



# Trustworthy, Reliable and Engaging Scientific Communication Approaches

D3.1 Set of illustrated vignettes with questions



This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 872855.



# **PROJECT DESCRIPTION**

Acronym:	TRESCA
Title:	Trustworthy, Reliable and Engaging Scientific Communication Approaches
Coordinator:	Erasmus University Rotterdam
Reference:	872855
Туре:	Research and Innovation Action (HORIZON 2020)
Program:	Science with and for Society (SwafS)
Theme:	(Science) Communication
Start:	01.01.2020
Duration:	28 months
Website:	https://trescaproject.eu
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Consortium: Erasmus University Rotterdam, The Netherlands (EUR), Coordinator Consejo Superior de Investigaciones Científicas, Spain (CSIC) Observa Science in Society, Italy (OBS) Zentrum Für Soziale Innovation GMBH, Austria (ZSI) Science Business Publishing Limited, United Kingdom (SBIZ) In a Nutshell, Kurzgesagt GmbH, Germany (KURZ)



# **DELIVERABLE DESCRIPTION**

Number:	D3.1
Title:	Set of illustrated vignettes with questions
Lead beneficiary:	CSIC
Work package:	WP3
Dissemination level:	Public (PU)
Туре	Report (R)
Due date:	30.11.2020
Submission date:	30.11.2020
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Reviewers:	Jay Lee, EUR

Acknowledgement: This project has received funding from the European Union's Horizon 2020 Research and Innovation Action under Grant Agreement No 826497. **Disclaimer:** The content of this publication is the sole responsibility of the authors and does not in any way represent the view of the European Commission or its services.



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# **1.** Executive summary

This report presents the design of key elements of an experimental design which includes an electronic factorial survey with illustrated vignettes and questionnaire items. The questionnaire here presented is used to gather people's reactions to the communication of some recent findings in social science research as part of the thematic area EnvironMentalHealth discussed in D1.3. Variations in the wording and images used in the vignettes will be used to test the effect of three main factors likely to influence people's views. These factors are: (1) the visual presentation of the scientific message, (2) the presence of a personal story in the explanation of the message, and (3) the opportunity of knowing the degree of reliability of the message offered by a fact-checking service.

Study participants will be randomly assigned to treatment effects, that is to variations of similar vignettes. After watching the vignettes and being asked questions related to them, people will be asked general demographic and background questions. Completing the survey is expected to take up to 10 minutes. Due to the specific interest in the influence of data visualisation, illustrations in the form of graphs will be included in the vignettes.

This report presents the two versions of the complete questionnaire, one used for 1,000 adults (18+) in seven countries (Spain, Italy, Poland, Hungary, Germany, France, the Netherlands), and the other used for 500 young adults (age 16-25) in Spain, Germany and the Netherlands.



# 2. INTRODUCTION

This report includes a description of key elements of the factorial survey design which are the illustrated vignettes and questionnaire items used in the large-scale data collection carried out in working package three 'Experimental online research on citizens' perceptions and trust in science communication'.

Study participants in seven EU countries will be invited to take an electronic survey between December 2020 and January 2021. Survey respondents will be asked to react to inputs expressed in the form of illustrated vignettes containing specific scientific information and findings from Social Science and Humanities (SSH). Variations in the wording and images used in the vignettes will be used to test the effect of factors likely to influence people's views. After watching the vignettes and being asked questions related to them, people will be asked general demographic and background questions. Study participants will be randomly assigned to variations of similar vignettes or *treatments*. Because of TRESCA's focus on the role of visualisation in SciCom, illustrations (e.g. graphs) will be present in the vignettes. The potential usefulness of the Misinformation Widget (MsW) to help people distinguish reliable from unreliable information will also be assessed in the experiments.

The survey will be administered by the same subcontractor in all seven countries. Translated versions of the online questionnaire will be tested on a small group of people in a pilot study to allow for relevant changes and refinements before the actual data collection takes place. 3000 responses will be collected from people living in Spain (low trust), Germany (medium), The Netherlands (high trust). In addition in these countries 1500 responses from teenagers and young adults (age 16-25) will be collected to explore teens' views and perceptions about science. Other 4000 responses will be collected from adults (18+) living in Poland, Hungary, Italy and France; all countries with very low levels of social trust. The data collected will be collated in a dataset in D3.2 and analysed; results will be presented in D3.2. The dataset will be made available to other researchers, after being fully anonymised, at the end of the project on an academic repository as D7.5.

# **3.** Theoretical background and research question

Based on literature review reported in D1.1 *Meta-analysis map: relevant factors shaping public attitudes of science communication*, the TRESCA team identified various fundamental research questions relevant in the study of science communication (SciCom). The research questions reported below inform the construction of the survey instrument presented in this report.



In raising people's awareness and understanding of science through SciCom with visual aids for enjoyment and opinion-forming<sup>1</sup>,...

*Question 1*. Is it more effective to emphasise the **scientific message associated with a data visualisation or to combine data visualisation with a personal story?** 

*Question* 2. Is it more effective to present the scientific message using **a neutral or a dramatic style of data visualisation?** 

*Question 3*. To what extent does the opportunity of using **fact checking services** showing the **reliability score** of the scientific message influence respondents' opinions?

*Question 4.* How does the presentation of the message influence people's (age 16-25) **sharing attitudes** and what are the reasons for deciding to share or not to share the post?

# **4.** Experimental design and elaboration of vignettes

A factorial survey design is used to construct the treatments used in the experimental setting. This method facilitates the study of people's beliefs and normative judgments about research findings coming from *EnvironMentalHealth*, which is one of the three thematic areas identified in TRESCA in WP1. During the survey, study participants are asked to react to inputs expressed in the form of illustrated vignettes containing specific scientific findings from social sciences. SSH findings used in the treatments present the inverse relationship between the use of social media and people's wellbeing.

The content of the vignettes used in the survey will communicate SSH results sitting within the area identified in TRESCA as **environmental health**. There is an ongoing debate about whether social media and the use of digital devices are detrimental to mental health. Particularly, the findings communicated come from academic fields investigating how digital technologies affect adolescents' psychological well-being. According to Amy Orben (2020)<sup>2</sup>, this field seems to be dominated by cross-sectional work that is generally of a low quality standard and that sometimes fail to differentiate between different types of digital technologies. Despite these limitations, most studies find a negative, though small, association between digital technology use, or social media use in particular, and psychological well-being. The fundamental question is whether social media is contributing to the recent rise<sup>3</sup> in anxiety, depression, self-harm, and suicide among American and

<sup>&</sup>lt;sup>1</sup> These categories are extrapolated from Burns, Terry W., D. John O'Connor, and Susan M. Stocklmayer. "Science communication: a contemporary definition ." Public understanding of science 12, no. 2 (2003): 183-202.

<sup>&</sup>lt;sup>2</sup> Orben, A. Social Psychiatry Psychiatr. Epidemiol. https://doi.org/10.1007/s00127-019-01825-4 (2020).

<sup>&</sup>lt;sup>3</sup> Haidt, J., & Twenge, J. (2019). *Is there an increase in adolescent mood disorders, self-harm, and suicide since 2010 in the USA and UK? A review.* Unpublished manuscript, New York University.



British teenagers.<sup>4</sup> The vignettes used in the experiments are variations of the graph and information reported below.

### Figure 1. Baseline vignette for survey experiment

# The academic field investigating how digital technologies affect adolescents' psychological well-being find a negative relationship between social media use and psychological well-being.



Scientific studies:

- Orben, Amy. 2020. "Teenagers, screens and social media: a narrative review of reviews and key studies." Social psychiatry and psychiatric epidemiology: 1-8.
- Haidt, Jonathan, and Nick Allen. 2020. "Digital technology under scrutiny." Nature 578 (7794): 226-227.

Findings of these scientific studies are sometimes supported by personal stories like the one presented in the following box.

<sup>&</sup>lt;sup>4</sup> Haidt, J., & Twenge, J. (2019). *Social media use and mental health: A review*. Unpublished manuscript, New York University. Available at: go.nature.com/2u74der



# 'Social media killed my daughter', <u>Youtube</u> Sky News, 17 January 2020.

Ian Russell believes social media is partly responsible for the death of his 14-year-old daughter, Molly, who he described as "one of the most caring people." He said he and his family "had no idea" Molly was suffering.

"The only thing that we did find was on social media ... which invited people who were depressed into a club," he said.



"It invited people who may have been self-harming into a club. It normalized those behaviors. ... It just said time and time again, I'm a lost cause, you're a lost cause. Join our club. And I do think she had a sense of complete worthlessness at the end of her life."

Russell has been very outspoken about the responsibility of social media companies to police suicide-related content on their platforms.

Parents of teens who died by suicide hope speaking up will prevent more deaths, CBS NEWS November 1, 2019, 9:00 AM.

# 4.1 Experimental setting

In the large-scale experiment (adults 18+), the design selected is a three-way factorial design with 2 x 2 x 2 conditions. This design has been used in previous studies relevant to our research. for instance, Ecker and Hang's  $(2020)^5$  study uses political misinformation in the form of fictional scenarios involving misconduct by politicians from left-wing and rightwing parties. Experiment 1 tested the hypothesis that worldviews affect retraction processing when the misinformation is a general assertion but not when it relates to a specific singular episodic event. Experiment 1 used a 2 x 2 x 2 between-subjects design with factors political party preference (Labor, Liberal), scenario (singular, general), and retraction



<sup>&</sup>lt;sup>5</sup> Ecker, Ullrich KH, and Li Chang Ang. "Political attitudes and the processing of misinformation corrections." Political Psychology 40, no. 2 (2019): 241-260.



condition (no-retraction, retraction). The test questionnaire consisted of 10 inference questions administered to 162 undergraduates students. In the end, participants were debriefed on the objectives of the study and the condition they had been assigned to.

The **first factor** is the scientific message, whose levels are neutral vs. dramatic. The levels are operationalised by manipulating the image of the graph and the source. In the neutral case, the image is the original graph appearing in the scientific article published in Nature<sup>6</sup> associated with the true source (Nature 578: 226). In the dramatic case, the image is the version of the graph appearing in the Social Dilemma and associated with the true source (The Social Dilemma, Netflix 2020). The **second factor** is the presence or absence of a personal story in the text above the image. The text in all four cases (scenario A, B, C and D) is taken from Jonathan Haidt's and Nick Allen's article from 2020.

The **third factor** is the opportunity of knowing the level of reliability of the message saw in the treatment. As in real settings, respondents are free to decide whether they want to double check the truthfulness of the message by using a fact-checking service. Those study participants who say yes are subject to the third treatment and see the same post they previously saw with a fact-checking reliability score. The appearance of the reliability score reflects the interface of the fact-checking service <u>Oigetit Fake News Filter</u>, which displays a green ('real news'), orange ('mostly real') or red ('fake news') shields (see figure ) and a reliability score in percentage. The third factor helps further explore people's ability to assess information truthfulness while taking into account their relationship with fact-checking services.



# Figure 2. Oigetit shields rating news accuracy

<sup>&</sup>lt;sup>6</sup> Haidt, Jonathan, and Nick Allen. 2020. "Digital technology under scrutiny." Nature 578 (7794):226-227.









Table 2: Vignettes showing first, second, and third factor
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# 4.2 Sampling procedure

1,000 complete surveys will be collected from seven countries, which are: Spain, Italy, Poland, Hungary, Germany, France, the Netherlands. The specified sample size is appropriate for the research design and expected to provide sufficiently large statistical power. The seven countries have been selected based on their level of average social trust according to 2016 European Social Survey (ESS) data. Poland, Hungary, Italy and France have low levels of social trust, while Spain and German have medium levels of social trust and the Netherlands has high levels of it. Data will be collected by a subcontractor that holds a proprietary panel with lay people who will be invited to participate in the study. The sample will be representative of the national population in each country.

## Tab. 3 Average social trust per country

Country	Mean	Ν	Country	Mean	Ν
NL	6,01	(1680)	FR	4,58	(2070)
DE	5,28	(2848)	IT	4,56	(2619)
ES	4,97	(1952)	HU	4,51	(1608)
			PL	4,08	(1684)

Source: European Social Survey (ESS) 2016 (ESS 2016)

Figure 3. Map with average social trust





# 4.3 Survey instrument

As previously explained, participants will be randomly assigned to see vignettes presenting one of four science communication messages. The manipulated dimensions are the scientificity of the message vs. the presence of a personal story and the visual style (neutral vs. dramatic) of the visual aid (a graph). The third manipulated factor is the level of reliability of the message (highly reliable vs poorly reliable). Afterwards, participants will be asked a series of questions measuring their perception of the message, namely their feelings, the truthfulness of the message and whether they would take action based on the content of the message. Finally, they will be presented with a series of background questions, capturing relevant covariates and moderators.

# 4.3.1 Variables and scales

## Questionnaire development

Survey items will be short and simple, avoiding esoteric language, inaccurate terminology, technical words or ambiguity. Clear instructions will be used to ensure participants fully understand what is expected of them. Questions will be asked one at a time and the subcontractor will design the survey to be mobile friendly as most people, especially young people, seem to prefer mobile devices over traditional laptop/desktop when interacting online.

# 4.3.1.2 Measured variables

## After-treatment outcome measures:

## 1. Self-reported emotions

Self-reports of emotion are likely valid when they relate to currently experienced emotions<sup>7</sup>, provided individuals are largely capable of reporting on their momentary emotional states. The PAD (*Pleasure, Arousal, Dominance*) model (e.g. Albert Mehrabian 1974)<sup>8</sup>, uses three-dimensional scales:

- the *Pleasure-Displeasure Scale* measures how pleasant or unpleasant one feels about something.
- the Arousal-Nonarousal Scale measures how energized or soporific one feels.

<sup>&</sup>lt;sup>7</sup> Mauss, Iris B., and Michael D. Robinson. 2009. "Measures of emotion: A review." Cognition & emotion 23 (2):209-237. doi: 10.1080/02699930802204677.

<sup>&</sup>lt;sup>8</sup> Mehrabian, Albert. 1996. "Analysis of the big-five personality factors in terms of the PAD temperament model." Australian Journal of Psychology 48 (2):86-92.



• the *Dominance-Submissiveness Scale* represents the controlling and dominant versus controlled or submissive one feels.

For instance, anger is a quite unpleasant, quite aroused, and moderately dominant emotion, while boredom is slightly unpleasant, quite unaroused, and mostly non-dominant. To measure this scale we use a version of the AffectButton developed by Joost Broekens and Willem-Paul Brinkman (2009; 2013).<sup>9</sup> Q5 in Appendix One measures this variable.

# 2. Truthfulness assessment

In the truthfulness assessment study participants are asked to assess the extent to which the content of the post they have seen in the treatment is true or false on a 0-100 scale. Truth discernment, that is people's ability to distinguish true from false information, is an extremely important aspect of scholarly studies around misinformation and the connection between truthfulness discernment, reasoning and other psychological traits. For example, recent studies on whether people are able to discern between true and false news headlines offer evidence of the positive role of deliberation in media truth discernment (Bago, Rand, and Pennycook 2020)<sup>10</sup>. Q8 in Appendix One measures this variable.

## 3. Behavioral intention

Jaron Lanier in a 2018 book<sup>11</sup> argues that overreliance on social media is undermining truth, making politics impossible, and leading people to make what they say meaningless, lose their free will and economic dignity, and to be unhappy. Based on these arguments, Lanier, who is an influential figure in Silicon Valley, comes to the conclusion that people should delete their social media accounts. A similar argument is also expressed by Lanier in the documentary film The Social Dilemma. We include a scale measuring people's willingness to delete their social media accounts to test whether survey respondents come to Lanier's conclusions after the treatment. The scale is developed following the 'resistance toward surveillance' and 'avoidance' measures used in the citizen summits organised as part of the FP7 SurPRISE project<sup>12</sup> in 2015. Q6 and Q7 measure this variable in Appendix One.

<sup>&</sup>lt;sup>9</sup> Broekens, Joost, and Willem-Paul Brinkman. 2009. "Affectbutton: Towards a standard for dynamic affective user feedback." 2009 3rd international conference on affective computing and intelligent interaction and workshops. Broekens, Joost, and Willem-Paul Brinkman. 2013. "AffectButton: A method for reliable and valid affective self-report." International Journal of Human-Computer Studies 71 (6):641-667. Info on AffectButton <sup>10</sup> Bago, Bence, David G Rand, and Gordon Pennycook. 2020. "Fake news, fast and slow: Deliberation reduces belief in false (but not true) news headlines." Journal of Experimental Psychology: General.

<sup>&</sup>lt;sup>11</sup> Lanier, Jaron. 2018. Ten arguments for deleting your social media accounts right now: Random House.

<sup>&</sup>lt;sup>12</sup> See V. Pavone, S. Degli Esposti, and E Santiago-Gómez. 2015, "SurPRISE D2.4: Key factors affecting public acceptance and acceptability", January.



## Predictors:

- framing of the visual scientific message: neutral vs. dramatic (change of colours and style)
- presence of a personal story: yes vs. no
- fact-checking information: low vs. high reliability index with orange or green shield.

## Covariates:

- age (Q1)
- gender (Q2)
- life satisfaction (from ESS) (Q3)
- internet use (adapted from ESS) (Q4)
- interest in politics (from ESS)
- political orientation
- conspiracy beliefs (Q15-17)
- social dominance orientation (Q18)
- social trust (from ESS) (Q19)
- trust in institutions (from ESS) (Q20)
- satisfaction with the country economy (from ESS) (Q21)
- satisfaction with the national government (from ESS) (Q22)
- satisfaction with the country democracy (from ESS) (Q23)
- years of education (Q24)
- current occupation (Q25)
- current household financial situation (Q26)
- Social Dilemma control question (Q27)
- sharing (Q11-Q12 Appendix Two)<sup>13</sup>.

The two versions of the questionnaire are reported in appendix one and two.

# 5. CONCLUSION

This report includes the instruments developed by the TRESCA team to gather data on people's views in seven European countries as part of the large scale experiments conducted in WP3. 7,000 responses will be collected from adults (18+) in Spain, Italy, Poland, Hungary, Germany, France, the Netherlands. 1,500 responses will be collected from young adults (age 16-25) in Spain, Germany and the Netherlands. The recruitment of study participants and the administration of the electronic survey will be carried out by the same subcontractor in all countries and for both adults and young adults.

<sup>&</sup>lt;sup>13</sup> Chen, X., 2016. The influences of personality and motivation on the sharing of misinformation on social media. *IConference 2016 Proceedings*.



# **A**PPENDIX **O**NE

## H2020 TRESCA QUESTIONNAIRE 18+

*Respondents:* All adults aged 18-75 in seven countries (1,000 per country)

*Countries*: Spain, Italy, Poland, Hungary, Germany, France, the Netherlands

*Experimental design (2 x 2 x 2 = 8)*: 125 respondents assigned to final treatments

#### Screen 1/\_\_\_\_

By clicking the next button you are agreeing to participate in an online survey and to contribute to a scientific project titled TRESCA.

TRESCA stands for "Trustworthy, Reliable and Engaging Scientific Communication Approaches" and it is a research project funded by the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 872855. The aim of this survey is knowing your opinions about the way science is communicated.

There is no right or wrong answer. We are simply interested in hearing your views.

### Screen 2/\_\_\_\_

### Q1. What's your year of birth?

[0-100]

## Q2. What's your gender?

□ Male [0] □ Female [1] □ Other or in transition [-1] □ I don't want to answer [995]

#### Q3. All things considered, how satisfied are you with your life as a whole nowadays?

		Neither satisfied nor dissatisfied			
Extremely dissatisfied			▶	Extremely satisfied	🖵 Don't know
	[-50	0	+50]	bar on zero	[998]

**Q4.** How often do you use the internet on a daily basis on any devices (computers, tablets or smartphones)?

	Occasionally	Often		
Never		Þ	Always	Don't know
	[0	100]		[998]

#### Screen 3/\_\_\_\_

As TRESCA is a project about science communication, we'll present some news about recent discoveries in social sciences to know your opinions.

#### Screen 3 / TREATMENT A\_

25% OF 1000 RANDOM

"A sudden increase in the rates of depression, anxiety and self-harm was seen in adolescents — particularly girls — in the United States and the United Kingdom around 2012 or 2013. Several studies show that there is a positive correlation between time spent on screens and bad mental-health outcomes."



(Nature 578: 226)

#### Screen 3 / TREATMENT B\_



"A sudden increase in the rates of depression, anxiety and self-harm was seen in adolescents — particularly girls — in the United States and the United Kingdom around 2012 or 2013. If you focus on social media you'll find strong evidence of harm especially for its millions of under-age users. When most of the 11-year-olds in a class are on Instagram (as was the case in my son's school), there can be pervasive effects on everyone. Children who opt out can find themselves isolated."







#### Screen 3 / TREATMENT C\_

#### \_25% OF 1000 RANDOM

"A sudden increase in the rates of depression, anxiety and self-harm was seen in adolescents — particularly girls — in the United States and the United Kingdom around 2012 or 2013. Several studies show that there is a positive correlation between time spent on screens and bad mental-health outcomes."



(The Social Dilemma, Netflix 2020)

#### Screen 3 / TREATMENT D\_

25% OF 1000 RANDOM

"A sudden increase in the rates of depression, anxiety and self-harm was seen in adolescents — particularly girls — in the United States and the United Kingdom around 2012 or 2013. If you focus on social media you'll find strong evidence of harm especially for its millions of under-age users. When most of the 11-year-olds in a class are on Instagram (as was the case in my son's school), there can be pervasive effects on everyone. Children who opt out can find themselves isolated."







\_EVERYONE\_\_\_

Screen 4/\_\_\_\_\_

# Q5. After reading the information provided, how do you feel?

AffectButton version 3.3		
pleased	0	
aroused	0	
dominan	0	

http://ii.tudelft.nl/~joostb/affectbutton\_version2\_original.html

#### Download the stand alone Java version for Java, HTML5, Python and Android from http://ii.tudelft.nl/~joostb/affectbutton.html

**INSTRUCTIONS FOR COMPUTING THE RESPONSE SCALE. PLEASE GO TO** <u>http://ii.tudelft.nl/~joostb/affectbutton.html</u> and program the AffectButton<sup>14</sup>. The AffectButton is a standard button component available for Java and Python. The recommended size of the AffectButton is 100x100 pixels.



Figure 2. The AffectButton in a simple window (left), its extreme affective states (right), and four example trajectories from neutral to extreme PAD states with corresponding mouse pointer location (down). Extreme states are elated (PAD=1,1,1), afraid (-1,1,-1), surprised (1,1,-1), sad (-1,-1,-1), angry (-1,1,1), relaxed (1,-1,-1), content (1,-1,1), frustrated (-1,-1,1). Labels are exemplary. Note that the AffectButton allows for continuous input in the PAD space, the extreme prototypes and trajectories are only depicted in this article to give an idea of the complete affective space covered by the AffectButton.

<sup>&</sup>lt;sup>14</sup> Broekens, J., & Brinkman, W.-P. (2013). International Journal of Human-Computer Studies, 71(6), 641-667.



#### Screen 5/\_\_\_\_\_

# After reading the post, do you feel like taking action?

Please say to what extent you agree or disagree with each of the following statements.

# Q6. I would like to know more about the effects of social media on people's wellbeing.

	Disagree	Neither agree nor disagree	Agree		
Strongly disagree		·	Þ	Strongly agree	Don't know
	[-50	0	+50] ba	ar on zero	[998]

# Q7. I may consider deleting some of my social media accounts.

	Disagree	Neither agree nor disagree	Agree		
Strongly disagree			Þ	Strongly agree	🖵 Don't know
	[-50	0	+50] ba	ır on zero	[998]

#### Screen 6/\_\_\_\_

# Q8. Do you believe that what said in the post you just saw was true or false?

		Neither true nor false			
100% false			Þ	100% true	🖵 Don't know
	[-50	0	+50]	bar on zero	[998]

# Q9. Out of curiosity, would you like to spend a few seconds double-checking if what was said in the post is true or false?

- Yes, show me the fact-checking score. [GO TO SCREEN 7]
- □ No, I have all the information I need and I prefer to move on. [GO TO SCREEN 9]



# Screen 7/\_\_\_\_\_

IF TREATMENT A, THEN SHOW TREATMENT A AND..

• 12,5% of original 25% who selected Q9a



REAL NEWS Reliability: 85%

• 12,5% of original 25% who selected Q9a



MOSTLY REAL Reliability: 52%

IF TREATMENT B, THEN SHOW TREATMENT B AND..

• 12,5% of original 25% who selected Q9a



REAL NEWS Reliability: 85%

12,5% of original 25% who selected Q9a



MOSTLY REAL Reliability: 52%

IF TREATMENT C, THEN SHOW TREATMENT C AND..

• 12,5% of original 25% who selected Q9a



REAL NEWS Reliability: 85%

• 12,5% of original 25% who selected Q9a



MOSTLY REAL Reliability: 52%

IF TREATMENT D, THEN SHOW TREATMENT D AND..

• 12,5% of original 25% who selected Q9a





#### Screen 8/\_\_\_\_\_

Q10. After double-checking, how do you feel now?

Affe	AffectButton version 3.3		
pleased	0		
aroused	0		
dominan	0		

After double-checking, do you feel like taking action?

Q11. I would like to know more about the effects of social media on people's wellbeing.

	Disagree	Neither agree nor disagree	Agree		
Strongly disagree			Þ	Strongly agree	🖵 Don't know
	[-50	0	+50] ba	ir on zero	[998]



# Q12. I may consider deleting some of my social media accounts.

	Disagree	Neither agree nor disagree	Agree		
Strongly disagree			Þ	Strongly agree	🖵 Don't know
	[-50	0	+50] ba	ir on zero	[998]

#### Screen 9/\_\_\_\_\_

#### Q13. What do you think of politics?

Nothing: I am definitely not interested		lt's important: l am very interested in it	Don't know
	[0100]		[998]

Q14. In politics people sometimes talk of "left" and "right". Where would you place yourself on this scale?

	Left	Neither left nor right	Right			
Extreme left			Þ	Extreme right	Don't know	
	[-50	0	+50] b	ar on zero	[998]	
Other, please specify: [500 words text]						
Screen 10/						

Please rate each statement according to whether you agree or disagree with each of them.

# Q15. Politicians are frequently bribed by major companies or interest groups.

	Disagree	Neither agree nor disagree	Agree		
Strongly disagree			▶	Strongly agree	Don't know
	[-50	0	+50]	bar on zero	[998]



# Q16. Much of what happens in the world today is decided by a small and secretive group of individuals.

	Disagree	Neither agree nor disagree	Agree		
Strongly disagree			Þ	Strongly agree	🖵 Don't know
	[-50	0	+50] b	ar on zero	[998]

Q17. People never really landed on the moon, everything was recorded in TV studios.

	Disagree	Neither agree nor disagree	Agree		
Strongly disagree	•		Þ	Strongly agree	🖵 Don't know
	[-50	0	+50]	bar on zero	[998]

Q18. In general, when people in a group set priorities, superior groups should dominate inferior groups rather than pushing for group equality.

	Disagree	Neither agree nor disagree	Agree		
Strongly disagree				Strongly agree	🖵 Don't know
	[-50	0	+50]	bar on zero	[998]

# Screen 11/\_\_\_\_\_

Q19. Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?

You can't be too careful		Most people can be trusted	Don't know
	[0100]		[998]



## Q20. How much do you personally trust each of the following institutions?

	No trust at all	Complete trust	Don't know	
Q20a. Political parties		Þ		
Q20b. The press				
Q20c. Social media		Þ		
Q20d. The Church		Þ		
Q20e. The Government		Þ		
Q20f. The European Union		Þ		
[0100]				

# Screen 12/\_\_\_\_\_

# Q21. On the whole how satisfied are you with the present state of the economy in [country]?

		Neither satisfied nor dissatisfied			
Extremely dissatisfied	<b>_</b>		▶	Extremely satisfied	Don't know
	[-50	0	+50]	bar on zero	[998]

# Q22. Now thinking about the [country] government, how satisfied are you with the way it is doing its job?

		Neither satisfied nor dissatisfied			
Extremely dissatisfied			F	Extremely satisfied	🖵 Don't know
	[-50	0	+50]	bar on zero	[998]



Q23. And on the whole, how satisfied are you with the way democracy works in [country]?

		Neither satisfied nor dissatisfied			
Extremely dissatisfied			Þ	Extremely satisfied	Don't know
	[-50	0	+50]	bar on zero	[998]

Screen 13/\_\_

A few more questions and we are done.

### Q24. About how many years of education have you completed?

Write number			
--------------	--	--	--

Q25. Which of these descriptions applies to what you have been doing for the last month? Click all those that apply to you.

- □ I have been studying as part of my education [dummy 0-1]
- **I have been in paid work** (or away temporarily, as employee, self-employed,
- working for the family business, etc.) [dummy 0-1]
- □ I have been looking for benefits or charity support [dummy 0-1]
- □ I have been looking for a job [dummy 0-1]
- □ I have been looking after my family or other vulnerable people [dummy 0-1]
- □ I have been permanently sick or disabled [dummy 0-1]
- □ I have been in community or military service [dummy 0-1]
- Other: [text box 250 words]
- **Don't want to answer** [dummy 0-1]

Q26. Which, if any, of the following statements best describes how well, or not, your household is meeting its bills and credit commitments at the moment?

- Let is a constant struggle [1]
- Let is a struggle from time to time [2]
- **Without much difficulty but with no savings** [3]
- **Without any difficulty and with some savings** [4]
- **Don't know: somebody else deals with my household bills and credit commitments** [998]

Q27. Have you ever watched the 2020 documentary film The Social Dilemma, produced by Netflix?

- **No, I have never heard of it** [0]
- **No, I haven't, though it sounds familiar to me** [1]
- **Yes, I have** [2]
- □ I don't know [998]



# Screen 14/\_\_\_\_\_

Thank you for participating in this study.

If you want to know more about the TRESCA project please visit the official website at <u>https://trescaproject.eu/</u>

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 872855.



# APPENDIX Two

## H2020 TRESCA QUESTIONNAIRE 16+

*Respondents:* All young adults (age 16-25) in each country (500 per country)

Countries: Spain, Germany, the Netherlands

*Experimental design (2 x 2 = 4)*: 125 respondents assigned to final treatments

#### Screen 1/\_\_\_

By clicking the next button you are agreeing to participate in an online survey and to contribute to a scientific project titled TRESCA.

TRESCA stands for "Trustworthy, Reliable and Engaging Scientific Communication Approaches" and it is a research project funded by the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 872855. The aim of this survey is knowing your opinions about the way science is communicated.

There is no right or wrong answer. We are simply interested in hearing your views.

#### Screen 2/\_\_\_\_\_

### Q1. What's your year of birth?

[0-100]

#### Q2. What's your gender?

□ Male [0] □ Female [1] □ Other or in transition [-1] □ I don't want to answer [995]

#### Q3. All things considered, how satisfied are you with your life as a whole nowadays?

		Neither satisfied nor dissatisfied			
Extremely dissatisfied			Þ	Extremely satisfied	🖵 Don't know
	[-50	0	+50]	bar on zero	[998]

**Q4.** How often do you use the internet on a daily basis on any devices (computers, tablets or smartphones)?

	Occasionally	Often		
Never		Þ	Always	🖵 Don't know
	[0			[998]

#### Screen 3/\_\_\_

As TRESCA is a project about science communication, we'll present some news about recent discoveries in social sciences to know your opinions.

#### Screen 3 / TREATMENT A\_

#### 25% OF 1000 RANDOM

"A sudden increase in the rates of depression, anxiety and self-harm was seen in adolescents — particularly girls — in the United States and the United Kingdom around 2012 or 2013. Several studies show that there is a positive correlation between time spent on screens and bad mental-health outcomes."



(Nature 578: 226)

#### Screen 3 / TREATMENT B\_

#### \_25% OF 1000 RANDOM

"A sudden increase in the rates of depression, anxiety and self-harm was seen in adolescents — particularly girls — in the United States and the United Kingdom around 2012 or 2013. If you focus on social media you'll find strong evidence of harm especially for its millions of under-age users. When most of the 11-year-olds in a class are on Instagram (as was the case in my son's school), there can be pervasive effects on everyone. Children who opt out can find themselves isolated."







#### Screen 3 / TREATMENT C\_

#### \_25% OF 1000 RANDOM

"A sudden increase in the rates of depression, anxiety and self-harm was seen in adolescents — particularly girls — in the United States and the United Kingdom around 2012 or 2013. Several studies show that there is a positive correlation between time spent on screens and bad mental-health outcomes."



### (The Social Dilemma, Netflix 2020)

#### Screen 3 / TREATMENT D\_



"A sudden increase in the rates of depression, anxiety and self-harm was seen in adolescents — particularly girls — in the United States and the United Kingdom around 2012 or 2013. If you focus on social media you'll find strong evidence of harm especially for its millions of under-age users. When most of the 11-year-olds in a class are on Instagram (as was the case in my son's school), there can be pervasive effects on everyone. Children who opt out can find themselves isolated."







\_EVERYONE\_

Screen 4/\_\_\_\_\_

# Q5. After reading the information provided, how do you feel?

Affe	AffectButton version 3.3					
pleased	0					
	0					
dominan	0					

http://ii.tudelft.nl/~joostb/affectbutton\_version2\_original.html

#### Download the stand alone Java version for Java, HTML5, Python and Android from http://ii.tudelft.nl/~joostb/affectbutton.html

**INSTRUCTIONS FOR COMPUTING THE RESPONSE SCALE. PLEASE GO TO** <u>http://ii.tudelft.nl/~joostb/affectbutton.html</u> and program the AffectButton<sup>15</sup>. The AffectButton is a standard button component available for Java and Python. The recommended size of the AffectButton is 100x100 pixels.



Figure 2. The AffectButton in a simple window (left), its extreme affective states (right), and four example trajectories from neutral to extreme PAD states with corresponding mouse pointer location (down). Extreme states are elated (PAD=1,1,1), afraid (-1,1,-1), surprised (1,1,-1), sad (-1,-1,-1), angry (-1,1,1), relaxed (1,-1,-1), content (1,-1,1), frustrated (-1,-1,1). Labels are exemplary. Note that the AffectButton allows for continuous input in the PAD space, the extreme prototypes and trajectories are only depicted in this article to give an idea of the complete affective space covered by the AffectButton.

<sup>&</sup>lt;sup>15</sup> Broekens, J., & Brinkman, W.-P. (2013). International Journal of Human-Computer Studies, 71(6), 641-667.



#### Screen 5/\_\_\_

## After reading the post, do you feel like taking action?

Please say to what extent you agree or disagree with each of the following statements.

# Q6. I would like to know more about the effects of social media on people's wellbeing.

	Disagree	Neither agree nor disagree	Agree		
Strongly disagree			Þ	Strongly agree	Don't know
	[-50	0	+50] ba	ar on zero	[998]

#### Q7. I may consider deleting some of my social media accounts.

	Disagree	Neither agree nor disagree	Agree		
Strongly disagree			Þ	Strongly agree	🖵 Don't know
	[-50	0	+50] ba	ır on zero	[998]

[IF Q7 > 0 THEN SHOW]

# Q8. Which social media account you use would you consider deleting or which internet service would you like quitting? Write what you think in the box below.

Text box with 500 words limit

Instructions with example of services:

TEXTING AND CALLING APPS (WhatUp, Telegram, Kik Messanger, Whisper..)

PHOTO AND VIDEO-SHARING APPS AND SITES (Instagram, TikTok, Pinterest)

MICROBLOGGING APPS AND SITES (Twitter, Tumblr, Reddit)

LIVE-STREAMING VIDEO APPS (Youtube, HouseParty, LiveMe)

MEETING AND DATING APPS AND SITES (Tinder, Badoo, Monkey, MeetMe, Yubo)

COMMUNITY APPS (Facebook, LinkedIn, Xing)



### Screen 6/\_\_\_\_\_

# Q9. Do you believe that what said in the post you just saw was true or false?

		Neither true nor false			
100% false			Þ	100% true	Don't know
	[-50	0	+50]	bar on zero	[998]

Q10. Why do you believe so? Is your assessment of the authenticity of the post based on facts or on personal experience?

		A mixture of facts and experience			
Belief based on personal experience			Þ	Beliefs based on facts	Don't know
	[-50	0	+50]	bar on zero	[998]

#### Screen 8/\_\_\_\_\_

#### Q11. If it were possible, would you like to share the post with your friends?

		I am indecisive			
No, I wouldn't like to share the post			-	Yes, I'd like to share the post	Don't know
	[-50	0	+50]	bar on zero	[998]

[If Q11 = 0 then show Q13]



# [If Q11 > 0 then show Q12]

**Q12. What are the reasons why you have decided to share the post?** Please rate each statement according to whether you agree or disagree with each of them.

		Disagree	Neither agree nor disagree	Agree		
	Strongly disagree	•		Þ	Strongly agree	Don't know
Q12a. Sharing because I want to know other people's views and opinions.	Strongly disagree	<u> </u>		×	Strongly agree	Don't know
Q12.b Sharing because the post seems accurate.	Strongly disagree	<b>I</b>		Þ	Strongly agree	Don't know
Q12.c Sharing is a culture and I share like others do.	Strongly disagree	<b>I</b>		Þ	Strongly agree	Don't know
Q12.d Sharing because the post comes from authoritative sources.	Strongly disagree			Þ	Strongly agree	Don't know
Q12.e Sharing makes me look good to other people.	Strongly disagree			Þ	Strongly agree	Don't know
Q12.f Sharing because what's written in the post sounds frightening.	Strongly disagree	<u> </u>		Þ	Strongly agree	Don't know
Q12.g Sharing helps me bookmark useful information.	Strongly disagree			Þ	Strongly agree	Don't know
Q12h. Sharing because it's consistent with my beliefs or assumptions.	Strongly disagree			Þ	Strongly agree	Don't know
		[-50	0	+50]	bar on zero	[998]



# [If Q11 < 0 then show Q12bis]

**Q12bis. What are the reasons why you have decided NOT to share the post?** Please rate each statement according to whether you agree or disagree with each of them.

		Disagree	Neither agree nor disagree	Agree		
	Strongly disagree			F	Strongly agree	Don't know
Q12bis.a Not sharing because I don't need to know other people's views and opinions about this.	Strongly disagree	•			Strongly agree	Don't know
Q12bis.b Not sharing because the post doesn't seem accurate.	Strongly disagree			Þ	Strongly agree	Don't know
Q12bis.c Not sharing because I don't like the culture of sharing with other people.	Strongly disagree	<u> </u>			Strongly agree	Don't know
Q12bis.d Not sharing because the post doesn't come from authoritative sources.	Strongly disagree	<u> </u>		Þ	Strongly agree	Don't know
Q12bis.e Not sharing because it would make me look bad to others.	Strongly disagree			Þ	Strongly agree	Don't know
Q12bis.f Not sharing because what is written in the post sounds frightening.	Strongly disagree	•			Strongly agree	Don't know
Q12bis.g Not sharing because I don't need to bookmark this useless information.	Strongly disagree	<u> </u>			Strongly agree	Don't know
Q12hbis. Not sharing because it's not consistent with my beliefs or assumptions.	Strongly disagree	<u> </u>		Þ	Strongly agree	Don't know
		[-50	0	+50]	bar on zero	[998]



# Screen 9/\_\_\_\_\_

#### Q13. What do you think of politics?

Nothing: I am definitely not interested		lt's important: l am very interested in it	Don't know
	[0100]		[998]

Q14. In politics people sometimes talk of "left" and "right". Where would you place yourself on this scale?

	Left	Neither left nor right	Right		
Extreme left	•		▶	Extreme right	Don't know
	[-50	0	+50] <i>b</i>	ar on zero	[998]
Other, please specify: [500 words text]					

Screen 10/\_\_\_\_\_

Please rate each statement according to whether you agree or disagree with each of them.

#### Q15. Politicians are frequently bribed by major companies or interest groups.

	Disagree	Neither agree nor disagree	Agree		
Strongly disagree				Strongly agree	🖵 Don't know
	[-50	0	+50]	bar on zero	[998]

Q16. Much of what happens in the world today is decided by a small and secretive group of individuals.

	Disagree	Neither agree nor disagree	Agree		
Strongly disagree			Þ	Strongly agree	🖵 Don't know
	[-50	0	+50] bo	ar on zero	[998]



## Q17. People never really landed on the moon, everything was recorded in TV studios.

	Disagree	Neither agree nor disagree	Agree		
Strongly disagree			Þ	Strongly agree	🖵 Don't know
	[-50	0	+50]	bar on zero	[998]

Q18. In general, when people in a group set priorities, superior groups should dominate inferior groups rather than pushing for group equality.

	Disagree	Neither agree nor disagree	Agree		
Strongly disagree				Strongly agree	Don't know
	[-50	0	+50]	bar on zero	[998]

# Screen 11/\_\_\_\_\_

Q19. Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?

You can't be too careful		Most people can be trusted	Don't know
	[0100]		[998]



	No trust at all	Complete trust	Don't know
Q20a. Political parties		Þ	
Q20b. The press		Þ	
Q20c. Social media		Þ	
Q20d. The Church		Þ	
Q20e. The Government		Þ	
Q20f. The European Union		Þ	
	[0		[998]

# Screen 12/\_\_\_\_\_

# Q21. On the whole how satisfied are you with the present state of the economy in [country]?

		Neither satisfied nor dissatisfied			
Extremely dissatisfied	<b>_</b>		▶	Extremely satisfied	Don't know
	[-50	0	+50]	bar on zero	[998]

# Q22. Now thinking about the [country] government, how satisfied are you with the way it is doing its job?

		Neither satisfied nor dissatisfied			
Extremely dissatisfied				Extremely satisfied	Don't know
	[-50	0	+50]	bar on zero	[998]



# Q23. And on the whole, how satisfied are you with the way democracy works in [country]?

		Neither satisfied nor dissatisfied			
Extremely dissatisfied				Extremely satisfied	🖵 Don't know
[-5	0	0	+50] b	ar on zero	[998]

#### Screen 13/\_\_\_\_\_

## Q24. About how many years of education have you completed?

#### Write number

Q25. Which of these descriptions applies to what you have been doing for the last month? Click all those that apply to you.

- □ I have been studying as part of my education [dummy 0-1]
- L have been in paid work (or away temporarily, as employee, self-employed,
- working for the family business, etc.) [dummy 0-1]
- □ I have been looking for benefits or charity support [dummy 0-1]
- □ I have been looking for a job [dummy 0-1]
- □ I have been looking after my family or other vulnerable people [dummy 0-1]
- □ I have been permanently sick or disabled [dummy 0-1]
- □ I have been in community or military service [dummy 0-1]
- Other: [text box 250 words]
- **Don't want to answer** [dummy 0-1]

Q26. Which, if any, of the following statements best describes how well, or not, your household is meeting its bills and credit commitments at the moment?

- Lis a constant struggle [1]
- Let is a struggle from time to time [2]
- **Without much difficulty but with no savings** [3]
- **Without any difficulty and with some savings** [4]
- **Don't know: somebody else deals with my household bills and credit commitments** [998]

Q27. Have you ever watched the 2020 documentary film The Social Dilemma, produced by Netflix?

- □ No, I have never heard of it [0]
- **No**, I haven't, though it sounds familiar to me [1]
- **Yes**, **I** have [2]
- □ I don't know [998]



Screen 14/\_\_\_\_\_

Thank you for participating in this study.

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