by the anticipated benefits of the evaluation. Prospective participants are informed about the research and voluntarily agree to participate, participants' privacy and confidentiality are protected, and subject selection is equitable. This formative evaluation will be formally reviewed by the RMC Research HPA committee in Year 4 prior to data collection.

Abiding by Children's Online Privacy Protection Rule

The Federal Trade Commission established the Children's Online Privacy Protection Rule (COPPA)[2] which states that if a child is 13 or younger data cannot be collected without parental consent if personally identifiable data is collected (i.e., it is not anonymous). If a child is over 13, parental consent is not necessary if the study meets federal exclusion criteria for an institutional review board review. To abide by COPPA this formative evaluation sets the minimum age of respondents to 15, will not collect identifiable data from youth, and meets the exemption criteria described in the prior section.

Youth Assent

Youth are not legally able to consent to participate until they are 18, but they can assent to participation in an evaluation. Assent will be obtained from youth at the onset of the survey. The assent process ensures youth understanding and cooperation and provides a feeling of inclusion. The process also illustrates the investigator's respect for the rights and dignity of youth in the context of the evaluation. In recognition of children's differing rates of intellectual and emotional development, federal regulations do not specify the age for which assent is required nor state the form the assent process should take. Rather, these determinations are left to the judgment of the Principal Investigator and the institutional

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[1]https://www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/index.html#46.404
[2]https://www.ftc.gov/enforcement/rules/rulemaking-regulatory-reform-proceedings/childrens-online-privacy-protection-rule

review board. Whenever assent is sought from a minor, the assent discussion, form, or information sheet must include the following criteria:

- A simplified description of the purpose of the research, including the risks and benefits.
- A description of the procedures and interventions to which the minor subject will be exposed.
- An explanation of any procedures that may hurt and for how long the pain will last.
- An explanation that the child has the right to decide whether or not to participate in the research study.
- An explanation of the research alternatives.
- A description of the level of confidentiality of the data including whether there could be any state mandated reporting such as abuse reporting and whether or not the child's responses will or will not be shared with their parents.
- A question and answer period in which the researcher should encourage the child subject to ask questions about her/his participation in the study.
- An explanation that the potential subject may withdraw from the research at any time, if applicable.

Assent forms are always in a simple format that is appropriate to the child's maturity and cognitive ability. The use of large type, simple schema, and pictures can facilitate the child's understanding of the text. Older children, such as adolescents, may receive a form that mirrors the parental/guardian permission form in content and format. The assent form for this evaluation will meet these criteria. Assent will be obtained from youth survey participants at the onset of the survey.

Adult Consent

Consent will be obtained from adult survey participants at the onset of the survey. The consent will include the 8 basic elements of informed consent (45 CFR §46.116[3]):

1. A statement that the study involves research, an explanation of the purpose of the research, the expected duration of participation, a description of the procedures, and identification of the experimental procedures.
2. A description of any reasonably foreseeable risks or discomforts.
3. A description of any benefits to the participant or to others that might be reasonably expected from the research. (Incentives cannot be described as a benefit to the participant.)
4. Disclosure of appropriate alternative procedures or courses of treatment, if any, that may be advantageous to the participant.
5. A statement describing the extent, if any, to which confidentiality of records identifying the participant will be maintained including, as appropriate, (a) what records may be examined by the sponsor, the institutional review board, or other regulatory agencies, (b) whether or not the data collected will be retained and, if so, for what purpose and for what period of time, or when the data will be deidentified and/or destroyed, (c) what procedures will be put in place to ensure that unauthorized individuals will not have access to this information, and (d) the limitations (if any) to these confidentiality procedures such as legal reporting requirements in the case of suspected child or elder abuse.

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[3]https://www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/index.html

6. For research involving more than minimal risk, an explanation as to whether or not any compensation and medical treatment are available if injury occurs to the participant and, if so, what they consist of or where further information may be obtained.

7. Identification of whom to contact for answers to questions about the research and the research participants' rights including whom to contact when the investigator may be unavailable or to discuss any other questions, complaints or concerns and whom to contact if the participant sustains a research-related injury.

8. A statement that research participation is voluntary, that the participant may discontinue participation at any time, and that the participant's refusal to take part or withdraw will not involve a penalty or loss of benefits to which the participant is otherwise entitled.

Appendix F: Data Tables

Exhibit 1: "Do you agree to participate in the Hacking Your Mind TV Survey?"

Response	n	%
Yes	983	97.3%
No	27	2.7%

Note. *N* = 1010. "No consent" individuals exited the survey after this item.

Exhibit 2: "What is your age?"

Response	n	%
Under 15	3	0.3%
15-18	172	17.8%
19-34	265	27.4%
35-50	452	46.7%
50+	75	7.8%

Note. *N* = 967. "Under 15" and "50+" individuals not included in the analysis.

> *Only the target audience are included in the remainder of the analyses and the following data tables. **Target audience** is defined as individuals at least 15 years old and not older than 50 years old.*

Exhibit 3: Demographics for Target Audience

Study Groups	Gender	Underrepresented Racial Group n (%)	Non-Underrepresented Racial Group n (%)	Missing Racial/Ethnic Group n (%)	Row Totals n (%)	Age Totals n (%)
Teens aged 15–18	Female	53 (6.9%)	40 (5.2%)	0 (0.0%)	93 (12.1%)	
	Male	14 (1.8%)	27 (3.5%)	0 (0.0%)	41 (5.3%)	153 (19.9%)
	Missing Gender	3 (0.4%)	4 (0.5%)	12 (1.5%)	19 (2.5%)	
Millennials aged 19–34	Female	46 (6.0%)	69 (9.0%)	0 (0.0%)	115 (15.0%)	
	Male	29 (3.8%)	56 (7.3%)	2 (0.3%)	87 (11.3%)	223 (29.0%)
	Missing Gender	5 (0.7%)	3 (0.4%)	13 (1.6%)	21 (2.7%)	
Generation Xers aged 35–50	Female	78 (10.1%)	175 (22.8%)	2 (0.3%)	255 (33.2%)	
	Male	27 (3.5%)	64 (8.3%)	1 (0.1%)	92 (12.0%)	393 (51.1%)
	Missing Gender	2 (0.3%)	1 (0.1%)	43 (5.2%)	46 (6.0%)	
Column Totals		257 (33.4%)	439 (57.1%)	73 (9.5%)	*N* = 769 (100.0%)	

Note. Marginal totals are shown in the shaded areas.

Exhibit 4: "What is your race?" (Check all that apply.)

Response	*n*	%
American Indian or Alaska Native	3	0.4%
Asian	39	5.6%
Black or African American	95	13.6%
Native Hawaiian or other Pacific Islander	0	0.0%
White	389	55.9%
Hispanic	78	11.2%
More than 1 race	92	13.2%
Underrepresented race (UR)	257	36.9%
Non-underrepresented race (non-UR)	439	63.1%

Note. *N* = 696. UR (used for subgroup analyses) includes American Indian or Alaska Native, Black or African America, Native Hawaiian or other Pacific Islander, Hispanic, and those who provided more than 1 race/ethnicity with at least 1 specified race/ethnicity in the UR categories.

Other responses include (*n* = 1, unless otherwise noted):

- Coded as UR: Ethiopian American, Filipino, Middle Eastern (*n* = 2), Mixed Race, West Indian American.
- Coded as non-UR (because another UR category checked in each case): 46516, q.
- Coded as missing: American, Polish, "Do not wish to disclose," Human, Not your business.

Exhibit 5: "How do you identify?"

Response	*n*	%
Female	463	66.6%
Male	220	31.7%
Transgender	7	1.0%
Other	5	0.7%

Note. *N* = 695. Because this item was programmed as a "check-all-that-apply," individuals with multiple responses were recoded as "missing."
Only male and female were included in UR gender analyses (Male = Non-UR gender; Female = UR gender).

Exhibit 6: "What type of device do you watch TV on?" (Check all that apply.)

Device	All	Teens	Millennials	Gen-Xers	Females	Males	UR	Non-UR
TV	89%	85%	90%	90%	89%	88%	90%	88%
Mobile phone	55%	76%	63%	42%	53%	60%	65%	51%
Laptop/desktop	46%	61%	53%	35%	44%	48%	48%	44%
Gaming console	16%	20%	20%	11%	15%	15%	20%	13%
Other	6%	5%	6%	6%	5%	6%	5%	7%

Note. All: N = 711. Teens: n = 145. Millennials: n = 212. Gen-Xers: n = 354. Females: n = 463. Males: n = 220. UR: n = 257. Non-UR: n = 439.
Differences assessed using chi-squared tests and were deemed significant for $p < 0.05$.
Teens are significantly more likely to watch on a phone than Millennials or Gen-Xers (p = 0.012 and p = 0.000, respectively).
Millennials are significantly more likely to watch on a phone than Gen-Xers ($p < 0.001$).
Teens and Millennials are significantly more likely to watch on a desktop/laptop or console than Gen-Xers (Teens vs. Gen-Xers: $p < 0.001$ and $p < 0.001$, respectively; Millennials vs. Gen-Xers: p = 0.011 and p = 0.003, respectively).
UR significantly more likely to watch on a phone or a console than non-UR ($p < 0.001$ and p = 0.025, respectively).
No significant difference by gender.

Other responses include (n = 1, unless otherwise noted): Amazon Firestick (n = 7), tablet (n = 15), Apple TV, BluRay player, iPad (n = 7), iPad touch, Kindle (n = 3), streaming device (n = 4).

Exhibit 7: "How do you watch television programs?" (Check all that apply.)

Device	All	Teens	Millennials	Gen-Xers	Females	Males	UR	Non-UR
Netflix	68%	85%	78%	55%	69%	65%	72%	66%
YouTube	57%	79%	63%	45%	55%	60%	64%	53%
Cable/dish	53%	46%	50%	58%	51%	58%	53%	53%
Hulu	40%	38%	56%	32%	39%	42%	40%	41%
Amazon	35%	30%	44%	31%	33%	38%	33%	35%
Antenna TV	23%	13%	21%	29%	23%	23%	26%	22%
Other	7%	8%	4%	9%	8%	5%	4%	8%
I don't watch any television programs	1%	1%	0%	0%	0%	1%	1%	0%

Note. All: N = 711. Teens: n = 145. Millennials: n = 212. Gen-Xers: n = 354. Females: n = 463. Males: n = 220. UR: n = 257. Non-UR: n = 439.
Differences assessed using chi-squared tests and were deemed significant for $p < 0.05$.
Teens are significantly more likely to watch on YouTube than Millennials or Gen-Xers (p = 0.002 and $p < 0.001$, respectively).
Teens are significantly less likely than Millennials to watch on Hulu (p = 0.001), Amazon (p = 0.005), or antenna (p = 0.049).
Teens and Millennials are significantly more likely to watch on Netflix than Gen-Xers ($p < 0.001$ and $p < 0.001$, respectively).
Teens are significantly less likely to watch on cable or antenna than Gen-Xers (p = 0.014 and $p < 0.001$, respectively).
Millennials are significantly more likely than Gen-Xers to watch on Hulu, Amazon, or YouTube ($p < 0.001$, p = 0.001, and $p < 0.001$, respectively).
UR significantly more likely to watch on YouTube than non-UR (p = 0.005).
No significant difference by gender.

Other responses include: Apps (n = 2), Crunchyroll (n = 2), CW seed, Directv (n = 3), DVD, Fandango, HBO (n = 4), Amazon Firestick, FuboTv, Get, Hallmark movies, independent streaming services, Kodi, library, Chromecast, websites (n = 3), Philo (n = 2), Playstation Vue, Plex (n = 2), Roku (n = 5), ShowBox, STREATS MART BOX, TubiTV (n = 6).

Exhibit 8: "Do you watch public television?"

Subgroup	N	Never	Rarely	Sometimes	Often
All	709	7%	26%	42%	25%
Teens	145	10%	27%	46%	17%
Millennials	212	5%	29%	41%	26%
Gen-Xers	352	7%	23%	42%	28%
Female	463	7%	27%	41%	25%
Male	220	8%	22%	44%	26%
Underrepresented race (UR)	257	5%	23%	43%	29%
Non-underrepresented race (non-UR)	439	8%	27%	42%	23%
Non-science people	312	20%	44%	29%	7%
Science people	390	30%	41%	23%	6%

Note. Differences assessed using Kruskal-Wallis test (for all 3 age groups) and Mann-Whitney U tests (for pairwise comparisons). Differences were deemed significant for $p < 0.05$.
Kruskal-Wallis show differences among groups ($p = 0.049$).
Teens watch significantly less than Gen-Xers ($p = 0.008$).
UR watch significantly more than non-UR ($p = 0.034$).
No significant difference by gender.

Exhibit 9: "I do science related hobbies in my free time."

Subgroup	N	Strongly Disagree	Disagree	Agree	Strongly Agree	M	sd
All	702	22%	40%	31%	7%	2.24	0.871
Teens	141	18%	45%	29%	8%	2.27	0.844
Millennials	211	20%	34%	37%	9%	2.35	0.900
Gen-Xers	350	24%	42%	28%	6%	2.16	0.858
Female	463	23%	42%	29%	6%	2.19	0.855
Male	220	20%	37%	34%	10%	2.33	0.898
Underrepresented race (UR)	257	23%	41%	30%	6%	2.18	0.856
Non-underrepresented race (non-UR)	350	21%	39%	32%	8%	2.27	0.880

Exhibit 10: "I want to understand how processes in science work."

Subgroup	N	Strongly Disagree	Disagree	Agree	Strongly Agree	M	sd
All	702	10%	20%	53%	17%	2.77	0.851
Teens	141	10%	16%	57%	17%	2.81	0.836
Millennials	211	10%	17%	52%	21%	2.84	0.872
Gen-Xers	350	11%	23%	52%	14%	2.70	0.841
Female	463	11%	21%	54%	14%	2.72	0.836
Male	220	10%	18%	50%	22%	2.85	0.876
Underrepresented race (UR)	257	12%	20%	56%	13%	2.69	0.845
Non-underrepresented race (non-UR)	350	9%	21%	51%	19%	2.80	0.854

Exhibit 11: "I enjoy learning about new scientific discoveries."

Subgroup	N	Strongly Disagree	Disagree	Agree	Strongly Agree	M	sd
All	702	7%	12%	56%	26%	3.01	0.798
Teens	141	6%	14%	57%	23%	2.96	0.788
Millennials	211	6%	9%	55%	30%	3.10	0.783
Gen-Xers	350	7%	12%	56%	25%	2.98	0.810
Female	463	7%	13%	58%	23%	2.97	0.787
Male	220	6%	10%	53%	31%	3.08	0.812
Underrepresented race (UR)	257	7%	13%	56%	24%	2.97	0.805
Non-underrepresented race (non-UR)	350	6%	11%	56%	27%	3.04	0.796

Exhibit 12: "Other people would describe me as a 'science person.'"

Subgroup	N	Strongly Disagree	Disagree	Agree	Strongly Agree	M	sd
All	702	28%	38%	25%	9%	2.15	0.932
Teens	141	33%	36%	21%	11%	2.09	0.982
Millennials	211	20%	37%	32%	11%	2.34	0.918
Gen-Xers	350	31%	40%	22%	7%	2.06	0.906
Female	463	30%	38%	24%	8%	2.09	0.918
Male	220	23%	38%	27%	12%	2.28	0.951
Underrepresented race (UR)	257	31%	41%	22%	7%	2.05	0.898
Non-underrepresented race (non-UR)	350	26%	37%	26%	11%	2.21	0.950

Exhibit 13: "I am very interested in science."

Subgroup	N	Strongly Disagree	Disagree	Agree	Strongly Agree	M	sd
All	702	14%	26%	43%	17%	2.64	0.923
Teens	141	13%	34%	36%	17%	2.57	0.920
Millennials	211	9%	23%	47%	21%	2.81	0.869
Gen-Xers	350	17%	25%	43%	15%	2.55	0.943
Female	463	15%	30%	40%	16%	2.57	0.923
Male	220	12%	21%	47%	21%	2.76	0.911
Underrepresented race (UR)	257	14%	28%	42%	15%	2.58	0.915
Non-underrepresented race (non-UR)	350	13%	26%	43%	18%	2.66	0.925

Exhibit 14: Science Interest Scale Scores by Subgroup

Subgroup	N	M	sd	Percentage of Science People
All	702	0.52	0.245	56%
Teens	141	0.51	0.246	50%
Millennials	211	0.56	0.241	63%
Gen-Xers	350	0.50	0.245	54%
Female	463	0.50	0.242	52%
Male	220	0.55	0.247	62%
Underrepresented race (UR)	257	0.50	0.236	51%
Non-underrepresented race (non-UR)	350	0.53	0.250	58%

Note. A **science person** is defined as an individual where Science Interest scale score > 0.50.
For Science Interest scale: differences assessed using ANOVA (for 3 age groups) and independent *t*-tests (for pairwise comparisons). For percentages of science people: differences assessed using chi-squared tests. Differences were deemed significant for $p < 0.05$. Millennials were significantly more likely to be science people than Teens or Gen-Xers ($p = 0.016$ and $p = 0.040$, respectively). No difference by race/ethnicity. Males significantly more likely to be science people than females ($p = 0.012$).

Exhibit 15: Tag Line Interest Ratings for All Target Audience

Tag Line	Not at all interested	Slightly interested	Somewhat interested	Very interested	Extremely interested	M	sd
Are dogs smarter than people?	20%	19%	35%	17%	9%	2.76	1.213
Who's more tribal? Monkeys or humans?	31%	21%	28%	13%	7%	2.45	1.242
How do cops treat black people differently than white people?	21%	12%	25%	22%	21%	3.10	1.407
Can cops overcome their unconscious biases?	20%	13%	25%	25%	17%	3.07	1.362
Can a government hack your mind?	21%	15%	24%	24%	16%	2.98	1.371
How can you save the planet?	12%	16%	28%	27%	18%	3.24	1.245
Why can't we agree on facts?	15%	18%	32%	22%	14%	3.02	1.250
Even if you're racist, can race be used to change how you vote?	28%	13%	25%	21%	14%	2.79	1.398
Is what you buy or how much you eat or how happy you are literally contagious?	17%	19%	30%	21%	13%	2.94	1.256
How do social media companies hack your mind?	17%	16%	26%	23%	20%	3.14	1.347
Can we overcome sexism?	22%	16%	26%	21%	15%	2.91	1.363
What new discoveries are being made in the social, behavioral, and economic sciences?	16%	18%	26%	22%	18%	3.09	1.326

Note. N = 769.

Exhibit 16: Tag Line Interest Ratings by Age Group

Tag Line	Teens		Millennials		Gen-Xers		
	M	sd	M	sd	M	sd	p
Are dogs smarter than people?	2.62	1.187	2.79	1.313	2.80	1.163	0.268
Who's more tribal? Monkeys or humans?	2.35	1.167	2.44	1.293	2.49	1.242	0.518
How do cops treat black people differently than white people?[a]	3.37	1.366	3.20	1.454	2.95	1.379	0.004
Can cops overcome their unconscious biases?	3.21	1.360	3.12	1.409	2.98	1.331	0.175
Can a government hack your mind?[b]	3.48	1.328	3.03	1.317	2.76	1.367	0.000
How can you save the planet?	3.38	1.262	3.32	1.221	3.14	1.250	0.062
Why can't we agree on facts?	3.05	1.245	3.08	1.311	2.97	1.218	0.586
Even if you're racist, can race be used to change how you vote?[c]	2.98	1.416	2.97	1.408	2.61	1.366	0.001
Is what you buy or how much you eat or how happy you are literally contagious?	3.03	1.262	2.99	1.234	2.88	1.267	0.345
How do social media companies hack your mind?[d]	3.48	1.333	3.24	1.324	2.94	1.334	0.000
Can we overcome sexism?[e]	3.02	1.374	3.08	1.378	2.77	1.340	0.015
What new discoveries are being made in the social, behavioral, and economic sciences?	3.14	1.383	3.22	1.347	2.98	1.286	0.082

Note. Teens: n = 153. Millennials: n = 223. Gen-Xers: n = 393.
Difference assessed using one-way ANOVA comparisons (for all 3 age groups; p-value shown in table). Post-hoc comparisons conducted using independent t-tests with a Bonferroni adjustment (p-value shown in note when significant). Differences were deemed significant for $p < 0.05$.
[a]Teens sig. more interested than Gen-Xers (p = 0.005).
[b]Teens sig. more interested than both Millennials (p = 0.005) and Gen-Xers (p < 0.001).
[c]Gen-Xers sig. less interested than both Millennials (p = 0.006) and Teens (p = 0.017).
[d]Gen-Xers sig. less interested than both Millennials (p = 0.022) and Teens (p < 0.001).
[e]Millennials sig. more interested than Gen-Xers (p = 0.022).

Exhibit 17: Tag Line Interest Ratings by Gender

Tag Line	Females		Males		
	M	sd	M	sd	p
Are dogs smarter than people?	2.77	1.186	2.70	1.236	0.443
Who's more tribal? Monkeys or humans?	2.42	1.215	2.46	1.262	0.643
How do cops treat black people differently than white people?	3.13	1.408	2.98	1.385	0.205
Can cops overcome their unconscious biases?	3.12	1.336	2.98	1.381	0.216
Can a government hack your mind?	3.03	1.362	2.95	1.352	0.471
How can you save the planet?	3.30	1.235	3.15	1.257	0.152
Why can't we agree on facts?	3.08	1.228	3.00	1.242	0.416
Even if you're racist, can race be used to change how you vote?	2.77	1.399	2.86	1.402	0.421
Is what you buy or how much you eat or how happy you are literally contagious?	3.01	1.277	2.85	1.211	0.135
How do social media companies hack your mind?	3.18	1.323	3.12	1.313	0.601
Can we overcome sexism?	2.95	1.363	2.79	1.335	0.157
What new discoveries are being made in the social, behavioral, and economic sciences?	3.15	1.311	3.06	1.314	0.414

Note. Females: n = 463. Males: n = 220. People who answered "transgender," "other," or gave multiple responses are not included in these analyses.

Difference assessed using independent t-tests. Differences were deemed significant for $p < 0.05$.

Exhibit 18: Tag Line Interest Ratings by Race/Ethnicity

Tag Line	Underrepresented race (UR)		Non-underrepresented race (non-UR)		
	M	sd	M	sd	p
Are dogs smarter than people?	2.75	1.169	2.75	1.211	0.973
Who's more tribal? Monkeys or humans?	2.50	1.222	2.40	1.234	0.275
How do cops treat black people differently than white people?	3.63	1.313	2.79	1.358	0.000
Can cops overcome their unconscious biases?	3.48	1.250	2.87	1.360	0.000
Can a government hack your mind?	3.23	1.345	2.90	1.354	0.002
How can you save the planet?	3.44	1.246	3.16	1.228	0.004
Why can't we agree on facts?	3.20	1.218	2.97	1.238	0.022
Even if you're racist, can race be used to change how you vote?	3.21	1.370	2.58	1.362	0.000
Is what you buy or how much you eat or how happy you are literally contagious?	3.12	1.239	2.88	1.259	0.014
How do social media companies hack your mind?	3.41	1.335	3.02	1.291	0.000
Can we overcome sexism?	3.18	1.276	2.79	1.383	0.000
What new discoveries are being made in the social, behavioral, and economic sciences?	3.31	1.285	3.04	1.322	0.009

Note. UR: *n* = 257. Non-UR: *n* = 439. Non-underrepresented includes people who marked White, Asian, or both. Underrepresented includes people who marked one of the following: American Indian or Alaska Native, Black or African American, Native Hawaiian or Other Pacific Islander, or Hispanic.

Difference assessed using independent *t*-tests. Differences were deemed significant for $p < 0.05$.

Exhibit 19: Tag Line Interest Ratings by Science Interest

Tag Line	Science people		Non-science people		
	M	sd	M	sd	p
Are dogs smarter than people?	2.85	1.206	2.64	1.184	0.021
Who's more tribal? Monkeys or humans?	2.66	1.272	2.15	1.108	0.000
How do cops treat black people differently than white people?	3.29	1.401	2.87	1.373	0.000
Can cops overcome their unconscious biases?	3.29	1.341	2.84	1.332	0.000
Can a government hack your mind?	3.26	1.295	2.71	1.376	0.000
How can you save the planet?	3.50	1.201	2.96	1.226	0.000
Why can't we agree on facts?	3.31	1.221	2.73	1.181	0.000
Even if you're racist, can race be used to change how you vote?	3.02	1.349	2.54	1.416	0.000
Is what you buy or how much you eat or how happy you are literally contagious?	3.09	1.226	2.80	1.278	0.002
How do social media companies hack your mind?	3.35	1.257	2.93	1.364	0.000
Can we overcome sexism?	3.09	1.364	2.71	1.323	0.000
What new discoveries are being made in the social, behavioral, and economic sciences?	3.46	1.237	2.72	1.298	0.000

Note. Science people: *n* = 390. Non-science people: *n* = 312. A "Science Person" has a Science Interest scale score > 0.5.

Difference assessed using independent *t*-tests. Differences were deemed significant for *p* < 0.05.

Exhibit 20: Most Interesting Hook:
How can you save the planet?

a. b. c. d.

Subgroup	n	a.	b.	c.	d.
All	713	5%	6%	57%	32%
Teens	145	3%	7%	52%	37%
Millennials	212	4%	6%	56%	33%
Gen-Xers	356	5%	6%	59%	29%
Females	463	4%	6%	56%	33%
Males	220	7%	7%	59%	27%
Underrepresented race (UR)	257	4%	4%	56%	37%
Non-underrepresented race (non-UR)	350	5%	8%	58%	29%
Non-science people	312	4%	8%	55%	34%
Science people	390	5%	5%	59%	31%

Note. Differences assessed using chi-squared tests and deemed significant for $p < 0.05$.
There were significant differences among age groups or by gender.
UR more strongly preferred Image D compared to non-UR ($p = 0.036$).
There were no significant differences by science people vs. non-science people.

Exhibit 21: Most Interesting Hook:
**How do cops treat black people differently than white people?**

a.

b.

c.

d.
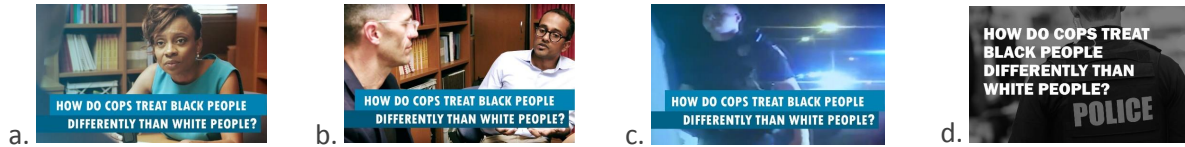
Subgroup	n	a.	b.	c.	d.
All	731	10%	14%	32%	44%
Teens	149	8%	7%	33%	52%
Millennials	216	13%	16%	32%	39%
Gen-Xers	366	9%	16%	32%	43%
Females	463	11%	12%	29%	48%
Males	220	8%	18%	40%	34%
Underrepresented race (UR)	257	15%	12%	31%	42%
Non-underrepresented race (non-UR)	439	7%	15%	33%	45%
Non-science people	312	10%	14%	32%	44%
Science people	390	10%	14%	33%	43%

Note. Differences assessed using chi-squared tests and deemed significant for $p < 0.05$.
There were significant differences among age groups ($p = 0.034$): most notably, Teens more strongly preferred Image D, compared to Millennials and Gen-Xers ($p = 0.007$ and $p = 0.037$, respectively).
Males and females differed in the overall preferred images: males preferred Image C while women preferred Image D ($p = 0.017$).
UR were twice as likely to prefer Image A compared to non-UR($p = 0.001$).
There were no significant differences between science people and non-science people.

Exhibit 22: Most Interesting Hook:
Can cops overcome their unconscious biases?

a.

b.

c.

d.
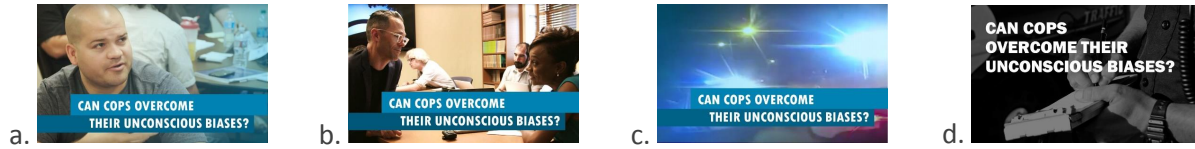
Subgroup	n	a.	b.	c.	d.
All	720	13%	23%	28%	37%
Teens	146	9%	23%	31%	38%
Millennials	214	16%	23%	21%	39%
Gen-Xers	360	12%	23%	30%	35%
Females	463	11%	25%	27%	37%
Males	220	14%	19%	31%	37%
Underrepresented race (UR)	257	10%	28%	23%	39%
Non-underrepresented race (non-UR)	439	13%	20%	31%	36%
Non-science people	312	11%	23%	29%	37%
Science people	390	13%	23%	27%	37%

Note. Differences assessed using chi-squared tests and deemed significant for $p < 0.05$.
There were significant differences among age groups or by gender.
Non-UR more strongly preferred Image C compared to UR ($p = 0.027$).
There were no significant differences by science people vs. non-science people.

Exhibit 23: Most Interesting Hook:
Can a government hack your mind?

a.   b.   c.   d.

Subgroup	n	a.	b.	c.	d.
All	716	14%	9%	51%	26%
Teens	145	15%	6%	59%	21%
Millennials	212	18%	10%	46%	26%
Gen-Xers	356	10%	10%	52%	28%
Females	463	12%	9%	52%	27%
Males	220	17%	10%	49%	24%
Underrepresented race (UR)	257	15%	10%	45%	30%
Non-underrepresented race (non-UR)	439	13%	8%	55%	24%
Non-science people	312	12%	10%	47%	31%
Science people	390	15%	8%	55%	22%

Note. Differences assessed using chi-squared tests and deemed significant for $p < 0.05$. There were significant differences among age groups ($p = 0.043$), but those differences were minimal and not detectable with pairwise comparisons.
There were no significant differences by gender or race/ethnicity.
Science people more strongly preferred Image C compared to non-science people ($p = 0.029$).

Exhibit 24: Most Interesting Hook:
Are dogs smarter than people?

a.

b.

c.

d.
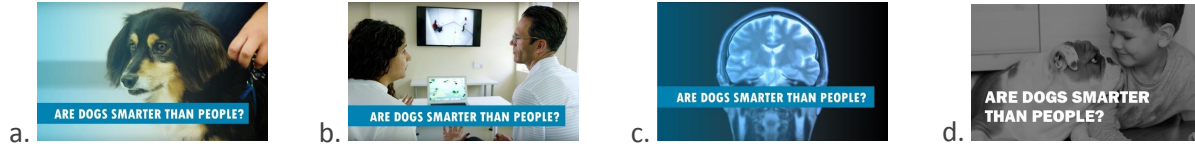
Subgroup	n	a.	b.	c.	d.
All	755	27%	9%	20%	44%
Teens	151	33%	8%	19%	40%
Millennials	219	24%	11%	18%	47%
Gen-Xers	385	26%	9%	22%	44%
Females	463	27%	8%	17%	49%
Males	220	24%	12%	26%	37%
Underrepresented race (UR)	257	22%	10%	23%	46%
Non-underrepresented race (non-UR)	439	28%	8%	19%	44%
Non-science people	312	27%	8%	16%	49%
Science people	390	25%	10%	24%	41%

Note. Differences assessed using chi-squared tests and deemed significant for $p < 0.05$.
There were significant differences among age groups.
Women more strongly preferred Image D compared to men ($p = 0.002$).
There were no significant differences by race/ethnicity or science people vs.
non-science people.

Exhibit 25: Most Interesting Hook:
Who's more tribal? Monkeys or humans?

a.

b.

c.

d.

Subgroup	n	a.	b.	c.	d.
All	743	58%	10%	20%	12%
Teens	150	51%	9%	31%	9%
Millennials	217	60%	10%	22%	8%
Gen-Xers	376	59%	11%	14%	16%
Females	463	59%	10%	18%	13%
Males	220	59%	10%	23%	9%
Underrepresented race	257	54%	9%	23%	14%
Non-underrepresented race	439	60%	11%	18%	10%
Non-science people	312	55%	9%	19%	17%
Science people	390	61%	11%	21%	8%

Note. Differences assessed using chi-squared tests and deemed significant for $p < 0.05$.
There were significant differences among age groups ($p < 0.001$): most notably,
Gen-Xers more strongly preferred Image D, compared to Teens and Millennials
($p < 0.001$ and $p = 0.006$, respectively).
There were no significant differences by gender or race/ethnicity.
Science people more strongly preferred Image A compared non-science people
($p = 0.002$).