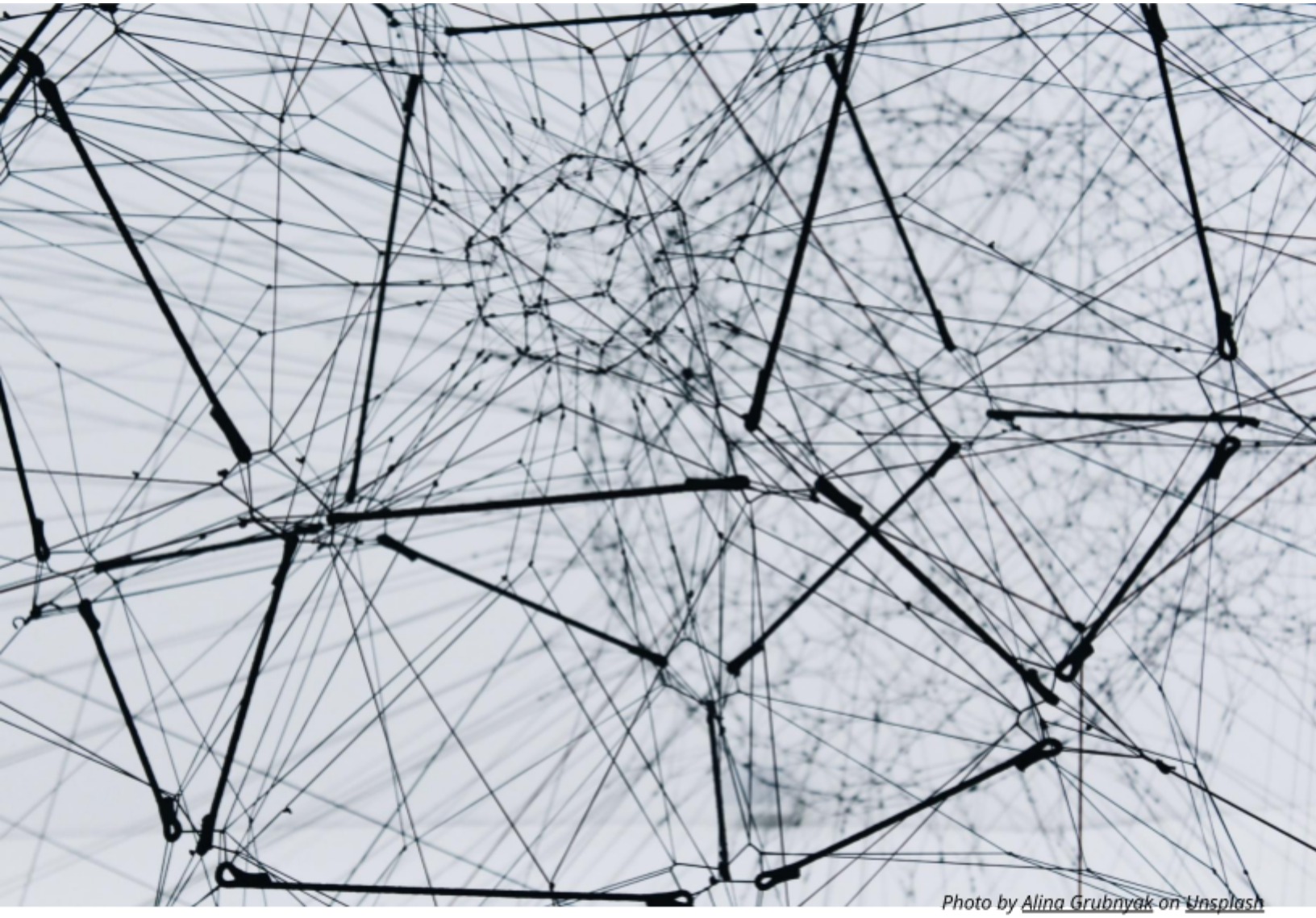

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TRESCA

Trustworthy, Reliable and Engaging Scientific Communication Approaches

D4.1 New SciCom video script and storyboard

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

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Executive summary

This deliverable describes the steps of the research and script process for the planned science communication video. The video was projected to be talking about group resilience and personal versus digital communication, as was outlined in deliverable D1.4. However, the research process led to the realization that the initial premise for the video does not stand up to the scientific claim. This resulted in a switch to a different direction and the topic of rationality and different outlooks on the way humans rationalize.

The deliverable forms the basis of the script, which poses the question why humans reason. The storyline is structured in several parts. First, it gives a brief overview about the definitions of rationality throughout human history. Then, key aspects of research about human reasoning are described, introducing the concept of biases and detailing confirmation bias using different situations and studies in the context of individuals and groups. The video then looks at the evolution of rationality and its perceived evolutionary advantage in comparison to the confirmation bias: one improves the capacity to collaborate, the other the ability to effectively convince others of your ideas. The conclusion of the video is centered around the current scientific view of rationality as a communal trait that works best in groups.

The topic fits with the aims of TRESCA even better than the previously proposed one and has the potential to be a useful asset for viewers by raising their awareness of their own biases, thus giving them a valuable tool to improve their confident handling and assessment of science communication.

This also ties in with the goal of the series of experiments about trustworthy and reliable science communication. An update on the experiment is also outlined in the deliverable, as well as the next steps in the process and when and how the results of the experiments will be used in the video production process. A more detailed description of the experiment can be found in the corresponding deliverable D4.2.

1 Introduction

The importance of science communication is steadily increasing and its crucial relevance has become painfully apparent during the ongoing COVID-19 pandemic. Even more apparent is the tendency of the public to turn away from facts in the face of complex issues, which is a particularly worrying phenomenon in this context. TRESCA aims to understand and improve science communication and enable scientists and science communicators to deliver important messages in a way that resonates with the public audience for whom this information is crucial. The learnings from this exploration will be incorporated into an evidence-based and assessed science communication video.

With this goal in mind, of empowering the public, it makes sense to also use the content of the video itself for this purpose. This is why we decided to go with the topic of rationality: it addresses the aims of TRESCA on a metalevel and can help raise the awareness of viewers about the importance of their own perception and reasoning.

This deliverable explains the steps led from the deviation from the previous and different topic to the choice of the final video topic, it provides an overview over the status quo of the story outline and gives an update about the planned science communication experiments.

2 Script development process, steps and status

2.1 Research process and topic switch

The idea behind TRESCA is not only to gain insights into effective science communication and come up with suggestions on how to improve it, but to put these findings directly into action in the form of a science communication video that will be produced by kurzgesagt as part of the project.

As outlined in deliverable 1.4, great care was taken in discussing and choosing a topic and the message for the content of the video. The basic considerations were to find a suitable fit for the thematic areas of TRESCA and alignment with the expertise of the TRESCA consortium as well as to find a topic that is interesting to the general audiences and ensure that the video retains its relevance for a couple of years.

Inspired by the strong and inevitable shift towards more digital communication in work environments and personal lives that was caused by the rise of the COVID-19 pandemic in early 2020, the topic of social resilience and group dynamics in the context of digital communication was proposed by EUR. In collaboration with EUR, the question “Can digital communication sustain real connection?” was determined as a focal point for the video. Research and a compilation of sources was conducted by kurzgesagt and in close coordination with EUR, we constructed a storyline consisting of three parts:

Part 1 presents the origins and the historical development of communication and social relationships. Part 2 shines a light on the unique benefits and drawbacks of digital communication and part 3 aimes to answer the central question of the video: can digital communication sustain real connection?

The most important concern was to make sure the story and content were evidence-based and the video would be able to provide a satisfying and encouraging take-away message, that leaves viewers with a positive outlook – something we at kurzgesagt always aim to do with our videos. In an iterative process the script drafts were refined based on desk research of scientific literature.

In this regard the scripting process for a kurzgesagt video bears a certain resemblance to writing a scientific paper, where there is a constant process of evaluation the claim and the scientific validity of the message might have to be amended, and sometimes a project has to be abandoned altogether. We are determined to never compromise if we realize a topic or story does not measure up to our internal quality standards.

As it turned out, the projected hopeful message about the positive role that digital communication could play for group resilience did not prove as durable and too thin when it comes to being a scientifically backed-up claim.

In order to live up to our responsibility towards the spectators as well as our quality standards, kurzgesagt and EUR discussed the issue and decided to switch to the topic of rationality instead.

This decision and the idea for the topic were inspired partly by the aforementioned process: we always try to question our motives during the research process and not succumb to our biases by pushing a particular story.

Addressing and explaining the scientific background of rationality and the reflection process is both a worthwhile topic for a video in general, as well as a great link to the overall goals of TRESCA.

In this process, another round of desk research was conducted and we came across the researcher Julia Galef, founder of the Center for Applied Rationality, who coined the metaphor of the soldier and scout mindset for different approaches to rational thinking. We incorporated the metaphor in our storyline and also reached out to Ms. Galef, who agreed to give input for the video production in 2021.

2.2 Overview over the new storyline

The story outline consists of three parts.

Part 1 gives an overview of the definitions of rationality throughout human history.

In Part 2, key aspects of research on human reasoning are described, introducing the concept of biases and detailing confirmation bias. The metaphor of a soldier is used to describe the dynamic of a confirmation bias. The research is outlined using different situations and studies in the context of individuals and groups.

Part 3 shines a light on the evolution of rationality and how the theories about its perceived evolutionary advantage changed. The argumentative theory of reasoning is introduced here, which sees rationality as a tool for better collaboration. The metaphor of a scout is used to describe a mindset focused on neutral assessment and compromise. Additionally, this approach categorizes biases not as inherent flaws of our thinking process but assigns a specific useful function to them.

The conclusion of the video brings the two mindsets together and credits them both as useful if seen together and in context.

2.3 Scriptdraft

Rationality – Why do we reason and how can we do it more successfully?

Why do humans reason? One way to look at human nature is as a coin with two sides: our emotions on the one side. On the other side, our capacity to analyze and understand things, to think and act rationally.

So an answer to this question could be: our rationality is part of what makes us human. But over the course of our history the role of this trait actually shifted a lot:

During medieval times, the common worldview was rather based on beliefs than on logic: God created the universe and since humans were not divine they couldn't really grasp it, so they shouldn't even bother.

This opinion changed drastically during the Renaissance. Humans moved to the center of the world view. All of a sudden, the human capability to reason was regarded as outstanding. Humans might not be able to grasp god's will, but compared to animals, they had the great gift of analyzing the world based on logic. This led to an unprecedented progress in natural science over the past century. For quite some time, the confidence in our rational capabilities grew considerably. Until, we created something that showed us how irrational we are after all: the computer. Programmed to keep a cool head and completely unaffected by messy emotions, computers outshine our capability to assess information rationally, by far.

So how do we humans really fare on the spectrum of rational thinking? In recent years, a lot of studies were conducted to get a better understanding on how human reasoning works and which factors play a role.

Their results all indicated the same: Humans are inherently biased, that means our judgment isn't purely led by facts or logic. Instead, we are influenced by the imperfect way we process information and make decisions.

As of 2020, the list of so-called cognitive biases contains around 50 different forms of human biases that have been studied so far.

Cognitive biases are all forms of biases that happen unconsciously. The term includes all sorts of unconscious distortion in our mind like being more unforgiving in our judgement when hungry or the fact that people pay more attention to consequences that are closer to the presence than to those farther in the future, and many more sorts of emotional reasoning.

Biases affect us constantly as individuals. But there is one kind of bias that becomes very powerful when looking at societies as a whole and makes it especially hard for us to change our minds about something: confirmation bias.

 # Confirmation bias

Confirmation bias describes the phenomenon that people want every piece of new information to align with their beliefs. We tend to favor information that confirms our existing beliefs and unconsciously ignore facts and new pieces of information that contradict them. We do reason – but in many cases we tend to have a certain incentive and a favored outcome already in mind, which is why psychologists also speak of motivated reasoning.

You can compare this to the mindset of a soldier. A soldier fights for his cause, defends his post and tries to win as much ground as possible. His task isn't to question the ideas and beliefs behind his mission but to accept them unconditionally. We act like soldiers when we defend ideas that we believe to be true, even if we get new information that might change our standpoint. We look for evidence that supports our beliefs but unconsciously ignore or disregard those that might contradict them. In a soldier-mindset we wield reason like a weapon, which makes it very hard for us to change our beliefs on a lot of topics.

This can happen to us with beliefs that we just recently established. For example, it only takes us between 2 to30 seconds to form a first impression when meeting a new person. We make further judgments on this person based on this very first impression, even though there is no evidence for it.

And confirmation bias doesn't only affect our judgment of someone else but also of ourselves. So whether you have a rather low self-esteem or are overconfident, it will affect your interpretation of events. Such as when you ask a colleague to hang out on the weekend and don't get a response within a day; if you are self-confident you probably won't be bothered and assume there are plenty of reasons why the colleague didn't find the time to respond yet. But people with very low self-esteem might immediately see this as an approval of their self-doubt and form the idea that this person probably doesn't want to have contacts with them.

And the longer we hold beliefs in our minds, the more likely we are to stick to them.

This phenomenon doesn't only affect us in our everyday lives, it can also impair more areas that are specifically dedicated to a rational approach, like scientific research.

When scientists conduct a survey or a case-control study, they often have a hypothesis in mind that they want to confirm. They are carefully collecting data to support this hypothesis, but also run the risk of cherry picking and ignoring data that contradicts their original hypothesis. (One meta-analysis of bias in scientific research even estimated that about 85% of research

resources are wasted and that the frequency of positive test results strongly exceeds its disproof.)

Some psychologists argue that scientists should instead try to falsify their hypotheses rather than seeking to confirm them.

Biases within the scientific field becomes even more visible when it comes to political issues:

In a 1979 study, scientists faked two different studies on the effects of capital punishment on the crime rate and showed them to undergraduates, half of which was opposed to capital punishment and the other one was in favor. Both proponents and opponents rated those results and methodological procedures that confirmed their own opinion as more convincing, even though both studies were conducted in the same way.

Not only were people more likely to find methological errors when it came to political topics like capital punishment, they weren't even able to apply math skills properly.

In another study, over 11,000 participants were given several different math tasks. Among these were two different questions that had to be solved in the very same mathematical manner. The calculations that needed to be done were exactly the same in both of these questions. But one version asked about the correlation between rashes and a skin cream, a non-political topic, while the other asked about crime rates and gun control legislation. All participants had shown strong math skills in previous tasks, but most of them got the non-political question correct and ailed when it came to the political topic, despite the fact that the two solutions were mathematically identical.

Confirmation bias is only one of many examples. In a nutshell, research shows that humans are very flawed reasoners. But if we are so bad at it, why did this ability arise in us in the first place and stick with us for so long?

 # Evolution of reasoning

One long standing theory about reason is that it is an evolutionary advantage to be able to make sense of things, and then assess or adapt your actions. Basically: If you grasp what's going on, you win. In this theory, biases were simply regarded as errors in the system.

But in recent years, psychologists started to doubt the idea that reason is meant to be used to form ideas and make decisions all by oneself.

More recent theories suspect that it's actually meant as a tool for teamwork.

Imagine two prehistoric humans collaborating with each other, hunting food for their group. It is dangerous and hard. Now one of them thinks of a new solution that might help secure more yield. The old way might not be as efficient, but it has worked so far. Is the added risk worth the potential gain? Both ways to do things can't be done alone. How do they proceed?
If both of them reason with a soldier mindset and stick to their guns, their collaboration will probably end there.

Intelligence and the ability to reason are part of what made humans thrive. But what really made us so successful as a species is something else: our ability to collaborate in large groups and over longer stretches of time.

To work together successfully, a soldier mindset isn't helpful. What is more helpful is the mindset of a scout:

Different from soldiers, scouts aren't out there on a mission to blindly follow orders. If soldiers are rigidly determined, scouts are open-minded and curious. They simply observe their environment, collect evidence and weigh pros and cons, in order to figure out what's actually the best choice based on rational thinking. You could say they use their rationality more like a compass: as a tool that helps you with guidance. If our two prehistoric humans approach their disagreement like scouts, they can use their reasoning skills to figure out a compromise or determine the better solution of the two.

According to the argumentative theory of reasoning, the advantage of evolution is not to make every single one of us more rational, but to serve the needs of collaboration within a society. Thus reason can't be understood as something that one has and others don't, but something that works best within groups.

And scientists even found an explanation of how confirmation bias might be useful as well in that group context:

The ability to persuade others of your ideas can be just as much of an advantage as the ability to compromise – at least as long as you don't reject arguments that contradict your beliefs, but are objectively correct and would improve your situation.

According to this explanation, cognitive biases aren't just us humans messing up, but they might actually have a function of their own. So our sense of rationality evolved as a sort of middle path between the soldier and scout mindset.

This interpretation matches with the most important finding from observations of human reasoning: Humans reason better in groups than alone and the most rational outcome can be expected from a group that consists of many different people with different ideas and beliefs. In

such an argumentative environment people are most likely to challenge their beliefs and less likely to fall for confirmation biases.

What was true for early humans is still true for us today: Rationality can be used to assess a situation on one's own. But it is how we use it in groups that makes the real difference: like a sword or like a compass, to divide or to compromise.

Science proves what we intuitively know oftentimes: The best way to solve problems and to make the right decisions as a society is to discuss with each other. To challenge our own beliefs from time to time and to be open for new evidence. And to be aware and accept that we are all unconsciously biased to a certain degree.

3 Science Communication experiments

In the original grant agreement it was proposed to make a survey with manipulations (D 4.2) of the sci-com video (D 4.1) to find out best practices for trustworthy and reliable science communication that can later be used in the finalisation of the video (D 4.3).

However this approach has proven to be time inefficient and it came with some downsides for the quality of the survey as well. Therefore we decided to detach the two parts from each other. The manipulation will now be done with a recently released Kurzgesagt video titled “Who is responsible for climate change?” and the results will be used to improve the new sci-com video.

The main reason for this is that using the newly developed sci-com video on rationality limits our freedom in choosing suitable manipulations. Every video needs its own approach that must fit the content and so it may not feature all characteristics/variables that would be interesting to do research on.
So we came to the conclusion to choose a video based on its suitability for the survey instead of it being a part of the project. We chose a video that features a whole set of variables to manipulate and that would not be included in the newly reported video for creative choices. This gives us the opportunity to improve the new video while doing some research on general best practices for science communication videos.

There are other advantages in the new approach as well:
To make a comprehensive and understandable survey we need a video that can easily be separated into parts that make sense individually. The aforementioned video fits that criteria because it is already divided into 4 chapters that cover separate aspects and can be watched separately, while the video on rationality will tell a comprehensive story that should not be taken apart or out of context.

In the end, we decided to manipulate three of the four chapters of the video with a total of 10 variables. The last chapter did not provide enough opportunities for manipulations.

In addition, the production quality of the video assets supposedly play a huge role in their perceived trustworthiness. Therefore it is easier to make variations based on the already existing high quality material instead of working with makeshift versions (anything else would have been hard to make within the proposed timeline) for the survey which may influence the result.

The results from the survey will be used to improve the draft text in D4.3 and will give indications on producing a storyboard and a video in general that will stick to the best practices in sci com.

4 Conclusion

Communicating scientific findings to the public is more important today than ever, especially in light of the ongoing COVID-19 pandemic. But even more crucial is the step before the actual communication: deciding how to present the information and knowing that even the smallest details of the presentation might influence the impact of the message. But it is also important to be aware of how the mindset of the audience affects their receptiveness. TRESCA tries to gain insights on both these aspects and put them into practice.

The aim of this deliverable was to describe the research and development progress of the video and present the main changes and steps since deliverable 1.4. It highlights how the content and research topic of the video influenced the production process itself and how the end result is intended to uphold the messages it proclaims.

While the storyline has been fleshed out considerably, a final polish will be done in January 2021 to take advantage of the opportunity to incorporate the findings from the experiments into the final product.

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