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UNDERSTANDING OUR POLITICAL NATURE

HOW TO PUT KNOWLEDGE AND REASON AT THE HEART OF POLITICAL DECISION-MAKING

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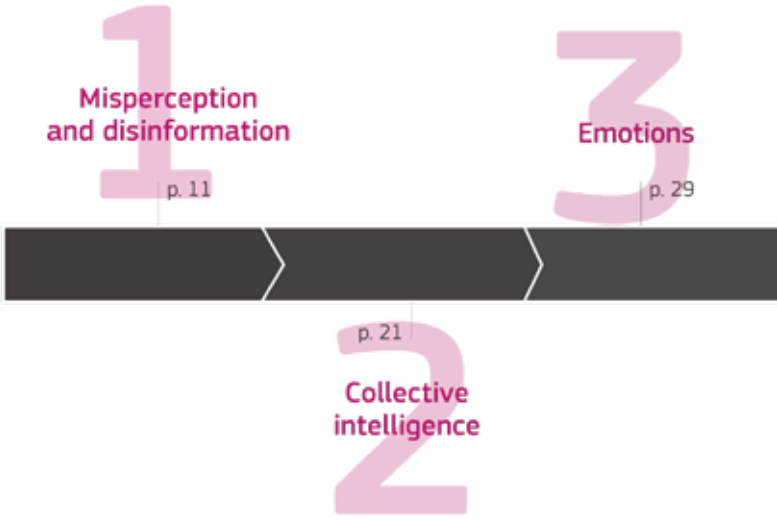
EXECUTIVE SUMMARY

The behavioural sciences, social sciences and humanities can bring us new insights into our political behaviour, such as how and why emotions, values, identity and reason affect how we think, talk and take decisions on political issues.

Misperception and disinformation: our thinking skills are challenged by today's information environment and make us vulnerable to disinformation. We need to think more about how we think. Motivated reasoning makes people resist evidence that runs against their beliefs. Misinformed people do not think of themselves as ignorant – they hold facts which they believe to be true. False news, particularly political is diffused 'significantly farther, faster, deeper and more broadly than the truth'. Corrections do lead to more accurate assessments of the facts although generally do not change people's views.

Collective intelligence: science can help us re-design the way policymakers work together to take better decisions and prevent policy mistakes. Thinking collectively can significantly improve the quality of political decisions but only if collaborative processes are carefully designed. Only if all critical information, unique knowledge and expertise are shared can collective intelligence be achieved and groupthink or polarisation avoided. Psychological safety is essential for the sharing of critical information, ideas, questions and dissenting opinions.

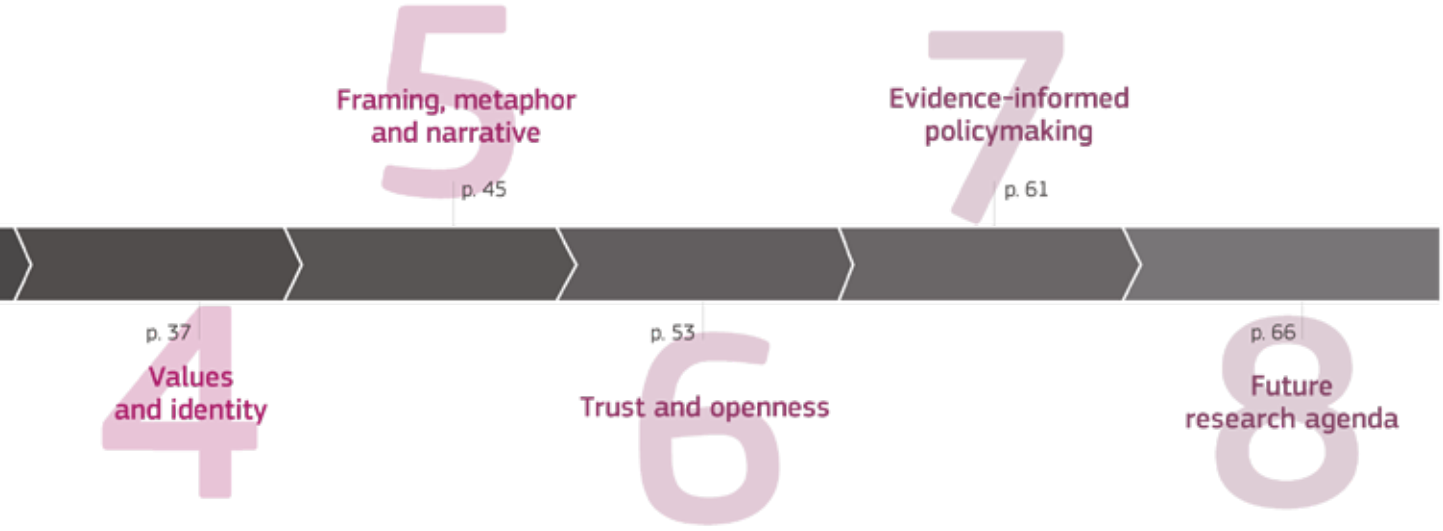
Emotions: we can't separate emotion from reason. Better information about citizens' emotions and greater emotional literacy could improve policymaking. Emotions are just as essential to decision-making as logical reasoning and as likely to enhance rationality as to subvert it. Angry people are less likely to seek information and more likely to adopt a closed mind while anxiety may lead to a deeper processing of information. Sensing citizens' emotions more effectively could better guide policy choices. Learning to integrate and use emotions, rather than trying to suppress them could improve decision-making and collaboration in government.



Values and identities drive political behaviour but are not properly understood or debated. Political decisions are strongly influenced by group identity, values, worldviews, ideologies and personality traits. Political polarisation is on the rise and a new form of cultural, rather than economic, polarisation

has emerged, with the far right opposed to immigration and multiculturalism. Values strongly influence not only our political behaviour but also our perceptions about facts.

Framing, metaphor and narrative: facts don't speak for themselves. Framing, metaphors and narratives need to be used responsibly if evidence is to be heard and understood. There is no such thing as a neutral frame; something is included at the expense of something else. The ways in which policy problems are framed can substantially influence beliefs. It is not the side with the most or best facts that wins an argument, but the one that provides the most plausible scenario that feels intuitively reliable, communicated by a perceived credible source.



Trust and openness: the erosion of trust in experts and in government can only be addressed by greater honesty and public deliberation about interests and values. Trustworthiness depends on expertise, honesty shared interests and values. The ideal of value-free science is more complex in reality: values may enter at several stages of the process. This does not mean that science cannot be trusted but that there is a need to be more transparent about the role of values in science. Opening evidence to public scrutiny is crucial to maintain scientific authority. Deliberative democracy and citizen engagement can be effective responses to the loss of trust in democratic institutions.

Evidence-informed policymaking: the principle that policy should be informed by evidence is under attack. Politicians, scientists and civil society need to defend this cornerstone of liberal democracy. The framing of a policy problem is a political rather than technical issue that determines what research is needed, what evidence counts and what should be ignored. The commitment to evidence-informed policy cannot be taken for granted. Partisan leadership in highly polarised political environments undermines the capacity of governments to use evidence effectively.

There are extensive barriers to the use of evidence – scientists and policymakers have different norms, cultures, languages, misaligned incentives, understanding of time and budget constraints. A well-designed evidence-informed policy system would include knowledge brokers and boundary organisations between scientists and policymakers. The principle of informing policy through evidence could be recognised as a key accompaniment to the principles of democracy and the rule of law.

INTRODUCTION

We are at a defining moment for the way our societies are governed. Complexity, wicked problems, the abundance of information, the pace of change, uncertainty, misinformation, populism, polarisation as well as new governance models and digital technologies are creating the need to change how policy is made.

Competition for both power and the support of voters is at the heart of the policymaking eco-system. But all the actors in this eco-system, whether politicians, civil servants or citizens are also humans, not algorithms. Science can bring us new insights into our political behaviour, such as how and why emotions, values, identity and reason affect how we think, talk and take decisions on political issues.

The European Commission's Joint Research Centre (JRC) is committed to support better policies and to uphold EU values through bringing scientific knowledge into policy. The new challenges to the way policy is made also pose serious challenges to those seeking to influence policy through scientific knowledge. The solution cannot be to simply carry on in the same way. It is not enough to rebut myths, check facts, correct misperceptions, fund more science and increase scientific literacy. These are all desirable but fail to get to the bottom of why facts don't simply speak for themselves.

Instead we have to get smarter about how we make policies and integrate science, by developing a better, scientifically informed understanding of how we as citizens, policymakers and scientists take political decisions at an individual, collective and institutional level. The so-called deficit model is inadequate. It is only on the basis of a more accurate picture of our political nature that we can understand what really drives politics and policymaking and ensure that scientific evidence gets properly taken into account.

Our analysis is not limited to studying the behaviour of policymakers, broadly defined to include both civil servants and politicians. This report also seeks to understand and include the political behaviour of citizens, who have a fundamental role to play in the policymaking process, either at election time or through more direct participation in political processes.

The aim of this report is therefore to bring powerful insights from the behavioural sciences (psychology, neuroscience, anthropology, economics, cognitive-linguistics), social sciences and humanities (history, political science, public policy studies and philosophy of science) to update our picture of human political behaviour.

This understanding will provide solid foundations to improve policymaking, enabling scientific evidence and reason to contribute to democracy. These insights have the potential to address some of the current crises in our democracies.

The findings are grouped under seven chapters:

1. Misperception and Disinformation
2. Collective Intelligence
3. Emotions
4. Values and Identity
5. Framing, Metaphor and Narrative
6. Trust and Openness
7. Evidence-informed Policy

Each chapter is divided into two sections; the first part sets out key insights from the science, while the second part outlines potential implications for policymaking in its broadest sense. The chapters are closely inter-related as politics is a complex system with many feedback loops and connections between the different drivers.

METHODOLOGY

Rationale

The JRC believes that evidence-informed policymaking results in better policies. It is therefore in our interest and, we believe, in that of Europe's citizens, to find ways to improve the incorporation of evidence into the policymaking process. This was the motivation that led to the creation of the Enlightenment 2.0 programme.

This work started with the classical Enlightenment premise that reason is the primary source of political authority and legitimacy. Recognising that advances in behavioural, decision and social sciences demonstrate that we are not purely rational beings, we sought to understand the other drivers that influence political decision-making. Modern democracies are predominantly based upon the Western interpretation of the Enlightenment, that we consider ourselves to be rational actors. During this project, it has become clear that in fact the original Enlightenment foreshadowed many of the insights covered in this report.

A collaborative approach

The extent of the challenge and the breadth of expertise required meant that collaboration was central to our methodology. An international Call for Expertise was launched in March 2018 seeking experts from the Humanities, Social and Natural Sciences. Applications from many disciplines were encouraged including:

Cognitive Linguistics; Ethnology/Anthropology; Evolutionary Biology; History of The Enlightenment; Neuroscience; Organisational Behaviour; Philosophy of Science; Physiology; Policy Studies; Political Behaviour; Political Psychology; Political Science; Psychology; Social Psychology; Sociology and Theology.

Experts could submit their applications for the following roles:

- Lead Author of a literature review of a specific discipline
- Contributing Author of a literature review of a specific discipline
- Reviewer of a literature review of a specific discipline
- Steering Committee member

An evaluation committee reviewed the applications received and a total of 60 experts were selected based upon published criteria.

> "Science can bring us new insights into our political behaviour, such as how and why *emotions, values, identity and reason affect how we think, talk and take decisions on political issues.*"

For the purpose of undertaking state-of-the-art literature reviews, experts were assigned to one of eight groups:

- Economics
- History
- Language, Linguistics, Anthropology & Culture
- Neuroscience
- Philosophy
- Political Science
- Psychology
- Public Policy, Administration & Sociology

Each group answered the same two research questions that had been established by the community of experts:

- What are the drivers of political behaviour?

- What are the most effective strategies for the optimal uptake of evidence into the political decision-making process?

This was an innovative approach to establishing research teams which was experienced positively – for the most part – by the experts. Their willingness and dedication to collaborating with unknown colleagues, rather than their existing research teams was demonstrated by the calibre of work produced in the 8 scientific reviews.

The JRC organised two workshops that included participation from colleagues across the Commission. The first workshop that took place in May 2018 established consensus on the approach, methodology and research questions. The second workshop that took place in October 2018 facilitated a real-time peer-review of the literature reviews. In both case, participatory leadership techniques were used to maximise the quality of discussions.

Normative statement

During the first workshop, the experts identified the need for the JRC to set out its assumptions for the project, we responded with the following statement:

'Policymaking, political debate and political decisions are better when they are informed by robust, pertinent and freely accessible evidence. Political questions cannot be "solved" in the same way as scientific ones because they are not purely analytical, they require normative trade-offs; science can only answer analytical questions about how the world "is" not normative ones about how it 'ought' to be. "Evidence-informed policy" is more accurate to "evidence-based policy" as it makes clear that evidence is an input to the political process and not the ultimate authority. The role of evidence in the policy debate is often challenged not because of general objections to evidence but because of the specific evidence used to inform particular decisions. The choice of scientific evidence and its use to inform political decisions is normative.

Evidence is essential because it provides the best available picture of reality, which imposes actual constraints on policymaking and potential costs and benefits. Scientific evidence can optimise political decisions and political debate by helping all political actors (citizens, civil servants, politicians) to make informed and autonomous decisions in line with their value preferences and priorities.'

Role of the JRC

As the Commission's knowledge and science service, the JRC plays a central role in creating, managing and making sense of collective scientific knowledge for better EU policies. It has been our role to take the insights from the different scientific disciplines, underpinned by the scientific reviews and translate them for use in policymaking.

Throughout the production of this report, we have attempted to apply the lessons learned from the science to our working methodology:

- With permission from the authors, the state-of-the-art reviews were shared internally with Commission colleagues, helping them to understand the evolution of this project.
- Commission colleagues met regularly and informally to receive updates on this project and to discuss policy implications. They have received early versions of work allowing scope for feedback and comments to be made.
- A highly synthesised version of this report was shared with over 100 experts to ensure faithfulness to the original reviews and reduce the risk of groupthink.
- Communities of Practice were created for the experts and interested colleagues across the Commission.

> “Recognising that advances in behavioural, decision and social sciences demonstrate that we are not purely rational beings, *we sought to understand the other drivers that influence political decision-making.*”

Access to the state-of-the-art scientific reviews

The JRC is currently evaluating options for the publication of all eight reviews in a special edition of an open-access academic journal, ensuring full transparency and maximising the reach of our work.

Thank you

This report is a collaborative work of synthesis, co-created with academia and policymakers. It has received formal and informal input from individual experts, policy practitioners, as well as representatives from international and civil society organisations. We are indebted to everyone who has generously contributed to this work; thank you, this report would not have been possible without you. The full list of external experts is set out in the Annex.

MISPERCEPTION AND DISINFORMATION

1.1 Key findings

1.1.1 Our thinking is not well adapted to the current political information environment

Humans do not always think rationally. This is not necessarily problematic. What is problematic is to neglect it and base politics on the assumptions that they do.

Today's information environment presents a significant challenge to citizens' political thinking. The media has traditionally played a major role in filtering out unreliable information and providing a balanced perspective. This ''gatekeeper'' role has played a significant role in framing how people think about political issues. However, the emergence of the Internet, particularly social media, has led to a relative decline in the importance of traditional media curating the political debate. It has made information available as never before, and has disrupted the business model that underpinned the media's traditional role.

In particular, production and distribution are separate – the author or editor of an article maintains control of the content, but distribution is increasingly left to social media platforms' algorithms[1]. These algorithms generally select and present data to maximise attention, rather than to provide balance or veracity. Evaluating the veracity of information, photos and videos, once a task done by media gatekeepers, is therefore now left to users themselves[2]. The information overload, coupled with the decline of the media gatekeeper role is putting our cognitive capacities

> Our thinking skills are challenged by today's information environment and make us vulnerable to disinformation. We need to think more about how we think.

under unprecedented pressure. This has led to an epistemic crisis, where individuals do not have the capacity to fully understand and explain critical information about events. The mental structures and information infrastructure they traditionally relied upon to explain reality are no longer fit for purpose[3].

This transformation in the political information environment provides new opportunities for political actors to communicate in an un-mediated and targeted way with citizens. While there is considerable potential to improve political debate, the manipulation of public opinion through social media platforms is a very real threat[4]. For example, the more a claim is repeated, the more likely it is to be considered true[5]. While it has always been possible to repeat a claim through

broadcast and print media, now it can be done on social media by different sources and in real time. The number of likes a source receives on social media can significantly increase its perceived credibility[6], while negative user feedback can undermine it[7]. Taking cues from other people's opinions is an ancient phenomenon, but the number of opinions available, the speed with which they can be accessed, and the possibility for manipulation through attention-grabbing algorithms, is new.

Social media users express their preferences through their likes, their friends and the content they post. In return, they will be exposed to narratives that reinforce these preferences, creating filter bubbles[8]. Whether these isolate individuals from divergent views is a matter of some debate. Evidence suggests social media and search engines actually increase exposure to material from the other side of the political spectrum[9]. But they also increase polarisation among individuals, who see their beliefs reaffirmed and who lose the inclination to discuss ideas with people who hold different opinions, hindering critical knowledge construction[10].

What is required, in this situation, is for individuals to develop epistemic vigilance, that is, a willingness to critically evaluate the information provided in order to determine if it is credible or not[11]. This includes being critical of the sources of the information, including suspect media outlets intending to misinform, as well as more traditional media outlets pursuing their own political agenda. This same vigilance can also be applied introspectively to one's own thought processes in order to become more aware of those mental models and narratives that shape interpretation of the world.

1.1.2 Facts don't necessarily change minds

One aspect of human thinking that needs to be more widely recognised is motivated reasoning, the tendency to arrive at conclusions about evidence that match people's pre-existing beliefs[12]. Motivated reasoning makes people resist evidence that runs against their beliefs. If an argument threatens their political ideology, they will fight it vigorously; but if it supports their worldview, they may accept it without much objection[13].

People are likely to resist information that challenges their beliefs particularly if it comes from the other side of the political spectrum[14]. For example, when presented with negative evidence about a political candidate they liked, people expressed a greater willingness to support them[15]. In other words, people have a tendency to believe what they want to believe, regardless of contradicting evidence, and especially if it is perceived as coming from an opposing political side.

Motivated reasoning is spread equally across the partisan divide, and has been found not to be related to reasoning ability[16]. It appears to be more prevalent among better-informed people, at least for some issues[17]. In fact, the more people reflect analytically about a certain issue, the more likely they are to engage in ideologically motivated reasoning[18]. This evidence lends support to cultural cognition, the notion that people form beliefs about the risks of activities to match their cultural evaluations of them[19]. On the issue of climate change, for example, research from the US has shown that greater scientific and political knowledge correlates with (a) greater scepticism about climate change and the role of human activity in causing it among conservatives but (b) lower scepticism among liberals (progressives)[20]. The same pattern was observed for some issues, such as stem cell research or human evolution, but not others, like nanotechnology or genetically-modified foods[21]. Moreover, a study shows that when counterevidence is provided to participants that contradicts firmly held beliefs, they are more likely to change their beliefs on issues that are not considered political, such as mobile phones or artificial food colourings *(see Figure 1)*[22].

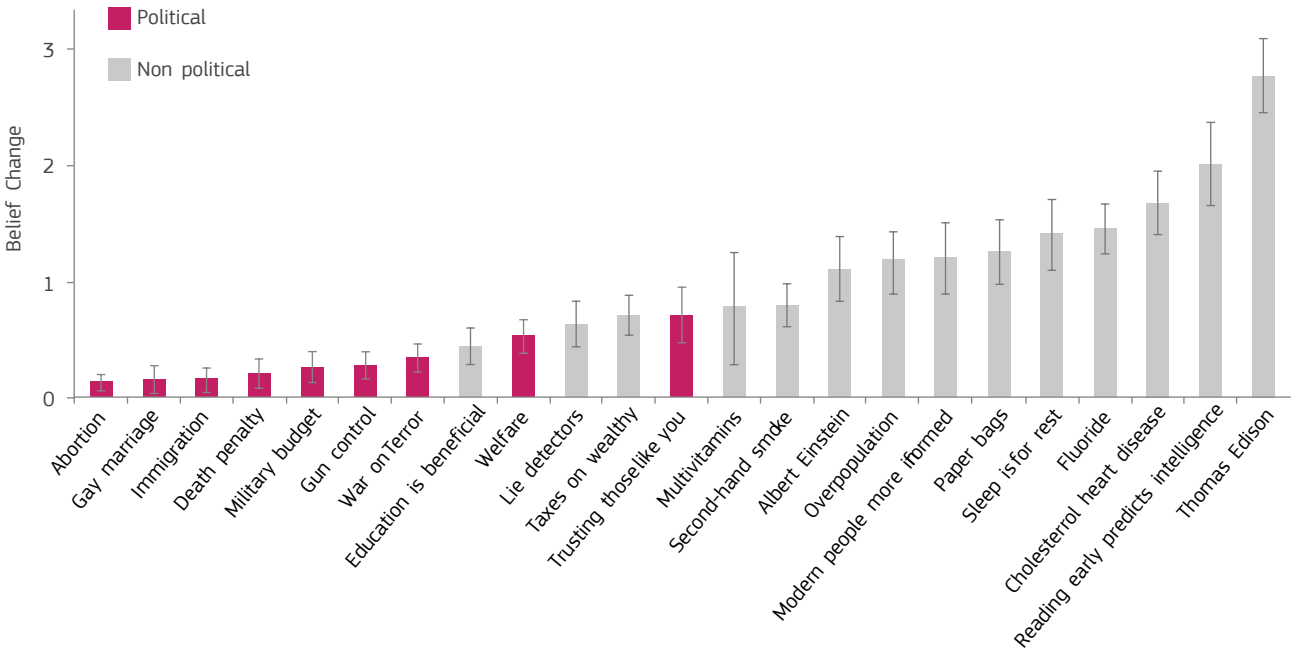


Figure 1: Stimulus items in order of average belief change
Source: Kaplan et al. (2016)

1.1.3 We tend to overestimate the prevalence of what worries us

Emotional innumeracy is an important concept when thinking about social and political realities. It suggests that when worried about a particular problem, people tend to think it is more widespread than it is; making them worry about it even more[23]. For example, Europeans tend to consistently overestimate the number of immigrants in their country *(Figure 2)*. Results vary by country, but in up to 20 EU Member States, they are overestimated by a ratio of at least two to one[24]. Similarly, people in the US think that 25 % of teenage girls give birth each year, when in fact it is 3 % and in Italy, people think half of the population is over 65 years of age, but the correct figure is 21 %[25].

To your knowledge, what is the proportion of immigrants in the total population in (our country)?

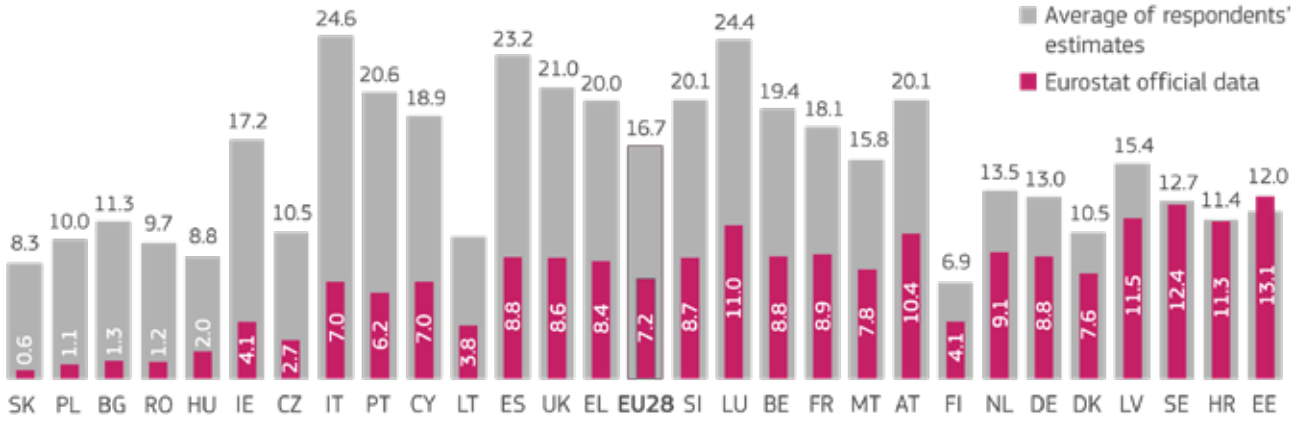


Figure 2: Actual and perceived proportion of immigrants in total population (%)
Source: Eurostat, 2018

> Misinformed people do not think of themselves as ignorant, *they hold facts which they believe to be true.*

A number of factors contribute to this phenomenon. For one, as decades of empirical work in behavioural economics show, humans have problems understanding probability and simple percentages[26]. They may overweigh low-probability events in some instances (e.g. in description-based decision problems), but not necessarily in others (e.g. when they rely on their experiences[27]). But there is more to it.

People have a tendency to focus on negative information, a negativity bias[28]. This kind of information remains vivid in their memory, making it easy to recall, and making them overestimate the prevalence of these otherwise rare phenomena[29]. People are also not very good at spotting slow gradual positive changes, like a decrease in teenage pregnancies in many countries. Finally, they have a tendency to think things are getting worse, and look at the past through rose-tinted spectacles. And while there is no evidence that people have less of a reality-based view of the world now than in the past, the online environment threatens this on a new scale[30].

1.1.4 We are increasingly exposed to misinformation...

Living in a 'post-truth' world suggests that appeals to emotion and personal beliefs are more influential in shaping public opinion than facts. However, evidence still plays a role in shaping political debate, especially when discussing complex and disputed social and political realities. The problem is, people have a misperception of reality, especially on politically salient questions.

Misperceptions are different from ignorance[31]. It is the difference between being uninformed and being misinformed, about not having the right answer to a factual question and holding a false belief about the answer[32]. Misinformed people do not think of themselves as ignorant – they hold facts which they believe to be true[33]. When people do not know much about a subject, they may be more open to new information, but when they have misperceptions about it, they might think they are relatively well informed, making them more resistant to new information.

While there is no evidence to suggest the number of uninformed people has increased over the past decades, there is growing concern over misinformation in contemporary politics[34]. Typical examples include the proportion of Americans who deny climate change or mistakenly believe the measles vaccine leads to autism in children[35].

Sometimes, crude self-interest will account for people's misinformation. When people believe in climate change, they worry about it, which may lead to their lifestyle (including investments) being questioned. In other cases, a belief in conspiracy theories can be the cause. They

strongly shape people's beliefs and can be very difficult to refute. This suggests that they respond to a need which has to be addressed otherwise for them to be abandoned. Worryingly, public interest in them seems to be increasing while engagement in the political process is decreasing.

1.1.5 ... often spread intentionally

Intention is the key difference between *mis*information and *dis*information. Misinformation refers to the spread of false information, but disinformation refers to false information shared with the intention of misleading others. One of the main ways of spreading disinformation is through fake news, meaning fabricated news disseminated through a variety of media outlets[36]. Its impact on political behaviour cannot be underestimated.

A study in 2018 investigated the differential diffusion of true, false and mixed news stories on Twitter. It looked at 126 000 stories, tweeted and retweeted about 4.5 million times. The false news was diffused 'significantly farther, faster, deeper and more broadly than the truth'. For example, while the top 1 % of true news seldom reached more than 1 000 people, the top 1 % of false news normally reached anywhere from 1 000 to 100 000 people. Furthermore, it took true news six times longer than false news to reach 1 500 people. Although this trend applied to all categories of information, it was particularly true of political news. In short, people like to share false news, especially if it is political. It is novel and more likely to provoke fear, disgust and surprise, whereas true stories elicit anticipation, sadness (or joy) and trust[37].

What makes people believe fake news? One explanation suggests people tend to believe fake news which is consistent with their political ideology because of motivated reasoning. For example, in the UK during the 2016 Brexit campaign, 64 % of Conservative leavers and 65% of Labour leavers believed the claim by the Leave campaign that EU membership cost the UK 350 million pounds a week, while only 32 % of Conservative remainers and 20 % of Labour remainers did so[38].

A combination of photos taken at the National Mall shows the crowds attending the inauguration ceremonies to swear in U.S. President Donald Trump at 12:01pm (L) on January 20, 2017 and President Barack Obama sometime between 12:07pm and 12:26pm on January 20, 2009, in Washington, US. The first photo led to the birth of the term 'alternative facts'.

Fake news believers may not engage sufficiently in critical thinking. Recent empirical evidence supports this explanation over motivated reasoning[39]. It would suggest that measures to increase analytical engagement with news items could help prevent misinformation. More thoughtful and reflexive consumers of media, the argument follows, are less easily duped. However, people who consider themselves critical thinkers, challenging the status quo and questioning the 'mainstream media', are also susceptible to misinformation[40].

1.1.6 Fighting *mis*- and *dis*information is one of the grand challenges of the 21st century

What else can be done to combat *mis*- and *dis*information apart from promoting critical thinking? Ultimately, mechanisms are needed that can differentiate news quality, separating reliable news from fake and low quality news[41]. One such mechanism relies on debunking, exposing false claims. Experimental evidence suggests debunking works, meaning that corrections do lead to more accurate assessments of the facts although it generally does not change people's views[42].

There has been some concern that if someone is told a claim that contradicts their beliefs they will become more entrenched. This *backfire effect* suggests that efforts to debunk could be ineffective or even counterproductive[43]. However, the evidence suggests that while the backfire effect might exist in some cases, it is actually rare in the literature and hard to replicate[44]. In cases where it has been found the topics were particularly contentious or the factual claims in question were ambiguous[45].

If debunking leads to more accurate beliefs, fact-checking operations could be a worthwhile effort. However, fact-checkers are human, and they can easily be overwhelmed by the sheer volume of misinformation that is being created daily[46]. Keeping up is a challenge. Time is also a consideration. Fake news can become viral in a matter of hours, not giving fact-checkers enough time to manually check the information and either debunk it or somehow give it less priority in social media platforms' algorithms[47]. Furthermore, a meta-analysis of de-biasing strategies has shown that appeals to coherence, compared to fact-checking and source credibility are more successful in reducing the effects of misinformation (e.g. it would not be enough to correct the faulty information that President Obama was born in Kenya, but rather add to the correction a chain of events providing a narrative to increase coherence)[48].

An alternative approach to correctly identify false claims is *pre-bunking*, based on inoculation theory[49]. If people are exposed to weak false claims which are quickly debunked, they are more likely to identify and reject such claims in the future. This is a promising technique, but needs further large-scale replication[50]. Other approaches which appear promising include playing 'fake news games', in which players create news stories about political issues using misleading tactics. Playing this game reduces the perceived reliability and persuasiveness of fake news articles[51].

Debunking (and pre-bunking) might work, despite the presumed backfire effect and in the face of practical challenges to fact-checkers. But they will just help assess the veracity of claims. The question remains: will these efforts be enough to counter the overall impact of disinformation? This is still a matter of debate[52]. Perhaps they would if the only aim of disinformation were to change minds. But it has more aims. For one, it seeks to polarise views by infiltrating online communities and amplifying divisive narratives that are already circulating[53]. Being better-informed does not necessarily make people immune to polarisation[54].

Disinformation also seeks to sow confusion and erode the value placed on facts. This undermines the role of the public sphere as a space for debate and mutual understanding.

The German-American philosopher and political theorist, Hannah Arendt, while reflecting on Europe's past experience with authoritarianism explained:

> "If everybody always lies to you, the consequence is not that you believe the lies, but rather that nobody believes anything any longer. […] And a people that no longer can believe anything *cannot make up its mind. It is deprived not only of its capacity to act but also of its capacity to think and to judge. And with such a people you can then do what you please.*[55]"
>
> Hannah Arendt - German-American philosopher and political theorist

Mitigating the effects of disinformation will require significant effort. An integrated approach is needed where the value placed on evidence is restored as well as trust in government and an increased role for citizens in the policies that affect their well-being.

1.2 So what does this mean for policy?

1.2.1 Closer attention needs to be paid to how people interpret information

Information will be interpreted differently depending on how it is communicated. Simple messages will be better understood. Technical terms can be systematically replaced with synonyms that correspond to lower reading scores[56]. Graphical aids help, as does presenting information in a more intuitive way[57]. For example, presenting natural frequencies instead of probabilities (e.g. saying 'one out of 4 people' instead of '25 percent') helps facilitate comprehension[58].

At the same time, efforts could be reinforced to improve basic critical thinking skills. Citizens could then be more cautious about how facts are used to support a political point. Simply bringing in statistical reasoning at an early age in school curricula would be a good starting point. Also, including behavioural insights about how humans think in schools would help citizens to be more reflective about their own thinking.

1.2.2 Policymakers can be biased too

The 'what you see is all there is' effect suggests people use the information available to them to make judgments and disregard the existence or importance of other viewpoints[59]. Being stuck in their information and social bubbles makes people more likely to have a biased view of the world. They will tend to think of themselves and those who surround them as 'normal', hindering empathy for other people and viewpoints. This 'naive realism' phenomenon applies to policy-making bubbles as well.

Added to this is the bias blind spot, a phenomenon whereby people tend to consider themselves as less biased than others[60]. In policymaking, this can lead to suboptimal outcomes: policymakers may disregard the arguments of others too easily

and not acknowledge the bias in theirs, leading to poor debate and ultimately poor decisions. Tools and procedures can be put in place to mitigate the effects of this bias. For example, when people are made to reflect on the fallibility of intuition, they exhibit less bias blind spot[61]. Games which incorporate such insights, and which are meant to reduce bias blind spot, can be used with policymakers[62]. Finally, people will exhibit less bias when making decisions in a foreign language, so promoting linguistically diverse working spaces may also be beneficial[63].

1.2.3 It's not all about the facts

The way politicians discuss facts in the public sphere sets the tone for the role of evidence in policymaking. Arguments are not won by resorting to facts alone. Certain facts appeal to people who hold certain values, and not to others. Relying on facts as 'the truth' is counterproductive. Motivated reasoning will mean people will choose not to believe the facts if they run counter to their beliefs. Greater efforts by politicians to disentangle facts from values and spend more time debating the latter would help to lower the temperature around the facts and perhaps firewall the factual debate from motivated reasoning.

To respond to emotional innumeracy, showing 'real facts' i.e. the actual prevalence of the problem may not be entirely effective. For one, insisting that some inaccuracy 'is not true' simply makes it more prevalent in public debate, which is counterproductive. And secondly, this approach

"Greater efforts by politicians to disentangle facts from values and spend more time debating the latter *would perhaps firewall the factual debate from motivated reasoning.*"

might, at best, counter the misperceptions, but will not allay the concerns that gave rise to those misperceptions in the first place. Responding to claims that almost 17 % of European residents are immigrants by saying that the actual rate is only 7.2 % does not address the underlying sentiment that gave rise to the inflated figure in the first place.

If people overestimate those things that worry them, the response should not be to disregard them (since they do not adhere to the facts). Rather, this overestimation can be taken as an indicator for their concerns. They determine people's outlook on the current state of affairs, which in turn will dominate the political debate. Policymakers neglect this at their peril.

1.2.4 Social media platforms need to contribute to tackling disinformation

The online environment, with its rapid growth of online content, needs a system that allows fast and convenient checking of misinformation. The big Internet platforms – Facebook, Google, Twitter – have all stepped up their efforts to combat this problem. But their interests are not necessarily aligned with those of government. When Twitter announced negative user growth after suspending 70 million suspicious accounts, its stock fell by 21 %[64]. Therefore, governments, whose incentives are aligned with fighting disinformation, especially if it is sponsored by a foreign state, could continue requesting that more be done by these companies to arrive at workable solutions.

COLLECTIVE INTELLIGENCE

2.1 Key findings

2.1.1 The social dimension of reasoning

Our individual reasoning has evolved to serve collective action. Individually, human reasoning capacity is limited and subject to confirmation bias and motivated reasoning. Thinking collectively can overcome individual bias and significantly improve the quality of outcome but only if collaborative processes are carefully designed[65].

The theory of argumentative reasoning, explains that the function of reasoning and people's ability to argue convincingly are a social competence that benefit the community[66]. An experiment showed that when asked to perform a selection of logical tasks, individuals achieved success rates of 10-20 % while small groups reached much higher rates of 70-80 %[67]. Other experiments have demonstrated that individuals are systematically subject to 'the illusion of knowledge'. People systematically overestimate their understanding of concepts (e.g. the workings of a bicycle) and only realise how limited their own knowledge is when challenged to provide a more detailed explanation[68].

People also systematically and incorrectly assume they know what others in their community know. However, a well-organised community can overcome this bias, highlighting the need to build effective *communities of knowledge*, within which reasoning tasks are shared among members[69].

> Science can help us re-design the way policymakers work together to take better decisions and prevent policy mistakes.

2.1.2 Groups also exhibit biased behaviour and judgement errors

Most political issues are complex, poorly structured and have to be addressed while coping with uncertainty, ambiguity, incomplete information and time constraints. Policymaking therefore is to a large extent driven by collective processes. However this does not inevitably lead to better decisions as groups do not necessarily collaborate effectively[70]. Like individuals, groups are subject to biases. Knowledge, techniques and skills can help to mitigate these effects.

Apart from goal and incentive misalignments, time pressure, the tendency towards intergroup-discrimination and in-group favouritism, collective processes are also often subject to group biases and judgement errors leading to poor decisions[71]. Unequal distribution of key information among group members and the failure to value expertise are very common in groups and reduce

decision quality, since unshared information and unacknowledged expertise might provide support for alternative decisions[72]. Only if all critical information, unique knowledge and expertise is shared across the group can the potential of the *wisdom of the crowd* be realised. Group members tend to share or withhold information strategically (e.g. due to conformity pressures or fear of rejection), focusing on information consistent with their values and see information supporting their own position as more valid, particularly in competitive situations[73].

Policymaking poses particular challenges to collective intelligence because of the need to identify trade-offs between different competing values, interests and policy-options. This can accentuate the tendency to share or withhold information strategically to achieve policy goals and to focus on goal-consistent information.

Information shared at the beginning of the deliberative process and subsequently repeated is more salient and perceived as more credible[74]. As a result, if no-one within a group is at least able to reach an accurate understanding of the problem, a wrong but convincingly communicated position can prevail.

Groups can also produce poor decisions through *groupthink*, when members privilege group harmony over the independence of thought and effective decision-making[75]. Homogeneity within groups is when members share similar socio-demographic backgrounds, past experience and worldviews[76]. This increases group cohesion, but facilitates the creation of echo chambers and the premature termination of discussions[77]. On an individual level, group pressure and the desire to belong, may lead people to support the majority opinion despite better judgement. Groupthink can also occur due to the tendency to select 'like-minded' persons when hiring or setting up project teams. The result is low diversity in terms of perspective and reasoning that can lead to lower overall team performance. Reasoning styles are different from other types of diversity in that being internal, they are not directly visible and hard to identify[78]. As a consequence, groups that are subject to groupthink are unlikely to reach optimal decisions. This has been the subject of numerous studies, in particular on high profile policy failures such as the Bay of Pigs Invasion, the Vietnam War, as well as the space shuttle Challenger and Columbia accidents[79].

Group polarisation is the inclination to make more extreme (either riskier or more conservative) decisions than initial preferences would seem to suggest[80]. This effect has been found in many high profile-situations ranging from economic and monetary policy committees to courts of law[81]. Competing theories exist about this phenomenon[82]. The surfacing of unshared information during the discussion process fuels this effect. Other research claims that informational factors such as social influences or a patchy, incomplete set of arguments are the underlying mechanisms of group polarisation[83]. Convincingly presented arguments, which support initial inclinations and emerging group consensus seem to suppress new items of information.

Stress can also have a negative impact on the quality of group deliberations, just as it does for individual decision-making, by inducing a switch from reasoned deliberation to automatic intuition[84]. Additionally, time pressure and the perception of one's task to be of low importance or not readily solvable can negatively affect decision quality.

This knowledge about what can go wrong when thinking in groups has helped identify the circumstances under which collective intelligence operates at its best.

2.1.3 More than the sum of its parts – the collective intelligence factor

Collective reasoning, or the *wisdom of the crowd*, has been the subject of experimental research since the early twentieth century. Recent research

> *"I not only use all the brains I have, but all I can borrow."*
>
> Woodrow Wilson, 28th President of the USA

showed that the higher the number of participants in a study with diverse views, the higher the level of accuracy of the average collective response. In a US experiment conducted between laywers and law students, both groups had to predict the outcome of civil jury cases. The results showed that the most significant difference in estimation accuracy was when individuals teamed-up with partners. When averaged, the estimate of 15 law students with limited expertise was more accurate than that of a very experienced individual lawyer.[85] Importantly however, this does not suggest that expertise is in any way redundant; rather, it shows that, depending upon the subject, additional opinions (particularly the first few) can add substantial value and reduce the error rate of collective prediction.

In what is still a relatively new field, results from empirical research suggest a collective's intelligence is more than the minimum, maximum or average intelligence of individual group members. Collective intelligence is a property in itself.

Some prominent research in this field proposes that collective intelligence can be measured by a single statistical factor, comprising components that can reliably predict a groups' capacity to perform effectively on a wide variety of tasks[86]:

- The extent to which group members are able to reason about the mental state of others (social perceptiveness)
- The extent of equal turn-taking in debates
- The proportion of women members
- The degree of cognitive diversity (different styles of reasoning).

Although the underlying method of measuring team performance is still contested these concepts hold great promise for how collaboration is organised in government[87].

The ability to reason about the mental states of others, to make judgments about other's knowledge and their knowledge about one's own knowledge (the 'theory of mind') is essential to our social functioning[88]. It can be tested via a 'reading the mind in the eyes' test *(see Figure 3)*. In one such test, participants were shown 36 images of eyes and asked to choose among four possible mental states to describe the pictured person.
This test of predicting group performance and social perceptiveness works both online and offline[89]. This suggests that collective intelligence can be predicted and might be systematically cultivated at scale in an online environment.

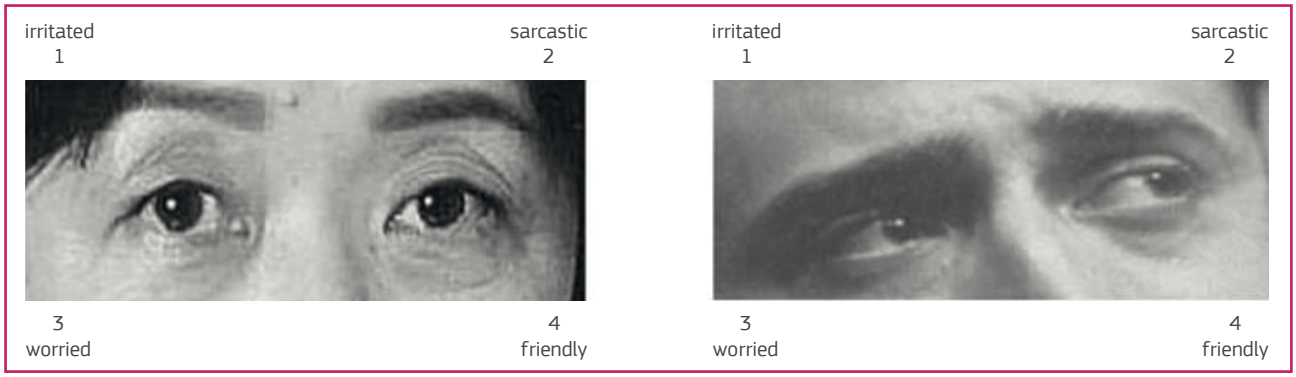


Figure 3: Reading the Mind in the Eyes Test
Source: Reginald B. Adams Jr., Nicholas O. Rule, Robert G. Franklin Jr., Elsie Wang, Michael T. Stevenson, Sakiko Yoshikawa, Mitsue Nomura, Wataru Sato, Kestutis Kveraga, and Nalini Ambady, 'Cross-cultural Reading the Mind in the Eyes: An fMRI Investigation', Journal of Cognitive Neuroscience, 22:1 (January, 2010), pp. 97-108. © 2009 by the Massachusetts Institute of Technology.

In situations where knowledge and expertise are widely dispersed, such systematic harnessing of collective intelligence could prove vital to building effective communities of knowledge.

Researchers studying Wikipedia have found that under certain conditions, like preventing deliberation in echo chambers and effectively providing for moderation, polarised teams consisting of a balanced set of ideologically diverse actors can achieve higher quality outputs than homogeneous ones[90].
This example however, shows how important the design of the collaborative environment is for its effectiveness.

Another framework that attempts to capture the factors driving collective intelligence puts forward independence of thought, decentralised inputs, a diversity of perspectives as well as an objective aggregation and synthesis of knowledge as vital components[91]. Finally, while social interaction, e.g. by the careful design of collaboration, can positively affect decision quality, a recent study suggests that intermittent breaks also improve collective intelligence, as this helps to maintain a high level of individual exploration[92].

2.1.4 Harnessing the wisdom of citizens

These ideas can be applied not only within government but also externally, potentially involving thousands of citizens, through the Internet. Practical solutions such as deliberative systems like *vTaiwan* and the *MIT Deliberatorium* exist[93]. One rationale for the use of such deliberative spaces is identifying and drawing on the (external) expertise of potentially very large crowds to improve prediction accuracy[94]. Deliberative platforms are also being explored to improve the quality of online-debate on potentially controversial, complex topics by using argument-mapping software and moderation systems.

EU Policy Lab, more information at: *https://blogs.ec.europa.eu/eupolicylab/*

2.2 So what does this mean for policy?

Collective intelligence approaches in government promise to improve the performance of teams and improve policymaking. Research on what drives collective intelligence confirms the importance of policymaking as a collective rather than an individual activity. In practice this is already largely the case, with a proliferation of committees, working groups, task forces and meetings at the heart of policymaking. However, the research shows that collective processes do not succeed automatically but require precise and careful design, training and the development of skills to avoid polarisation, group-think or poor decisions.

2.2.1 Developing groups into intelligent and effective teams

There is no scientific agreement on the optimal team structure for a working group. However, a diversity of reasoning styles, socio-demographic backgrounds, socially perceptive individuals (women are on average more socially perceptive[95]) and a range of views regarding the subject seems to provide the most fertile ground for the cultivation of collective intelligence.

> "Collective processes do not succeed automatically *but require precise and careful design, training and the development of skills.*"

While aligning goals and encouraging information sharing are essential to enhancing collective intelligence, research suggests that longer-term strategies also need to change. Hiring and staffing procedures, project-team composition, team-performance measurement[b] and monitoring as well as professional development could be addressed.

In addition to team structure, the process of day to day collaboration deserves careful attention. Policymakers could consider using and integrating the following techniques[96].

2.2.2 Tried and tested strategies to improve team collaboration and performance

Clearly structuring a group's task, e.g. by providing all relevant documents in good time before a meeting, enables members to deliberate more knowledgeably[97]. Conceptual tasks, according to some evidence, benefit from a high degree of self-leadership, but the optimal degree of inter-dependence between group members will be highly context specific[98].

There is growing empirical support that the use of methods to structure collaborative projects (e.g. soft systems methodology (SSM), strategic choice approach (SCA), cognitive Maps etc.) adds value, by supporting the creation of an objective and shared understanding of the underlying problem[99]. Nevertheless, concerns over the effectiveness of different methods remain.

Governments can apply deliberative software that visualises and maps arguments to more objectively synthesise information. This approach enables a more comprehensive exploration of potential policy solutions. Computer-aided

> Creating an environment of psychological safety is essential for the sharing *of critical information, ideas, questions and dissenting opinions.*

argument mapping (CAAM), software such as *Rationale* or *pol.is* visualises and explicitly infers relationships between arguments[100]. The use of such software as a tool for collaborative processes has great potential[101].

Creating an environment of psychological safety is essential for the sharing of critical information, ideas, questions and dissenting opinions. Psychological safety has been defined as a 'shared belief held by members of a team that the team is safe for interpersonal risk-taking in a climate of trust, care and mutual respect for competence[102].'Research supports a significant link between psychological safety, team learning and team performance. In the absence of psychological safe zones, people tend to refrain from sharing tacit information, asking for help, admitting a mistake or revising beliefs when afraid to lose face or appear incompetent[103]. It seems reasonable to expect a positive impact on a team's overall collective performance when team members share a feeling of psychological safety and are willing to take interpersonal-risk and responsibility[104]. This might also neutralise some group biases if information can be shared without fear of embarrassment, rejection or punishment. While relatively little research has been conducted about how best to create such safe environments in government, results from participatory leadership and mindfulness techniques suggest that these are promising practices[105].

Participatory leadership is a collective intelligence technique that enables group members to prioritise and perform leadership tasks for the collective according to agreed group rules and norms. Participatory leadership can yield better decisions when group members contribute different sources of knowledge and/or expertise and are considered competent in their respective domain(s) via better information sharing[106]. This is consistent with the importance of perspective diversity and independence of thought. A recent study also supports a positive link between participatory leadership and the emergence of collective intelligence, which can lead to higher decision quality[107].

Uncovering and clearly communicating relevant knowledge and the extent of team members' individual expertise, as well as explicitly assigning roles accordingly, can enhance group-performance[108].

Working effectively in an interdisciplinary environment, without shared theories, methodologies, assumptions or taxonomies is a difficult task. Expert teams are often poorly prepared for such collaboration as their thinking and knowledge structures are domain-specific. Making thought processes and assumptions

explicit can help to shape a more accurate and comprehensive understanding of an underlying policy issue[109]. Reaching informed consensus on the policy problem before weighing solutions would serve the development of political consensus and improve decision-making.

Group leaders can be trained, incentivised and evaluated based on group performance. Impact can be measured for: disseminating decision-relevant information, keeping people engaged in the discussion, moderating to ensure equal turn taking and the cultivation of group norms (psychological safety, civility, accountability)[110].

2.2.3 Tried and tested strategies to improve decisions

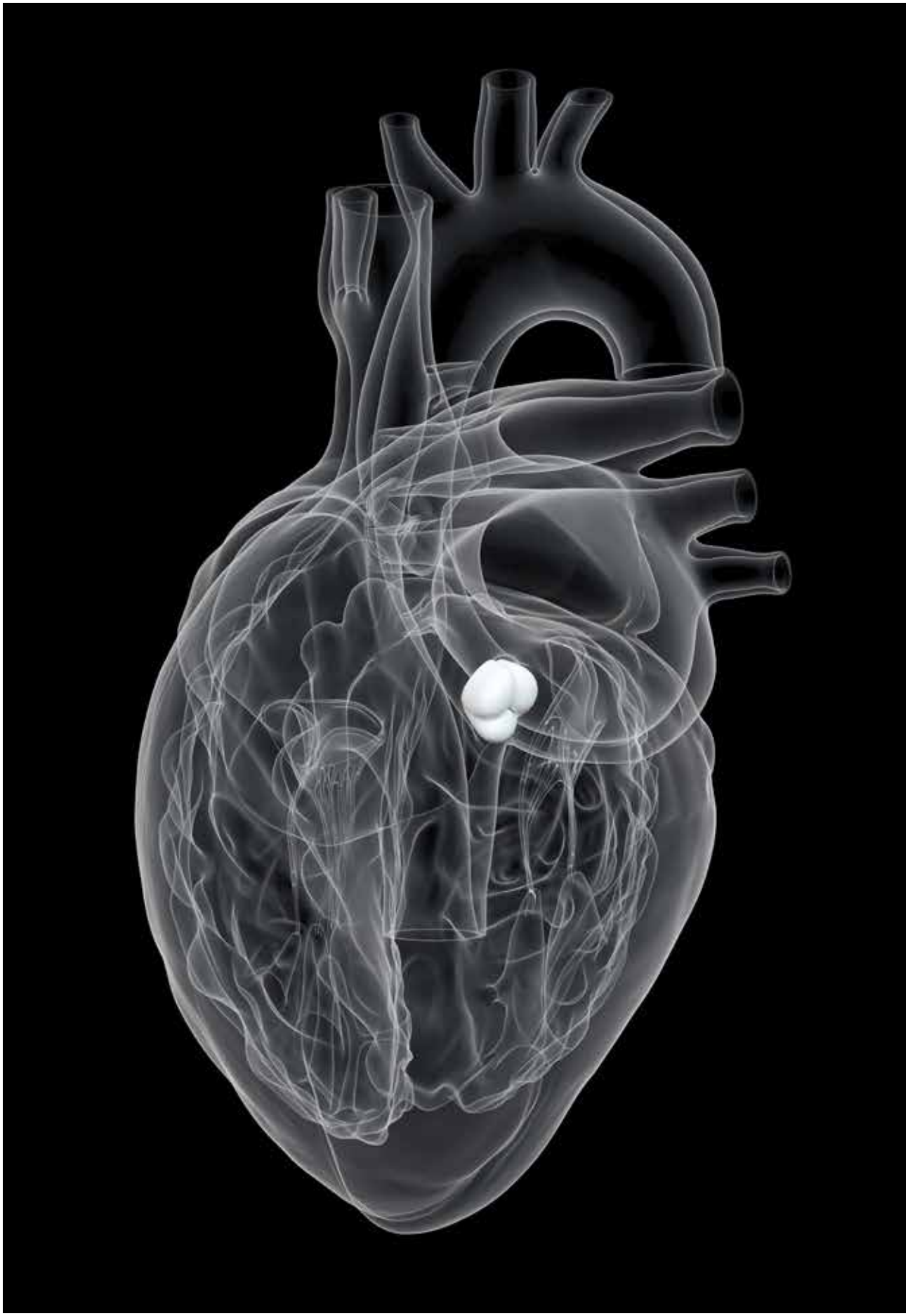
Groups can deliberately, formally or informally establish dissent, whereby a minority is regularly challenging the majority. Evidence shows that pre-discussion dissent among group members increases decision quality, through greater discussion intensity on a wider spectrum of knowledge. This is because people tend to withhold diverging and/or potentially controversial opinions[111]. Crucially however, a maximum range of dissenting options has to be expressed for a meaningful pre-discussion to take place. This will increase the probability that the optimal solution is considered[112]. Again, a wide spectrum of initial perspectives benefits the outcome.

Similarly, so-called *What if?* thinking, which assumes that the emerging course of action will fail in order to imagine potential causes and alternative paths, can be helpful. Counterfactual thinking can improve the dissemination of information and the quality of decisions made.

Creating scenarios using foresight techniques can help policymakers reason, anticipate and develop a better understanding of complex policy issues as well as the paths that lead to different plausible scenarios by embedding them into a social context. Research has shown that this approach can have a significant de-biasing effect as long as the scenario planning process is thoroughly executed[114].

Teams can systematically challenge their majority opinion through the *Devil's Advocate* method to deliberately establish dissent. Experimental research has found that the Devil's Advocate can effectively reduce tendencies to stick to failing courses of action and conformity pressures[115]. This requires an environment of psychological safety for the Devil's Advocate.

A similar instrument is *Red Teaming*, where distinct teams are tasked to identify shortcomings by applying a mix of critical and creative thinking techniques. An alternative to this is Collaborative Red Teams, which operate within the same team to consider multiple alternative perspectives[116]. This idea is supported by evidence that people are more willing to accept criticism from within their own group[117].



EMOTIONS

3.1 Key findings

3.1.1 Decisions are made of both emotion and reason

> *"The heart has its reasons, of which reason knows nothing..."*[c]
>
> Blaise Pascal - French mathematician, physicist, inventor, writer and Catholic theologian

We can't separate emotion from reason. Better information about citizens' emotions and greater emotional literacy could improve policymaking.

The widespread idea that emotion inevitably undermines reason, and that suppressing emotions automatically leads to better decisions is not supported scientifically: our decisions are made of both emotion and reason.

The study of emotion and reason has a long history, although until the twentieth century it was largely the preserve of philosophers, who saw emotion and reason as competitors[118]. More recent research has called this into question as researchers started to measure in a more systematic way the consequences of emotions on perception, attention and memory.

Research shows that people pay more attention and tend to remember emotionally-laden and threat-related information better than neutral information (e.g. angry faces capture our attention more efficiently than happy faces)[119]. It also shows that subliminal messages and simple contextual cues like music or images evoke emotions and can change behaviour[120].

The emergence of new neuroimaging techniques also point to a less binary picture of emotional and cognitive processes[121]. By providing evidence that emotion is an integral component of human decisions, science shows that emotion and reason are not necessarily antagonistic. Emotional and reasoning mechanisms evolved in the brain together and they complement and sustain each other[122]. They have worked together in a strongly interconnected, reciprocal and malleable relationship, to enhance our survival capacity[123]. These findings disprove the traditional idea[124] that emotion is an obstacle to reason that has to be excluded from decision-making.

3.1.2 Emotions are a kind of intelligence shaped by evolution[125]

A large body of research shows that emotions, moods and other contextual cues modulate perception, direct attention and affect what is remembered[126]. Recent theories grounded in evolution suggest that emotion and reason cannot

be meaningfully dissociated. This interaction can take many forms[127,d]. The evolutionary framework regards emotions as 'special modes of operation shaped by natural selection'[128] and emphasises their functions. Emerging scientific consensus is that, although emotion is experienced differently from conscious thought, there is hardly any decision that does not involve both emotion and reason. Hence, emotions are just as essential to decision-making as logical reasoning[129]. They are as likely to enhance rationality as to subvert it[130]. In other words, emotions are more rational than previously thought: humans not only feel, but also think with emotions and the best decisions combine reason and emotion[131].

If emotion cannot be meaningfully separated from reason, then it is also possible to exercise control over emotions by applying a variety of cognitive strategies[132]. For example, one strategy is to simply shift 'attention away from the source of distress'[133]; another is to reframe the meaning of an emotion in a more positive light, taking a distance from the object of the emotion[134].

The 'emotions revolution' in neuroscience has put 'emotional processes on an equal footing with cognitive ones'[135] by demonstrating that emotion and cognition are neither functionally nor anatomically different 'but are instead deeply interwoven in the fabric of the brain'[136]. However these insights are still not common knowledge and the mental model of the separation of reason and emotion is still very deeply held[137].

3.1.3 Emotions can have direct influence on political and moral reasoning

Initial unconscious and emotion-laden processing of information shapes all subsequent phases of thinking[138]. Emotional states exert powerful influences on our judgements and may distort them in an undesirable way. However, as powerful short-cuts, they allow rapid decisions on matters of complexity that would otherwise exceed the capacity of our reasoning[139]. Our reliance on emotions and physical sensations seems to increase as the surrounding environment becomes more complex, but also in risk-related decisions or contexts with high uncertainty[140]. The use of sensations as information may be much more frequent than is often assumed, as they can influence a wide variety of judgements, including risk estimates and attitudes toward political issues[141]: immediate emotional responses to bodily states are instinctive and have a vital role to play in decision-making[142].

> "Emotions are just as essential to decision-making as logical reasoning. *They are as likely to enhance rationality as to subvert it.*"

Additionally, new areas of research are attempting to show that individual differences of sensitivity to physical sensations may influence political attitudes and moral judgements[143]. Research on individual differences in sensing 'disgust', a powerful basic emotion essential for survival, and political preferences illustrates this argument.

Emerging evidence on the role of disgust suggests that not only 'momentary experience of disgust shift judgments in a politically conservative direction'[144] but also disgust sensitivity is associated with more stable moral and political attitudes. Disgust sensitivity seems to be connected to moral judgements and to broader political orientations, such as conservatism[145]. People with high disgust sensitivity show more tolerance to inequality, score higher on authoritarianism, and show decreased liking of ethnic, low status or deviant groups[146]. Furthermore, they often endorse stricter regulation across a wide range of political issues that belong to 'purity policies' focusing on maintaining health. For example, they are more likely to support organic foods and oppose genetically modified foods, support restrictions on cigarettes, and object to child vaccinations[147].

From an evolutionary point of view, disgust is a universal alarm system that motivates the avoidance of potential toxins. Since it is a protective emotion working outside conscious awareness, it is extremely difficult to override[148].

3.1.4 Stress impairs reasoning and favours intuition

Immediate physiological responses that involve emotional reactions, like stress can affect a broad range of social, reasoning, and physiological functions[149]. Exposure to stress limits working memory and impairs reasoning abilities. In addition there is evidence that greater cumulative life stress may impact reasoning. Although the relationship between stress and performance might not be linear, too much or too little stress is often detrimental to reasoning. Stress levels above the optimal, e.g. in the context

New Zealand's Prime Minister Jacinda Ardern attends the Friday prayers at Hagley Park outside Al-Noor mosque in Christchurch, New Zealand March 22, 2019. © REUTERS/Jorge Silva - stock.adobe.com

of perceived threats or when pushed to decide rapidly, may dramatically change decision-making strategies. Stress can make people switch from flexible reasoned deliberation and analytical reasoning to more intuitive processes to reach decisions. Such decision-making will naturally involve less conscious reasoning and may trigger emotional and affiliative preferences in some circumstances[150]. The finding that this modulating effect of stress is not limited to one particular domain suggests that stress generally favours habitual over reasoned learning and memory[151]. Also, individuals when stressed tend to be less likely to adjust their initial ruling, relying more on gut feelings in social situations and less on utilitarian judgements[152]. Although evidence is growing in this emerging field of study, the specific effects of stress on individual judgement and decision-making in different contexts are unclear.

3.1.5 Emotions shape how citizenship is practiced

While politicians routinely appeal to emotions in political campaigns, the research on how specific emotions actually shape political attitudes has only recently begun[153]. Positive and negative emotions seem to shape how citizens approach political issues and a growing body of evidence shows that different types of emotions have distinctive effects on information processing and political participation.

This work mostly focuses on anger and anxiety, two emotions that are central to contemporary political debates. Anger and anxiety are closely connected and appear to have similar causes, usually triggered by threat. However, there is growing evidence that they have distinct effects on political behaviour[154]. Anger generates greater political activism, though not necessarily greater thoughtful participation[155]. Anger is associated with 'partisan citizenship'[156] – since angry people are less likely to seek information and more likely to adopt a closed mind[157] (they are for example more likely to participate in protest marches than content-driven debates). Anger is an aversive feeling (similar to disgust and hatred), and when 'familiar aversive stimuli are encountered, people rely on previously learned routines to manage these situations'[158].

While familiar threats could activate anger, unfamiliar threats and situations where it is not easy to cope or assign blame, trigger anxiety. Anxiety is less mobilising than anger and may lead to a deeper processing of information and more deliberation since it increases information seeking and interest in learning about the subject[159]. Anxiety can also increase ambivalence towards a party that could moderate the effect of political polarisation[160].

Anger and anxiety have different impacts on the perceived risk of, and support for risky decisions. In certain contexts, anxiety enhances the perception of threat-related information, preference for low risk and willingness to endorse compromise[161]. Anger by contrast, generates higher support for existing views held, more risk-seeking and less desire for compromise[162].

Anxiety is associated with dissatisfaction with the quality of democracy and the failure to take the concerns of ordinary citizens into account. EU citizens, who are worried about the state of society) and are also economically anxious about their own economic situation (one-third to one-half of the population[163]), are less satisfied with EU politics. Anxious people are more likely feel closer to populist-right or far-right parties (or to deny having an affinity with any political party). They are also more likely to think that managing migration, fighting terrorism and securing citizen's rights should be the EU's main policy priorities in the coming years. However, a significant proportion of those who are pessimistic also say they have no close affinity with any political party[164].

3.1.6 Positive emotions are essential for social functioning and cooperation

Positive emotions signal pleasure in shared bonds and reinforce the drive towards collective action,

consequently the pain of social separation is a strong driver of social connection[165]. During development, the brain creates new neural circuits through human interaction. Empathy emerges at the 'interface of social interactions and internal feeling states' and helps cooperation with others[166]. It is essential for effective emotional and social functioning[167] and allows one to predict the actions and intentions of others[168], as well as motivating behaviour. Empathy has long been described as the ability to feel what someone else feels. Neurological research has shown that when seeing a face expressing a certain emotion, e.g. fear, the same brain areas are active as when experiencing the same emotion firsthand[169]. However, empathy involves more than an automatic emotional response to others, complex brain networks are activated[170]. People who show empathy are fully aware that it is not themselves but another person experiencing the emotion. Thus, self-awareness seems a necessary condition for the ability to empathise[171]. People show higher levels of empathy towards those more similar to themselves, members of the same group, or who are perceived to be fair[172].

3.1.7 Negative emotions hamper social functioning and cooperation

Several studies link pain and stress to impaired reasoning[173]. This is relevant to society as a whole because chronic pain affects at least 20 % of the adult population in Europe[174]. Loneliness, a form of 'social pain', is often considered by many as a terrible form of poverty and has severe consequences to health: mortality risks due to loneliness are comparable to those of obesity and smoking. Lonely people are more vulnerable and anxious and they are more likely to make pessimistic judgements and to feel more threatened by life situations than their 'non-lonely' counterparts. Loneliness is associated with political and social values as it can severely damage social cohesion *(Figure 4)*.

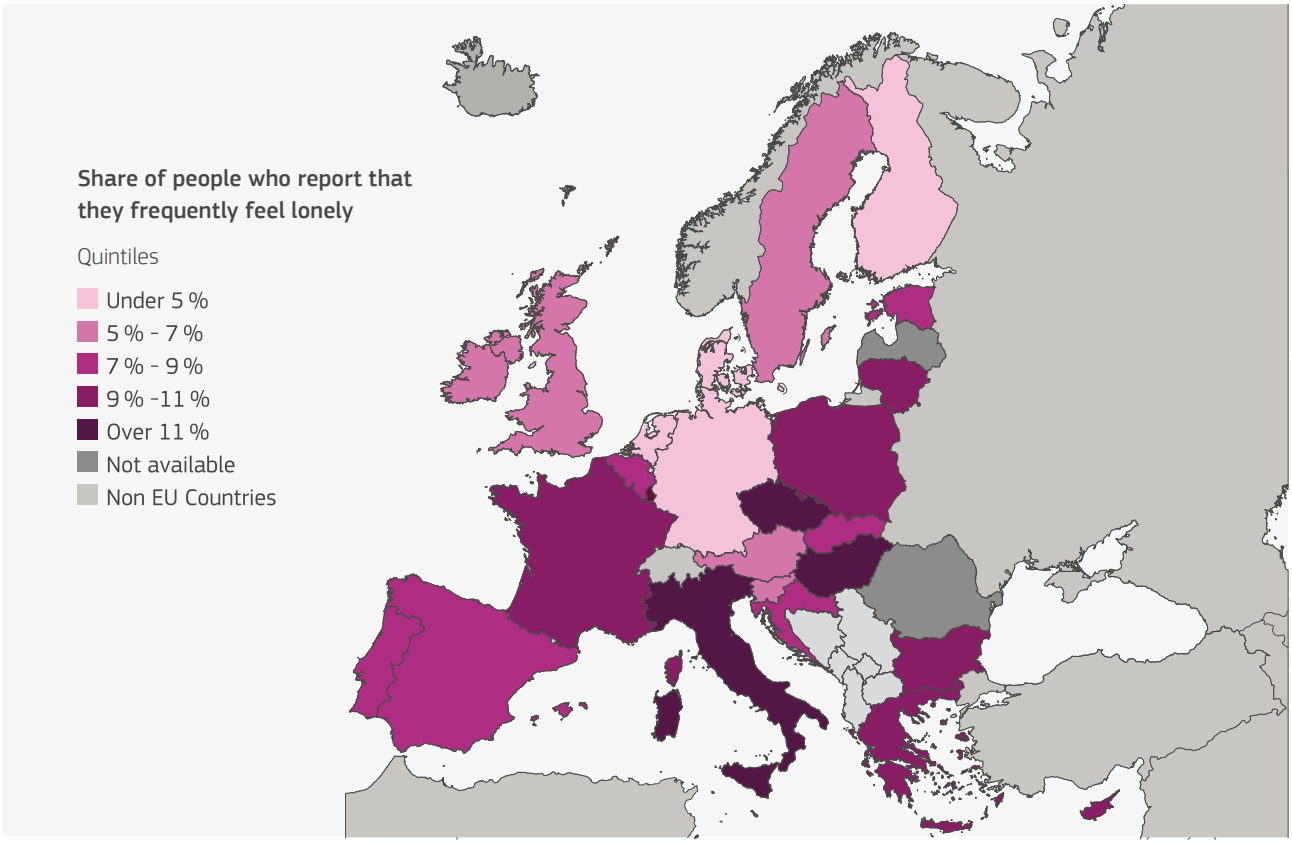


Figure 4: Prevalence of frequent loneliness across Europe
Source: JRC, 2019[175]

3.2 So what does this mean for policy?

3.2.1 Building a nervous system for policymakers

Changing policymaking into a system that is more sensitive to the emotions of both citizens and policymakers is essential. The fact that we cannot separate emotion from reason has important implications both how we integrate the emotions of policymakers into their decision-making but also how policymakers take into account the emotions of citizens, given how much they influence their political choices.

Citizens' political attitudes and behaviour are affected by emotions as well as their reason and perception of facts. While statistics and qualitative research provide policymakers with a detailed picture of the socio-economic reality of citizen's daily lives, this information does not capture their subjective lived experience and emotions as well, even if these may be more influential in their attitudes to the policy issue. The challenge is therefore to develop new tools to take the emotional temperature. Sensing citizens' concerns, fears, hopes and suffering more effectively could provide important new information to guide policy choices[176].

In particular fear or anger could be useful to sense better. Existing survey tools sometimes ask about issues of concern and these could be developed further. For example, Emotion Indicators (and maps[177]) could be developed by using text-mining and text-monitoring techniques of media and social media platforms. This could detect and classify emotions present in the media and aggregate them to obtain general levels of emotions expressed by citizens in different geographic locations. Even if assessed independently of the topic which these emotions are related to, this would be valuable information about discontent and happiness. These trend levels could subsequently be analysed in relation to socio-economic data to better identify connections to high level tensions that would remain invisible in a traditional analysis, e.g. the most 'anxious' geographical areas are not necessarily the poorest ones. These initiatives could be complemented by qualitative discourse analysis. This could help identify the most emotion-laden policy areas.

Pain and loneliness merit particular attention. Chronic pain is gaining recognition by both governments and healthcare professionals[178]. Since studies have linked pain-related negative emotions and stress to impaired reasoning. Pain is not only an inherently subjective but it also reflects culture and societal conditions. Measuring chronic pain could help identify struggling regions or demographics.

> "Sensing citizens' concerns, fears, hopes and suffering more effectively *could provide important new information to guide policy choices.*"

3.2.2 Emotional literacy training

Learning to acknowledge, integrate and use emotions, rather than trying to suppress them could be a central feature of training for policymakers. Greater emotional literacy from policymakers will in the first place make a significant contribution to improving collective decision-making and collaboration in government, given the important social intelligence communicated via the emotions and the importance of creating a safe psychological space for good collaboration. It can also improve the ability of organisations in government to learn, given that if people do not like each other, they are less likely to learn from each other. Skills to develop attention management and a more proactive way of dealing with negative emotions can enhance engagement, motivation and productivity both at individual and group levels.

Training in emotional literacy, through mindfulness and related techniques, is becoming increasingly widespread and has found its way into government, several parliaments in Europe and the Commission because it has the potential to change working habits both at personal and interpersonal levels. It can lead to better coping strategies, more goal-oriented and clear thinking in times of complex policy challenges. While research is still lacking, policymakers have reported personal benefits from techniques which focus on emotion regulation, impulse control, care and compassion. Training that aims to develop emotional literacy at the individual and collective level could be mainstreamed in policy organisations. Particular attention could be given to teaching these new skills to the next generation of policymakers. Such training could be coupled with learning about how the body and physical sensations influence the mind and decision-making, as part of a wider programme to develop critical thinking and meta-cognition skills.

3.2.3 Developing policies that respond to citizens' emotional needs

As well as improving the process of policymaking inside government, developing emotional literacy could also help to develop policies. Instead of seeing it as the job of civil servants to be technocratic and leaving it only to politicians to consider and respond to the emotions of the electorate, greater emotional literacy from all policymakers could help them to develop policy options that speak to citizens' emotional needs and values.

There may not be an alternative because even if policymakers eliminate emotion from their processes and communication, some actors could use emotions in a manipulative way to resonate with voters for their own ends. The power of anger and fear to drive political behaviour is already widely recognised. The challenge is to use emotions ethically and to re-invigorate the democratic process[179]. Communication that engages strong emotional responses, such as anger or fear, for example, should be justified with sound evidence. Politicians could consider talking about their own emotions about an issue more openly, as well as trying to elicit citizens' emotional reactions.

VALUES AND IDENTITY

4.1 Key findings

4.1.1 Group identity, values, worldviews, ideologies and personality traits influence political decisions

Political decisions are strongly influenced by group identity, values, worldviews, ideologies and personality traits. A pre-condition for the analysis of political choices and voting behaviours is therefore, understanding group identities and the values frameworks of people and political movements. Such frameworks however, are not properly understood, as a clear science of values is lacking. There is also no general consensus among scientists about what values are, as value theories differ. One main problem stems from the fact that values are mental constructs, which can only be inferred, and not measured directly[180].

4.1.2 Group identities are driven by values and worldviews

Human beings need to belong to groups. Recent developments in neuroscience have shown that this need can be as strong as the one for food and shelter[181]. This is because the human brain not only responds to physical, but also to social pain and pleasure[182].

When people join one (or multiple) group(s), it is in large part because they want to join like-minded people. This means that they share the groups' beliefs, values and worldviews. Belonging to one or more groups together with the emotional significance attached to that membership, contributes to form individuals' social identities[183].

> Values and identities drive political behaviour but are not properly understood or debated.

While people are usually members of multiple overlapping groups, political or partisan groups play a significant part in shaping identity. Political identity may be becoming more important than other identities for many people. If this is correct, it has important consequences for political behaviour. This is because evidence has shown that individuals make many political judgements but importantly, also non-political judgements along partisan lines[184]. This applies not only to politically-relevant information but also to people's approach towards scientific claims. Proposing evidence which aims to correct strongly partisan people's misperceptions therefore often fails to change false and unsubstantiated beliefs about politics[185].

Moreover, research from the US shows that individuals with a strong political orientation tend to be sceptical towards scientific evidence, particularly when it challenges their beliefs. Also, people who are highly politically knowledgeable are able to apply complex motivated reasoning processes to refute such scientific evidence[186].

There is currently an unresolved scientific debate between two different models of partisanship:

i) the *instrumental model*, which is based on ideological and policy considerations and

ii) the *expressive model* derived from social identity theory[187].

According to the *instrumental model*, individuals decide on their party affiliation through a combination of party performance evaluation, ideological beliefs and closeness to their preferred policies. This type of partisanship is based upon *rational choice theory*, which considers each individual's maximisation of utility[e] as the main driver of political decision-making.

The *expressive model* explains partisanship as 'an enduring identity strengthened by social affiliations to gender, religious, ethnic and racial groups'. These affiliations are characterised by an emotional attachment to the party, stability over time and are less influenced by short-term events. According to the theory, the choice of a political party follows identification with a social group. In short and in contrast to the *instrumental model*, individuals choose the party which they feel is closest to the group to which they belong.

The expressive model explains why political judgements are often made along partisan lines, and why party affiliations have such a strong influence on the way individuals process policy arguments. Individuals who identify as partisans apply, a 'party over policy'[188] approach, and can change their own preferences about certain policies in order to align them with the position of their preferred party[189]. Furthermore, individuals can bend their moral principles in keeping with their political party affiliation. This is done by addressing and judging the presumed immoral behaviour of politicians in a partisan manner, responding more negatively to violations made by politicians of a different party than the one they support[190].

4.1.3 Personality traits shape our political identity

Individuals are attracted to political ideologies because they satisfy three basic and interrelated psychological needs[191]:

1. Epistemic needs – offering a sense of certainty, predictability and control;

2. Existential needs – providing safety, security and reassurance; and

3. Relational needs or motives – through identity, belonging and shared reality.

Some ideologies satisfy certain needs better than others. There is increasing evidence that broad political orientations (ideologies) are influenced by two main opposing personality types: *open* and *closed*. The open type is typically associated with political liberalism (progressive), the closed type with political conservatism. These patterns are stable and cross-cultural[192].

For example, conservative ideologies are based on values like respect for tradition and order, which directly address the human needs to manage uncertainty and threat and therefore the desire to preserve the social system, while a liberal ideology strives to challenge it.

Similarly, individuals differ in the extent to which they emphasise values promoting individual rights, freedom, and diversity versus one aimed at protecting security and order.

However, these differences between personality types rarely manifest themselves in a binary way. Instead there is a spectrum associated with more 'open' or 'closed' characteristics. In the same way, political issues rarely present themselves as binary values choices; they often require trade-offs between values.

4.1.4 Deeply rooted values drive our political choices

The social psychologist Jonathan Haidt developed the moral foundations theory in the US political context, studying the belonging of citizens to political tendencies (conservatives vs liberal) according to the preferences expressed for six different moral foundations (Care, Fairness, Loyalty, Authority, Purity, Liberty). According to Haidt, those who can be identified as politically liberal (progressive), typically place a higher moral value on care and fairness than on the other moral foundations. Conservatives, by comparison place a higher value on authority and purity, although they put value on all six foundations. While not uncontested, this approach based on evolutionary psychology provides an interesting way to analyse values.

The values of European citizens have been studied and monitored for decades by various editions of the Eurobarometer, as well as by large scale surveys like the European Values Study (EVS) and the World Values Survey (WVS). Edition 89 of the 'Standard Eurobarometer', issued in March 2018, presents a dedicated section on European values. European citizens were asked to name their top three values out of a set of twelve values[f]. They ranked Peace, Human rights and Respect for human life as the most important values to them (individually), whereas the three values that best represent the European Union are Peace, Human rights and Democracy.

While Europeans generally hold similar values in most countries and across different demographic groups, there are clear differences concerning the acceptance of some values by some of these groups. For example, people over 75 years are less likely to name equality as one of their top three values than people aged 15–24 years (15 % vs 32 %). People who feel they belong to the upper class are far more likely to name democracy as one of their core values than people who feel they belong to the working class (55 % vs 23 %); on the other hand, they are far less likely to name respect

for human life as a core value in comparison to people who feel they belong to the working class (18% vs 40%).

The World Values Study (WVS) is a large-scale, cross-national, and longitudinal survey research program on basic human values. It has been repeated every nine years since 1981 in a variable number of countries. A considerable body of research has been produced based on WVS data. For instance, scientists found two fundamental value orientations[193]. The first runs along the 'Traditional/Secular-Rational' axis, reflecting the relatively religious and traditional values generally found in rural societies and the relatively secular, bureaucratic, and rational values found in urban, industrialised societies. The second orientation is 'Survival/Self-expression' which encompasses a wide range of beliefs and values, reflecting an intergenerational shift from the importance of economic and physical security, to an increasing focus on concerns of self-expression, subjective well-being and quality of life.

In 2019, the Open Society Foundation published results from the research project 'Voices on Values: How European publics and policy actors value an open society'. The report surveyed how European citizens in six countries (France, Germany, Greece, Hungary, Italy and Poland) rate values associated with open or closed societies. The survey asked citizens to evaluate seven attributes associated with more open societies and seven attributes of more closed societies[9]. Respondents were asked how essential each attribute was for a good society. The 14 attributes were randomly ordered.

The results show that while some individuals rate highly the values of open societies and poorly those of closed societies (and vice versa), almost half of the respondents in France and Germany and the majority of respondents in the other four countries gave either high scores to both open and closed society values or low scores to both.

As an explanation, the researchers state: 'To put it simply, there are many people for whom open and closed society attributes are not contradictory. They are happy to rate both as equally important or unimportant for a good society'.

Attributes associated with **MORE OPEN SOCIETIES**	Attributes associated with **MORE CLOSED SOCIETIES**
People who have recently come to live in [country] should be treated equally	As few immigrants as possible should come to [country]
Everyone can practise their religion	The government must ensure media reporting always reflects a positive image of [country]
Everyone can express their opinion	Everyone must respect the national values and norms of [country]
Government-critical groups and individuals can engage in dialogue with the government	Non-christians can only practise their religion at home or in their places of worship
The rights of minorities are protected	Same sex couples should not kiss in public
All political views can be represented in parliament	The views of the government always represent the views of the majority
Media can criticise the government	The right to citizenship in [country] is limited to people whose parents hold [country adjective] citizenship or are ethnically [country adjective]

Table 1: Attributes associated with open and closed societies
Source: Open Society Foundation[194]

Countries	Value scores percentage			
	High open society Low closed society	Low open society High closed society	High open society High closed society	Low open society Low closed society
Germany	50	3	44	3
France	41	6	48	5
Italy	29	3	65	3
Hungary	18	6	73	3
Greece	23	7	68	2
Poland	29	5	58	8
All	32	5	59	4

Table 2: Open society and closed society scores of all respondents in the six countries surveyed
Source: Open Society Foundation[195]

4.1.5 A more polarised political landscape?

Political polarisation has been increasing in recent years around the world. Some US findings show that while polarisation can be driven by economic inequality, group identification seems to be an even stronger determining factor[196]. While US politicians seem to be increasingly polarised in their opinion on economic issues, voters who identify themselves as politically engaged in one of the two main US parties are becoming polarised on moral issues[197].

A recent analysis on the results of surveys regularly conducted for more than 20 years by Pew Research Center provides further evidence on this phenomenon[198]. US citizens have been surveyed on 10 items (attitudes towards immigration, racial discrimination, peace, etc.) since 1994: while the differences between gender, age, religious, race and education groups have been relatively stable, the divides in the replies to the different surveys in terms of the two main political parties' affiliation have increased dramatically, from 15% in 1994 to 36% in 2017.

Polarisation is reinforced by 'identity alignment'. Individuals belong to multiple groups and when two or more identities align (e.g. concurrently belonging to a religious group and an ethnic minority or a political party), then a stronger tie emerges with the people who belong to the same groups and it is easier to develop a high degree of intolerance and anger towards others (the 'outgroup(s)')[199].

A good illustration is the debate about climate change. Several researchers have observed how citizens with high levels of scientific literacy and belonging to groups were highly polarised and prone to believe in the claims most in line with those held by other group members, shaping their beliefs along political and religious lines. Further evidence shows a higher ideological divide on the issue of global warming among individuals who are more knowledgeable about politics, energy and science[200].

While insights about political behaviour from the US cannot simply be read-across, because of the important role the political ecosystem plays in focusing values and identity, political polarisation has also been on the rise in Europe. The increased electoral scores of extremist parties have resulted in a new 'tripolar political space'[201]. The two historically dominant political poles – centre-right and centre-left – are now challenged by a third pole represented predominantly by the far right, see *Table 1*.

While there is an economic dimension, the cultural dimension to the political conflict seems to be

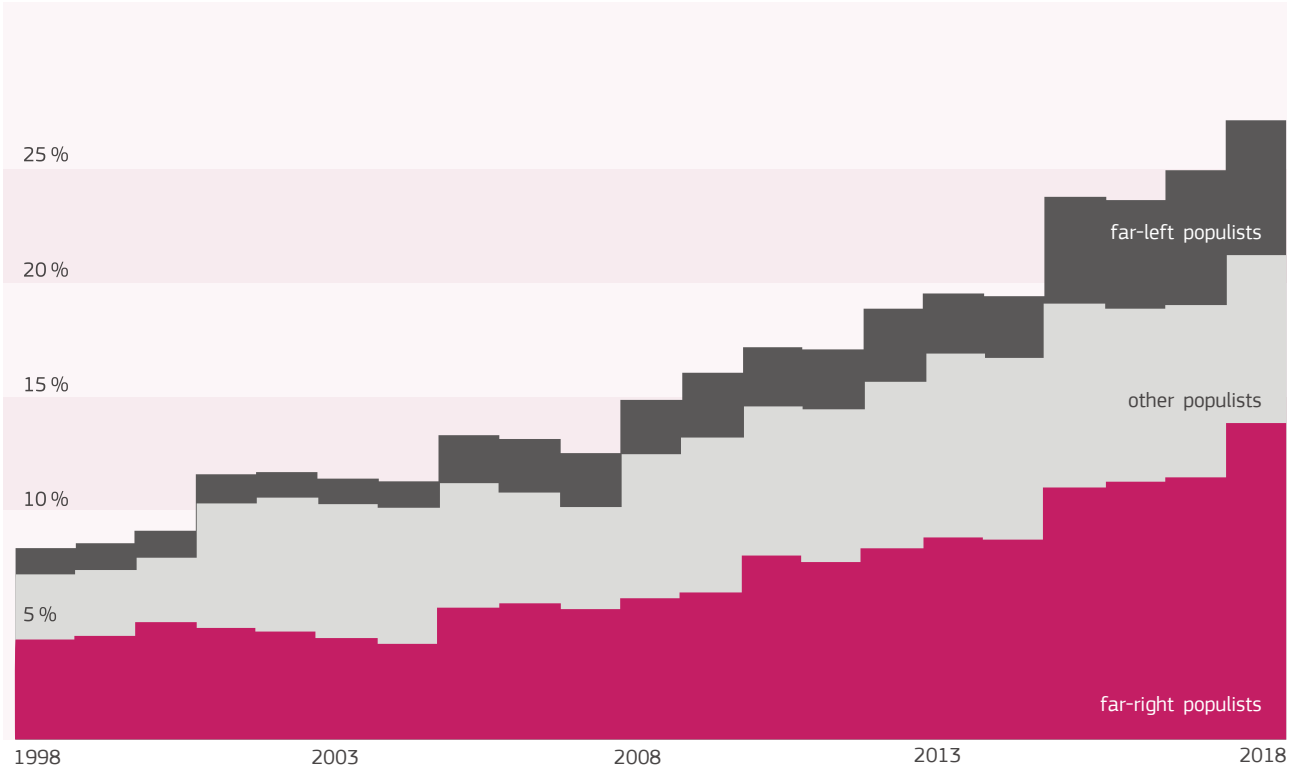


Figure 5: Combined vote share by year for 31 European countries, 1998-2018
Source: Oesch and Rennwald, 2018[202]

in the ascendant. A new form of polarisation has emerged, with the far right opposing both centre-left and centre-right over issues related to immigration, multiculturalism, European integration and attitudes towards European values. Most far right politicians, often defined as 'authoritarian populists', seem to share a worldview which openly questions certain liberal values and social cohesion in multicultural societies. They challenge the idea of an open and cosmopolitan society by proposing more national solutions, by calling for the defence of national identity to tackle the challenges posed by economic crises, globalisation and migration.

Several political ideologies currently compete in the EU political sphere, each embedding different values propositions. These range from those explicitly embracing EU values (e.g. tolerance, equality, support of the Single Market, etc.), to the ones of anti-EU and euro-sceptic movements (promoting nationalistic and xenophobic agendas and opposing further EU-integration). Moreover, today there is consensus among analysts that political divides are ambiguous and can go along multiple axes, involving tribal clashes between different political group identities.

Such cultural, values-based clashes have become more salient in recent years as European societies have become more heterogeneous. A recent analysis issued by the UN Migration Agency argues that opposition to immigration is stronger in people who endorse authoritarian values, like strict childrearing or support for death penalty[203]. Such attitudes show a much stronger correlation with opposition to immigration than income or class.

4.2 So what does this mean for public policy?

4.2.1 Consider values at the beginning of the policymaking cycle

Values are so important in driving political behaviour that they need to be considered from the initial development stages of the policy cycle through to the communication and information

stages. Values strongly influence not only our political behaviour but also our perceptions about facts. They appear to have some sort of a basis in our personality, identity and psychology and it is unclear how they change at an individual level or whether change happens at a societal level. Three types of change may occur:

- Period effect: attitudes of a whole population change in a similar way over the same period of time
- Lifecycle effect: people change their attitudes as they age i.e. attitudes can be shifted by certain stages in people's lives or life events
- Cohort effect: age cohorts show different views and these stay different over time.

At both individual and collective levels, it is also unclear to what extent reasoning can change values preferences. Whatever the answer to these questions, a deep understanding of specific values engaged by each political issue seems to be an indispensable part of policymaking throughout the policy cycle.

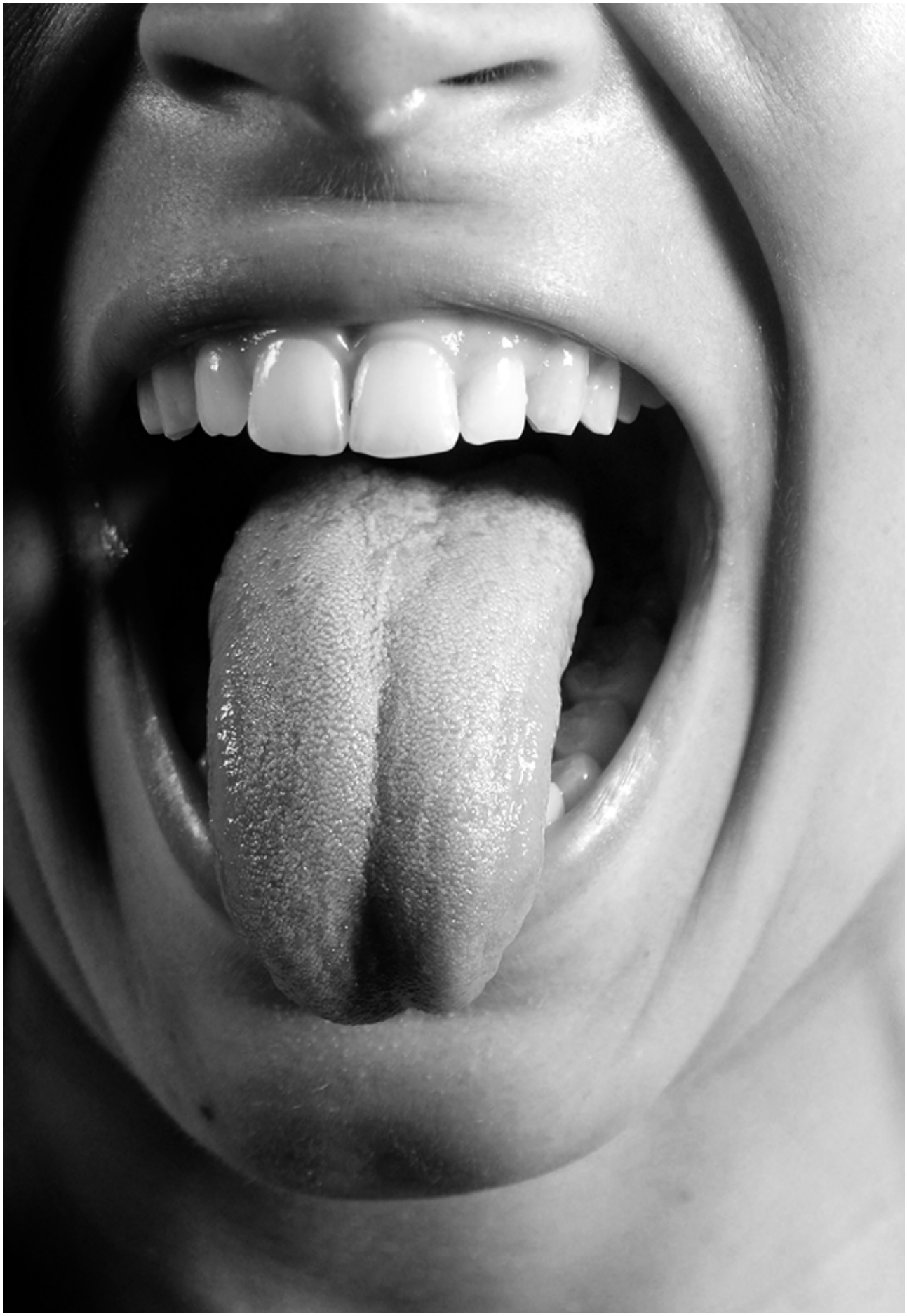
The importance of values in both political discourse and in the policymaking process is hardly new. Politicians regularly make appeals to values and often articulate their goals in values terms. The EU's founding treaties and national constitutions articulate fundamental values. Policy decisions also inevitably involve making complex value trade-offs. The challenge is that the tools to analyse and debate values are not as well developed as, say the tools to analyse economic and social impacts.

This is not surprising. As the previous analysis shows, there are multiple different frameworks for analysing values. There is no general consensus about what values are, as value theories, definitions and frameworks differ according to discipline as well as within the same discipline.

Without this consensus, it is hard to consistently analyse policy issues in values terms and provide some firmer ground for policymakers to make the necessary trade-offs. As set out in Chapter 10, the JRC has started a project to develop such a practical analytical framework that could be used by policymakers in a way analogous to current regulatory, environmental, or socio-economic impact assessment tools.

4.2.2 Understanding your own values and those of citizens

The apparently fundamental basis of values in our personalities, identities and psychologies also suggests that policymakers and scientists should take great care to not assume that their own values preferences are universally shared by all citizens. This requires an empathetic leap because the emotional component of our values make it hard to put ourselves in the shoes of those with different values. Developing emotional literacy as well as greater engagement with citizens on values questions will help policymakers take into account the full spectrum of values that exist on a particular issue.



FRAMING, METAPHOR AND NARRATIVE

5.1 Key findings

5.1.1 The human brain is primed to seek out patterns to construct meaning[204]

The ancient Greeks looked at the stars, 'joined the dots' in a way that was coherent for their geographic and social environment and saw a great hunter. The Lakota Native Americans, Tayamnicankhu looked at the same stars and saw the spine of a bison. This search for meaning gives power to the narrator who most effectively describes the world and its problems. Mastering the use of metaphor, framing and storytelling is essential as it can determine understanding[206].

So how can metaphors, framing and narratives best serve political decision-making?
The importance of this cannot be underestimated. Many observers of the debates on the rise of authoritarian populism in the EU and US have discussed the role of compelling narratives in constructing and circulating populist discourses, propaganda and Euroscepticism by both institutional and individual actors[207].

5.1.2 Communicating using frames

Framing is much more than a sophisticated communication tool. However, much of the scientific literature specifically refers to framing in a communications context e.g. 'to frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation'[208].

Facts don't speak for themselves. Framing, metaphors and narratives need to be used responsibly if evidence is to be heard and understood.

"There is always another way to say the same thing that doesn't look at all like the way you said it before."

Richard P. Feynman - The Nobel Prize Laureate for Physics, 1965

Frames are more than communication tools – they are mental models or heuristics that shape the way the world is viewed. They are generally understood to be knowledge that:

i) highlights a specific view of the world;

ii) uses a specific choice of words; and

iii) generates a specific set of expectations and attitudes [209].

There is no such thing as a neutral frame; something is included at the expense of something else being excluded. Consequently, understanding is frame dependent and the ways in which scientific results or policy problems are presented can substantially influence beliefs about the matter at hand.

Many frames are based on the following formulation:

- Values-based - this frame addresses underlying values to motivate them to engage in a desired behaviour.
- Gain - this frame focuses on what users will gain from engaging (or not engaging) in a particular behaviour.
- Loss – this frame focuses on what users will lose from engaging (or not engaging) in a particular behaviour.

EXAMPLE BOX 1 illustrates risk-averse over risk-prone framing alternatives [210]

In their 1981 experiment, scientists Tversky and Kahneman showed that there is a strong dependence on rational choice in the way a problem is formulated. They framed the same problem - the outbreak of an Asian disease in the US – as follows:

'Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. One possible program to combat the disease has been proposed. Assume that the exact scientific estimate of the consequences of this program is as follows:'

Some subjects were presented with options A and B:

A: If this program is adopted, 200 people will be saved.

B: If this program is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved.

Other subjects are presented with options C and D:

C: If this program is adopted, 400 people will die.

D: If this program is adopted, there is a one-third probability that nobody will die and a two-thirds probability that 600 people will die.

The experiment amongst students showed that subjects were risk averse for gains (72% of participants chose option A) and risk-seeking for losses (22% of participants chose option C).

In 2018, scientists repeated the study with 154 politicians across three national parliaments: the Belgian Federal Parliament, the Canadian House of Commons and the Israeli Knesset.

80% of the participants chose the risk-averse alternative. However, politicians were 38 percentage points more likely to choose the risky option if information was framed in terms of potential deaths, compared to lives saved.

Given the extent that losses loom larger than gains[211], one might expect loss-framed appeals to be more effective than gain-framed appeals. However, research on message framing does not support either a weak or strong link to loss aversion. In a meta-analysis of 93 studies involving over 20 000 participants in health-related messaging experiments, researchers did not find a single context where loss-framed appeals[212] had statistically greater persuasive power than gain framed appeals. Gain-framed appeals were actually found to be statistically more persuasive than loss-framed appeals in disease prevention messages[213].

Experimental research with policymakers about the impacts of framing is an important and growing area of investigation. One study from 2017 showed that 233 local Danish politicians were much less likely to correctly identify whether a public or private school was performing better when the answer was framed to clash with their values preferences[214].

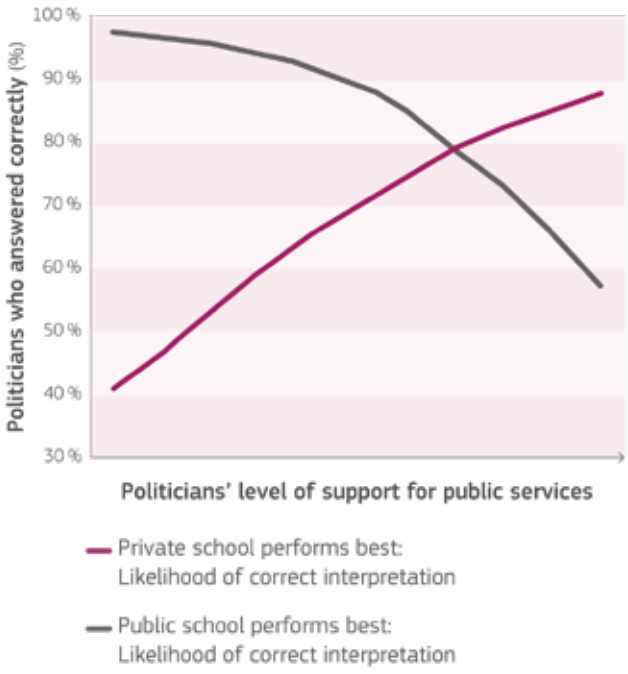


Figure 6: Relationship between prior attitudes and correct interpretations of statistical data among 233 Danish politicians.
Source: Baekgaard et al (2017)

Furthermore, exploratory research shows that experimental participants were influenced by strategies that framed issues in terms of their core values[215]. Importantly, this research highlights that framing fails when the source using the frame is not considered credible. A further study shows that only a seemingly credible source can use a frame to alter the perceived importance of different considerations that affect overall opinion, suggesting that perceived source credibility is a pre-requisite to frame successfully[216].

Therefore, it is not the side with the most or best facts that wins an argument, but the one that provides the most plausible scenario that feels intuitively reliable, communicated by a perceived credible source[217]. Consequently, those involved in policymaking need to very carefully consider the identity of the messenger as well as the message [218].

5.1.3 Metaphor – more than a figure of speech

On average, people use about 5 metaphors for every 100 words of text and approximately 2 novel and 4 frozen metaphors (e.g., leg of a table) per minute while talking [219]. From a communications perspective, metaphors have three main functions: (a) to speak of complicated things in a simple manner, (b) to communicate faster and more efficiently, and (c) to describe internal states and experiences accurately and expressively [220].

However, many experts argue that metaphors should not only be consigned to the domains of literature, rhetoric and philosophy. Decades of research by cognitive linguistics and the broader psychology community have demonstrated that metaphors help people to talk, reason, and structure their world. They operate both at the linguistic and the conceptual level, determining not only how things are said, but how they are understood and subsequently acted upon [221].

Metaphor (from the Greek *metapherein*, meaning 'transference') is a persuasive linguistic device; it explores the connection between two different concepts providing a partial mapping that highlights some features of meaning while hiding others; it allows people to see and understand certain things but also prevents them from considering anything which does not fit into the concept[222]. If used sufficiently within a community, metaphors can shape the way people think about the world[223].

Metaphors draw upon existing practical knowledge by triggering attitudes and emotion. Neuroscience has shown that the puzzling required to bridge the two conceptual ideas in a metaphor, connects with emotional centres in the brain associated with pleasure. As a result, experts argue that it is not possible to translate metaphorical meaning into literal language[224].

Metaphorical connections closely resemble thinking about abstract concepts. Using metaphors can help facilitate engagement with people in more personal and intuitive ways. Feedback in turn, can be richer, as the use of metaphors encourages inferences to be made about the concepts being explored.

Metaphors are often used to frame political issues, and these metaphorical frames are argued to affect how people reason on these issues[225].

EXAMPLE BOX 2

When the metaphor 'a natural disaster' (e.g; a 'flood' of migrants) is used to refer to immigration, elements from the source domain of 'disaster' are mapped onto the target domain of 'immigration', providing a negative image of immigration.

Politicians use metaphors to characterise themselves, their opponents, and their political agendas, and use metaphorical language in political debates to steer citizens towards a certain viewpoint[226].

5.1.4 The power of narrative and storytelling

> *"Stories constitute the single most powerful weapon in a leader's arsenal."*
>
> Howard Gardner, Professor of Cognition and Education at the Harvard Graduate School of Education

Life is rich with narratives. Humans have been developing language and transferring knowledge to future generations through stories for more than 100 000 years. Cave paintings dating back 27 000 years are proof of our longstanding capacity to conceptualise ideas and communicate through image and narrative[227]. Recent research shows that the much loved fairy tale 'Jack and the Beanstalk', thought to be centuries old, actually dates back over 5 000 years[228]. In short, mankind is the storytelling animal[229].

There is emerging research on the Narrative Policy Framework (NPF) that starts from the premise that because people universally narrate, understanding narrative is the best way to understand meaning-making within the policy process. Initial findings show that narratives, consisting of a setting, characters, plot, and moral can produce a measurable policy impact[234].

Importantly this work seems to suggest that narratives are most effective – and result in action – when reinforcing existing beliefs[235]. These congruent narratives are found to strengthen policy beliefs, increase the likelihood of accepting new policies, favourably structure how people recall policy consequential information and lead to increased empathy[236].

However, reactions to stories go further than emotion and reasoning, there are physiological mechanisms at play which should be considered when developing narratives[237].

Building suspense through narrative induces higher levels of dopamine in the brain which are known to increase focus, motivation and memory retention. When empathy is created through storytelling, pro-social behaviour is a result of the increased levels of oxytocin in the brain which incites generosity, trust and bonding. The increased endorphin response to funny stories results in greater focus, creativity and levels of relaxation. Importantly, there are emerging empirical studies that suggest emotionally engaging narratives inspire post-narrative actions[238].

Conversely, when narratives result in higher levels of cortisol and adrenaline being produced, through frightening or stressful stories, people become intolerant, irritable, uncreative, critical and most importantly, poorer at taking decisions.

5.1.5 The noble art of rhetoric

Rhetoric is sometimes seen as a dark or manipulative. But its origins in Ancient Greece can help us see that it is not necessarily so and is in fact a vital skill in ensuring that knowledge is not only heard but understood. Aristotle defines rhetoric as an ability to see the available means of persuasion which he classified as three principles or appeals: logos, ethos, and pathos.

- Ethos is persuasion through the authority of the author / speaker / rhetor.
- Logos is persuasion through the use of logic and facts.
- Pathos is persuasion through the use of emotion and sympathy.

The rhetor – the party that is attempting to persuade – uses the three appeals with their audience – the party that is the target of persuasion. It is not necessary for every act of persuasion to make use of all three appeals. Often, however, there is some element of each[239].

Studies from a range of areas, including risk perception, persuasion, and behaviour change, highlight the importance of emotional engagement for motivating public response to societal issues, it is therefore important to understand how emotions can be legitimately stimulated[240].

In terms of political decision-making, persuasive communication is aimed at altering the subjective beliefs that the audience holds towards a particular political issue or policy. Creating convincing arguments and discourse worthy of the public's beliefs is therefore critical to persuasion.

5.1.6 Using advanced communication techniques ethically

As some of the most effective advocacy strategies may see evidence being misused or manipulated[241], there is a need to address the possible ethical implications of using these techniques and their potential consequences in a democratic process[242].

Much can be learned from what not to do. In particular the field of Policy Studies research provides valuable insights about how evidence can intentionally and unintentionally be privileged by:

i) choosing the order in which issues are to be considered;

ii) refusing to engage in debate with competitors and

iii) framing issues to minimise attention, or maximise the convergence between evidence and the rhetorical devices of cynical politicians[243].

Policy actors in turn, can exercise power to draw attention to some issues and their framing of the issues as policy problems, at the expense of most others.

To overcome these potential issues, openness and transparency about the techniques being used are required by all actors at all stages of the decision-making process.

5.2 So what does this mean for policy?

5.2.1 Embrace subjectivity

The importance of framing, narrative and metaphor in communicating both science and policy mean that their use cannot be ignored. Indeed, their use is inevitable, given that a neutral framing of facts or policy is not possible and that narrative and metaphors are so deeply encoded in the very language used to communicate. Too strong a belief in the ability to neutrally frame and express information may in fact be counter-productive in that it makes the communicator less conscious of their own frames and orldviews, expressed through the language and stories used.

The key challenge is therefore to identify how to pay more attention to framing, narratives and metaphors in an ethical way. Crucially all versions of different communications on a single topic could be made publicly available and easily accessible for public scrutiny. Due diligence should ensure that there are no contradictory messages between different tailored communications.

When determining if persuasion techniques are appropriate to facilitating understanding, a clear designation of roles (either issue advocates or knowledge brokers) and purposes (to persuade or to facilitate comprehension) must be established. Persuasion can work where there is a high consensus that science 'can justify the best course of action', in particular for emergency action. Otherwise, using stories in science or evidence communication in policy contexts could have the purpose to 'facilitate discussion towards informed policy', to state underpinning values, to increase comprehension of policy problems and available evidence and to expand policy options through dialogue.

5.2.2 Your frame, their values

Having established frames that speak to different value-sets, it is important not to adopt the frames of others which can risk making a marginal discourse mainstream; of particular relevance to swing voters who can be easily influenced by reframing techniques. Reframing and the activation of new frames can be an everyday tool and a pillar of a communication strategy. The key to framing both science and policy lies in the advice of George Lakoff: 'always frame with values'. The ability to adopt effective frames that resonate with different groups therefore is dependent on the work set out earlier in this report on values.

5.2.3 Cultural adaptation

In support of the selected frames is the appropriate use of language and imagery. Both are always highly culturally and linguistically specific. Robust research is required to determine which messages, metaphors and linguistic devices resonate with the intended audience and result in optimal understanding. This is more than translation, to meaningfully engage, one needs to adapt at the cultural level.

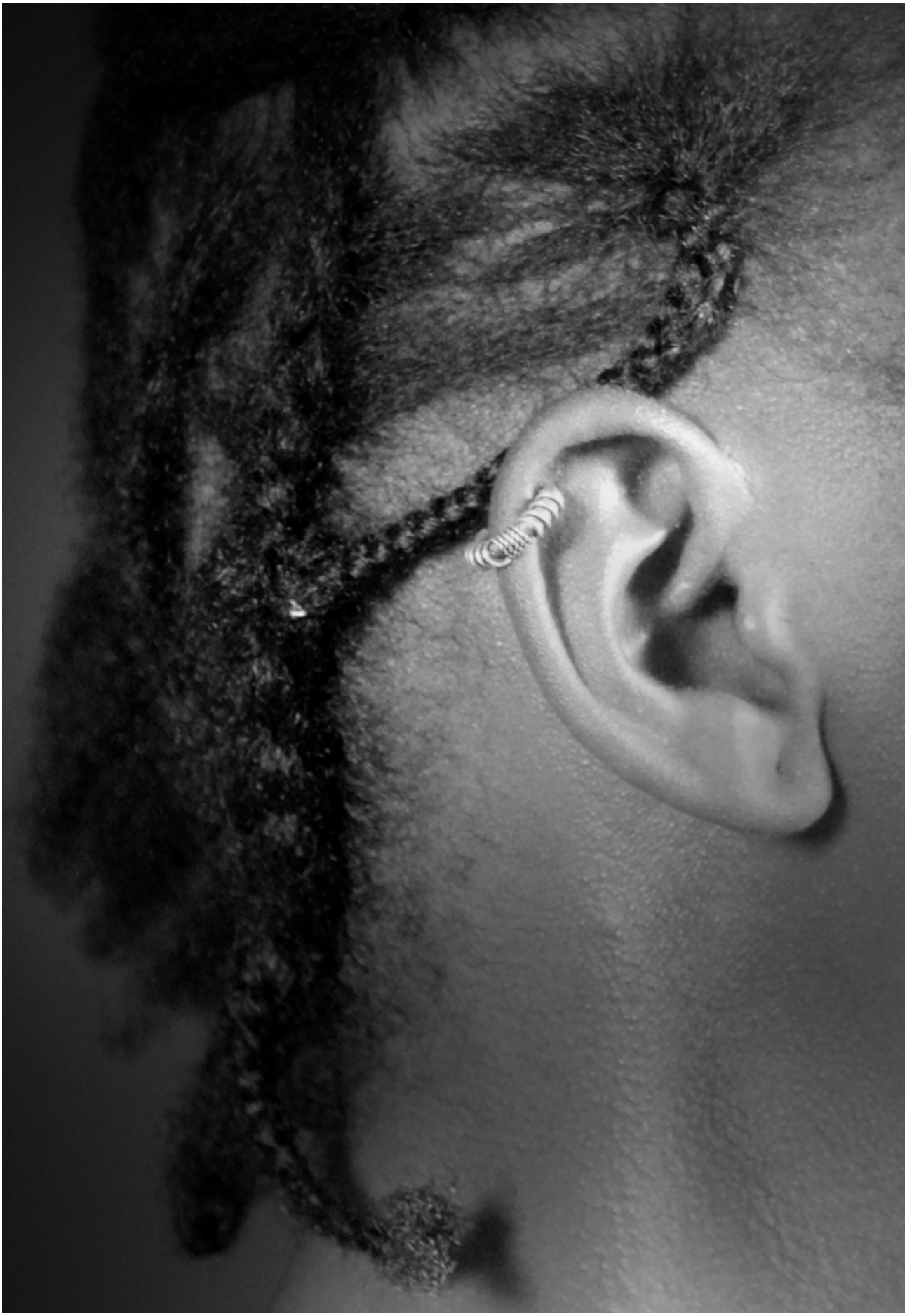
Given that frames, narratives and metaphors are bound by both cultural context and social structures, engagement with citizens can help in designing 'productive narratives' to address public

misperceptions or different understandings of policy issues. In order to design a communication campaign in support of better policies for older people, for instance, useful steps in addressing ageism included measuring citizens' associations with specific terms ('older adult' was considered to have more competence than 'senior'), avoiding communication traps (knowing which narratives close or side-line the conversation), testing multiple positive narratives using demographic variables so as to establish which one would gain most support and use it in framing public communication messages. The use of small stories in deliberative settings can provide valuable insights into citizen preferences and increase trust in the process.

5.2.4 Evidence-informed policymaking is a political endeavour

Finally and specifically for scientists, it needs to be recognised that communication for policy is a political exercise that involves making choices about how to frame evidence to issues; it is not simply a requirement to reduce the length of a report and write in plain language. Nevertheless, accuracy in communication and integrity with respect to the knowledge-based understandings, needs to be maintained and the inherent uncertainty relating to any technical issue, should be respected, resisting any tendency to engage in either false balance or exaggeration.

2018 G7 meeting – official photographs from (clockwise) Germany, Italy, France and Canada.



TRUST AND OPENNESS

6.1 Key findings

6.1.1 Trust in scientists and the scientific community

Scientists as a group are among the most trusted in society[244]. However, the authority of scientific evidence to help resolve political debates is being challenged. This comes at a time of political polarisation when the need for trusted sources of expertise is particularly high, as the role of traditional information 'gatekeepers' is weakened[245]. Trustworthiness depends on expertise, honesty and shared interests and values[246].

While trust in scientists as a group in abstract terms may be relatively high, from a long term perspective, any erosion in the authority of science on a specific issue will make it harder to solve the issue. To evaluate the concept of trust in science accurately, it is necessary to consider not only scientists, but also the scientific method, scientific organisations and more widely science as social system[247].

Research on trustworthiness provides valuable insights into how to address this erosion. Trustworthiness is not only about the competence or excellence of science. People are sensitive to both expertise and honesty of a source of information, distinguishing between them in their judgements of trustworthiness[248]. Both are needed to be credible and people expect more honesty from experts than others.

> The erosion of trust in experts and in government can only be addressed by greater honesty and public deliberation about interests and values.

Most of what anyone knows or believes about the world comes by definition from the statements of others, so trust and trust-worthiness are essential[249]. As philosophers have argued, statements are by themselves not evidence to verify any belief, but rather are a promise[250]. Experts are therefore implicitly promising to give their expertise accurately, carefully, critically and without interests. While an expert may be recognised in a certain field, it is much harder to assess whether the expert does in fact have expertise on the issue. For example a renowned expert on meteorology may not be recognised as an expert on climate change but might have relevant expertise. Deciding whether the expert has relevant expertise, means knowing what they know as well as understanding the issue in question. This is a complex and increasingly difficult task as knowledge grows and disciplines become more silo-ed.

6.1.2 Shared interests with the expert are important for trust [251]

Evidence also supports the idea that people listen more to the opinion of politically like-minded persons even on non-political topics and assume that someone sharing the same political perspective is more competent in unrelated tasks[252]. This can lead to the creation of echo chambers and judgment errors and has significant implications for those tasked with providing evidence to policymakers.

In the United States, conservatives report a declining trust in science as an institution over recent decades, while this is not shared by liberals (progressives)[253]. In Europe, Eurobarometer statistics from 1989 to 2005, during the pre-online-misinformation age do not show a significant ideological difference in scientific understanding. However, data on trust in science in Europe in relation to political preferences is limited. The 2010 'Special Eurobarometer' found that nearly three in five (58%) Europeans think that scientists are increasingly dependent on industry funding resulting in less trust[254]. By contrast, the 2014 'Special Eurobarometer' found more than half of respondents stated that they expect a positive impact on a variety of policy relevant areas through science and technology over the next 15 years[255].

6.1.3 The reality is science is *not* value-free

The ideal of value-free science is that it should be disinterested, impartial, objective, rational, morally neutral, and/or asocial.

If this ideal could easily be achieved and the scientific process was consequentially entirely value free, the relationship between science and political decision-making would be straightforward. Science would simply provide the relevant objective facts and political decision-makers would use facts, to take action.

The reality is more complex. Values may enter the scientific process when:

- researchers begin with an orientation on the background interests animating the field;
- frame a question informed by those interests;
- articulate a conception of the object they study;
- decide what types of data to collect;
- establish and carry out data sampling or generation procedures;
- analyse their data in accordance with chosen techniques;
- decide when to stop analysing their data; and
- draw conclusions from their analyses[256] and frame their result according to values[257].

It is hard to generalise about the extent to which different sciences approach the value-free ideal but it seems clear that this is easier to achieve within natural sciences and relatively harder within social sciences.

Cultural norms and background assumptions, have affected scientific processes and outcomes in fields ranging from primatology, human evolution and development to statistics and even physics. There are numerous cases of studies on topics like asthma, obesity or other diseases where cultural assumptions about default populations, categorisations by race and low participation of minorities in medical research skew results. Still it is thanks to the scientific method itself that society has been able to uncover these distortions and consequently progress towards the value-free ideal.

The difficulty of achieving the value-free ideal does not mean that science cannot be trusted or that the scientific method is at fault. Instead, it simply means that there is a need to be more transparent about the role of values in science, since scientists must usually make some value judgments and values are inevitably a part of the processes of scientific knowledge production[258].

6.1.4 Balancing risk and uncertainty

Science involves balancing scientists' confidence in their results against their understanding of the risks to society if those results are incorrect[259] Science is a social enterprise and consequently, scientists are deeply embedded in society[260]. In particular, when scientists advise on policy issues, their judgment includes value considerations in how they communicate evidence, for instance by choosing what results are emphasised, how those results are presented, which results are deemed reliable and which erroneous[261]. In light of this, greater transparency about values can play a legitimate and critical role in enabling science and expertise to be seen as trustworthy[262].

6.1.5 Opening evidence to public scrutiny is crucial to maintain scientific authority

The choice of experts and the extent to which expert judgement should have a privileged role is crucial for a democratic system to address[263]. The processes and jargon of science can be perceived as elitist or as being driven by particular interests. The authority of science is not a given, historical accounts prove the need for continuous public debate on the future role of science in society[264]. Opening up to public scrutiny can reinforce support for expertise[265].

Deliberative democracy and citizen engagement can be effective responses to the loss of trust in democratic institutions. Despite an abundance of platforms, discussions on these platforms are prone to fall short on factual accuracy. Discussing controversial issues in public or online often ends in polarised debates which harms trust in democratic institutions. These trends seem unlikely to diminish in the near future so policymaking bodies need to urgently find new ways to engage differently in discussions with citizens.

Dialogue via deliberative and co-creation techniques both face-to-face and online can effectively support both policymakers and scientists in cultivating civil and informed discourse[266]. They can also resolve disagreements on controversial issues through listening and learning from citizens and other stakeholders, and sharing of different perspectives[267].

There is robust evidence showing that engaging with citizens via e.g. citizen' assemblies, juries or large scale online deliberation are effective means to support citizens and policymakers. They are also an opportunity to enhance representative democracy in the face of populism, public distrust and illiberal tendencies[268]. Deliberation can help citizens and policymakers make sense of complexity in policy and societal issues, increasing understanding about the trade-offs that need to be made for policy-options.

Deliberation and citizen engagement is not easy. Ensuring a meaningful, civilised dialogue in a polarised environment is also resource intensive, requiring careful design and moderation[269]. Evidence suggests that deliberative processes are more inclusive partly because of non-traditional methods such as material deliberation, which includes sound (e.g. music), discursive (e.g. storytelling), material (e.g. *Makers-spaces*) or emotional expression[270]. These practices are not 'one-size fits all' but context specific, deriving their legitimacy from integrating them throughout the policy cycle[271]. When well organised, these deliver an informed, civilized, structured and representative exchange of arguments and in-depth reflections on underlying issues[272].

While the evidence is still thin, a number of successful examples suggest that these practices can strengthen trust in political actors' actions and bestow greater legitimacy on difficult policy decisions. However, these effects cannot be achieved if these techniques are merely used to *open-wash*[h] policies on controversial issues. Policymakers need to follow through on the outcomes of deliberation.

6.1.6 Proven and promising deliberative practices

Whether aiming to reach a consensus or co-creating policy solutions, the added value of these practices lies in allowing citizens, politicians and experts to engage on an equal footing. This provides a better understanding of why people may have a different perspective[273]. Policymakers have the opportunity to capture more accurately the values, as well as interests and expectations of citizens.

Co-design or participatory design is an approach that uses design methods to collaborate with stakeholders to produce shared visions, solutions, projects, and other policy-related outputs. The main goal is to get results that are closer to the needs of those who might be affected by the policy decisions, with the aim of ultimately reaching conclusions that represent as many perspectives as possible[274].

An increasingly studied form of public deliberation is *citizens' assemblies*, which are one or several full-day meetings involving around one hundred participants. They derive legitimacy and representativeness from the random sampling of participating citizens in order to accurately reflect a given community. At the assembly citizens hear from a balanced panel of scientific and policy experts representing different perspectives and are provided with a set of briefing. A steering or advisory committee usually ensures that the material is balanced. Despite limited scientific findings, anecdotal evidence suggests that for a citizen's assembly to be accepted, broad support across the range of political actors and a clear official mandate are important to ensure legitimacy and acceptance. An equally crucial aspect is to clearly describe to participants how the outcome will be taken into account and to provide participants with feedback.

While there is scepticism about citizens' assemblies, there is a growing body of evidence that supports the view that citizens are capable of debating complex issues and are interested to participate in and discuss politics[275].

6.1.7 Properly moderated deliberation has proven to be an effective tool to combat polarisation[277]

EXAMPLE BOX 3

Ireland successfully organised a constitutional convention and various citizens' assemblies bringing together randomly selected citizens, experts and politicians to discuss issues including abortion and same-sex marriage. Meeting regularly over a year and supported by an expert advisory group, participants developed an in-depth understanding of the issues, trade-offs and alternatives. The results informed several reports and substantially contributed to depolarising the issues at stake, creating a civilised public and political discourse in which it was possible to take informed decisions on these controversial, value-laden topics.[276]

Moderation systems have proven to be effective in avoiding polarisation by enforcing group norms of civilised behaviour in political discussions online, distributing balanced, relevant information to participants as well as ensuring equal conversational turn-taking during debates[278]. Online, the use of argumentative- and/or vote-mapping software to visualise conversations can help to increase clarity, visualising arguments, common ground or diverging views and problems[279].

6.1.8 Even if well organised, deliberation can fail

Budget constraints, organisational instability, policy shifts and political ambivalence among elected representatives are common causes

of failure[280]. Technical infrastructure problems or poor interface design can also hamper online initiatives for deliberation[281].
Still, thousands of cases of successfully executed deliberative and citizen engagement events and evidence suggest that these instruments can be of significant added value and even joy to both citizens and policymakers.

6.2 So what does this mean for policy?

6.2.1 Knowledge brokers can enhance the trustworthiness of science and government

Experts can earn the trust of citizens by being more transparent about their values, interests, methods and assumptions. Organisations and individuals acting as honest knowledge brokers can enhance the trustworthiness of science and government. In order to earn the trust of citizens necessary to achieve policy impact, scientists and knowledge brokers can take a number of steps:

- they can ensure that their work is open to scrutiny with regards to methods and assumptions so that replicability is facilitated and the role of values and interests easily identified;
- they can take into account the values of their communities in making their choices; and
- they can actively engage with stakeholders who may be affected by the results.

Offering simple causal explanations may be an approach to spark citizens' curiosity in science, encouraging trust in expertise as well as being a more effective and accurate way to convey evidence[282]. Instead of only offering complex scientific evidence, policymakers could communicate evidence that citizens can relate to (a hurricane for climate change or disease for a food or a pharmaceutical issue) and by providing a simple causal model of that evidence. Despite being far from complete, such causal replacement is a technique people can more easily understand. Associating such an explanation with a specific expert group can help to more broadly increase trust in this group's expertise[283].

6.2.2 Deeper integration of deliberation and citizen engagement into policymaking[284]

Public institutions could more systematically integrate different elements of citizen engagement into the policy process, such as citizen' assemblies or deliberative polls based on a random representative selection of citizens. Supported by scientific and policy experts to deliberate on controversial policy topics, citizen input could help to depoliticise, 'detoxify' and avoid political deadlock situations and inform the different stages of the policy cycle.

> "Organisations and individuals acting as honest knowledge brokers *can enhance the trustworthiness of science and government.*"

EXAMPLE BOX 4

In 2015 Taiwan initiated the online discussion platform vTaiwan to deliberate on controversial issues, (e.g. how to regulate the gig economy) and to co-create policy options[285]. The online discussion platform is combined with 'offline' points of engagement and 'hackathons'. The platform has so far proven most effective to resolve regulatory dead-lock. Arguments and opinions are visualised on the website and can be up or down-voted. Users however cannot comment on posts, which helps to reduce inflammatory and abusive 'trolling'. An apparent effect is that while users are grouped according to shared perspectives, common ground is being explored to develop proposals that are broadly supported by the community. Hundreds of thousands of citizens have already been deliberating online, providing a better understanding of opinions, values and interest but also providing ideas for policy-options. Of the 26 cases handled via the platform up to summer 2018, 20 have informed government decisions.

More recently, Taiwan has gone further with a government platform 'Join', which has led to more than five million of the 23 million inhabitants taking part in online deliberation. It is more closely connected to policymaking, with co-created proposals entering the policy cycle above a certain threshold of citizen support.

Ireland's Taoiseach Leo Varadkar at a gathering celebrating the result of the referendum on liberalising abortion law, in Dublin, Ireland, May 26, 2018. The result followed a year of intensive dialogue with representative citizen assemblies.

6.2.3 Governments could encourage and help organise new forms of dialogue

Several initiatives exist, such as 'Mycountry/Europe Talks' a Europe-wide collaboration of 17 media outlets where people with opposing positions are matched by an algorithm and have a face-to-face discussion[286]. Based on anecdotal evidence, participants tend to discover not only what divides them but also what they have in common. Political institutions could cooperate to organise similar regional, local or pan-European conversations.

Online, 'ChangeMyView' on Reddit and the recently launched platform 'ChangeAView', are platform exclusively dedicated to online deliberation and to change minds[287]. Governments could moderate similar spaces to openly debate current policy issues.

Since the beginning of 2014, the European Commission has engaged in over 1 572 citizens' dialogues, at 583 locations involving more than 194 000 participants.[288]

Moreover, in a collaborative effort with the Bertelsmann-Foundation, the Commission has also started to engage in a number of cross-national, multilingual citizen panels with randomly selected participants to discuss the future of the European Union.

EVIDENCE-INFORMED POLICYMAKING

7.1 Key findings

7.1.1 The inherent politics of policymaking

Framing of a policy problem and the accompanying decisions on what evidence to commission or take into account is sometimes seen as a technical issue. It is in fact political, hence the competition among political actors to impose their framing on a problem.

There are multiple ways in which to describe a policy problem and the precise definition has a profound effect on which problems are included on the policy agenda but also how they are framed and responded to[289].

For example, early anti-smoking policies met with resistance from users as the tobacco industry framed smoking as a question of personal freedom. Later anti-smoking success came in part due to it being framed as a public health and labour rights issue.

Skilled policy actors recognise that the first to successfully frame a problem will shape the policy debate, hence the intense competition over framing. Policy actors exercise their power to draw attention to some issues, and their framing of policy problems, at the expense of others. Their aim is to concentrate attention on a small number of solutions[290].

Despite the existence of many administrative procedures which all play a significant role in decision-making, policymaking remains an inherently political process. Interests and worldviews affect the ways in which problems are defined. The technocratic term 'policymaking' somewhat obscures the political nature of the process.

> The principle that policy should be informed by evidence is under attack. Politicians, scientists and civil society need to defend this cornerstone of liberal democracy.

The intensely political nature of the selection and framing of policy problems is not however, always fully appreciated, especially by scientists. It is important to recognise that the framing of policy problems determines the selection of what research is needed, what evidence counts and what should be ignored.

The key challenge is therefore whether government systems are well equipped to make this choice and take into account the plurality of different values positions.

7.1.2 Polarisation, partisanship and the commitment to evidence-informed policy

> "We're an empire now, and when we act, we create our own reality. And while you're studying that reality – judiciously, as you will – *we'll act again, creating other new realities, which you can study too, and that's how things will sort out. We're history's actors... and you, all of you, will be left to just study what we do.*"

The phrase was attributed to an unnamed official in the George W. Bush Administration, who was addressing an aide as someone from 'the reality-based community'[292].
This shows that the commitment to evidence-informed policy cannot be taken for granted. General political stability is a crucial part of the context for evidence-informed policy. Stable power relations tend to be favourable for rationality in politics but partisan leadership in highly polarised political environments undermines the capacity of governments to use evidence effectively. Partisanship weakens cooperation, while interest groups compete to interpret the evidence[293].

This has been shown in unwillingness to use systematic evaluation to assess performance, in the politicisation of public administration appointments and the limited recruitment and retention of highly skilled civil servants[294]. Polarisation also leads to some administrations seeking to weaken independent scientific authorities and to reduce the visibility of evidence critical towards the political leaders.

This is the case in countries with high degrees of polarisation, where traditionally independent education or research institutions are being put under pressure[295]. For example, scientists at the US Environment Protection Agency (EPA), have been barred from participating in advisory panels[296].

Populists and authoritarians may perceive independent evidence as a challenge to their interpretation of 'the public interest', underlining the need to recognise evidence-informed policy as a core value along with democracy.

7.1.3 The role of evidence in policymaking

Facts, data and science stand in for abstract concepts and realities and make them measurable and comparable. They paint a picture of the past as well as the present. They help describe the world, understand causality and values as well as what has worked in the past. Understanding is enriched, complex issues explained, common wisdom challenged and opportunities for change provided.

The linkages between the use of evidence, its quality and relevance to context in a multi-actor policy process and the increase in the quality and efficiency of resulting policies are well established[297]. Using evidence is indispensable

to better describe and understand policy options. It helps decision-makers take 'well informed decisions about policies, programmes and projects by putting the best available evidence at the heart of policy development and implementation'[298].

The idea that policy should be informed by evidence is not new. However there is a balance to be struck. In the late 1990s the UK adopted a seemingly pragmatic and anti-ideological, 'what works' attitude to social and health policies[299]. The danger of this approach is that it obscures the values choices that politics also has to make. Scientific evidence cannot determine what 'ought' to be done, only the nature of the problem and the likely impact of different options. Similarly, the misleading term 'evidence-based policy' also obscures the important political and values trade-offs needed.

Finding the right balance for evidence in policymaking is essential to well-functioning administrations and goes to the heart of the debate on liberal democracy. On the one hand, evidence can be misunderstood, misused, cherry-picked, or altogether intentionally or unintentionally omitted from decision-making. But on the other real debates about values, for example over abortion or same-sex marriage, cannot be resolved, but only informed by scientific evidence. In the worst cases, vital debates about values are avoided and replaced by arguments over the facts. Disentangling these debates is an important role that scientific knowledge brokers can play to support decision-making.

7.1.4 Barriers to the use of evidence in policymaking

Policymaking does not correspond to the ideal of a linear policy cycle with clearly defined policy phases and fixed roles for policy actors. It is instead an increasingly complex system with multiple actors, institutions, overlapping phases and feedback loops. Consequently, 'action' takes place in many different parts of the system, there are many different 'rules of the game', and policy often seems to 'emerge' without central direction. This dynamic is an inevitable feature of political systems, not a dysfunction to be solved[300].

The increasing complexity of policy problems and the abundance as well as ambiguity of scientific knowledge poses a significant 'technocrat's dilemma'. Relevant, synthesised, expert advice is increasingly needed but the authority of such experts is being challenged.

There are also extensive barriers to the use of evidence by policymakers. The two communities also have different norms, cultures, languages, misaligned incentives, understanding of time and budgetary constraints[301]. The gap between the needs of policymakers and the ways researchers present evidence is one of the key barriers for the injection of evidence into policy-making[302]. The process is further impeded when evidence is not fit for the purpose and when timing is poor[303].

Insufficient scientific literacy among policymakers and lack of a joined-up government approach to evidence can also reduce the ability of administrations to understand, assess and apply evidence. Similarly, civil society is traditionally not equally equipped with the necessary tools to understand and assess evidence critically. This creates a gap, open to special interests to exploit.

7.2 So what does this mean for policy?

7.2.1 A new start to the policy cycle

The decisions on how to frame policy problems and what evidence counts could to be taken in a more open and democratic manner, to better reflect societal values and interests. To make policy making innovative, inclusive and evidence-informed, a new model of conceiving and delivering policies could help; one that starts with a more open and democratic initial framing

of policy problems. It could take place before the policy debate on specific solutions can feedback into the problem definition.

Governments could seek to reach a consensus on the nature and framing of the problem and the evidence needed to describe it before debating solutions. Making a public call for evidence at the beginning of the process and allowing only evidence open to public scrutiny to be taken into account would enhance trust in the evidence used in the policy process.

7.2.2 Policymakers and scientists could co-define research questions

To get the right scientific evidence, it is vital that policymakers ask the right questions. Getting the research question right is a process that requires more extensive discussion and iteration. Instead of keeping scientists and policymakers at arms-length and working in a linear way, both could embrace co-creation and work in an iterative way from the very beginning. Building on this, a well-designed evidence-informed policy system would include knowledge brokers and boundary organisations, sitting between scientists and policymakers. They could identify and connect scientists and policymakers and build knowledge communities around policy problems.

7.2.3 New skills, new incentives for scientists and policymakers

The availability of competent, willing and incentivised scientists and policymakers is essential for better evidence informed policies. Both scientists and policymakers could acquire new professional competences. Amongst the skills that are useful for policymakers and policy organisations are:

- Scientific literacy within government, including the understanding of scientific evidence, its nature, risk literacy, statistical literacy and critical thinking; and
- Skills to source, procure, assess and apply evidence to solve complex policy challenges; this includes being able to identify the strategic use of evidence by interest groups.

For scientists the most important skills to engage in evidence-informed policy are:

- The ability to produce robust and fit-for-purpose evidence but also to understand the key drivers of the policy process;
- The ability to apply research synthesis and meta-analytical approaches to make better sense of the wealth of knowledge and to manage expert communities, develop networking and facilitation skills to overcome inter-disciplinary and inter-departmental boundaries;
- The ability to communicate evidence concisely and frame it more effectively to demonstrate its relevance to policy problems in an ethical way, being transparent about the techniques being used and the values and interests behind the research; and
- The ability to engage with citizens and stakeholders to build trust and legitimacy of evidence used for policy.

It is unrealistic to expect that all policymakers or scientists will ever master all these skills. The aim is to build teams of policymakers and scientists with these skills.

Both communities could implement better incentives for this work. Research funding could include impact on policies as one of the criteria for obtaining funding next to research and societal impact. Policy institutions could put in place incentives for policymakers to use and apply evidence.

To be truly effective however this ecosystem needs also knowledge brokers and boundary organisations acting as honest brokers.

The value of such organisations of 'regulatory science' at the boundary between science and policy could be better recognised. Despite the existence of many scientific advice systems across jurisdictions, policymakers often could benefit from more knowledge brokers to help them make sense of existing knowledge. Such trusted knowledge brokers and boundary organisations could work more closely with government. They can serve as entry points for researchers to bring their evidence into policy debates.

7.2.4 Recognise evidence-informed policymaking as a core value

Liberal democracy has not turned out to be the 'end of history'[304] but recent events show it requires constant renewal in the face of new challenges. The desire to inform public policy by scientific evidence has not generally been seen as a highly political topic but rather a more technocratic one. The insights and findings of this report show that the argument that public policy is best informed by evidence can no longer be taken for granted.

In the new complex information environment, where bad faith actors are taking advantage of the pressures on human behaviour, whether through disinformation, targeted political advertising or fake news, the case for evidence and expertise has to be argued on political as well as scientific grounds.

The principle of informing policy through evidence could be recognised as a key accompaniment to the principles of democracy and the rule of law. Similarly, the notion of independent scientific institutions as part of 'checks and balances' in democracy could be championed and defended.

Finally, the legitimate and rightful place of evidence and reason in policymaking could be better articulated by those who support it in a way that resonates with the values of citizens.

European Parliament's ENVI Committee - Exchange of views with Greta Thunberg, climate and pro-science activist.

FUTURE RESEARCH AGENDA

This report is the first output from the JRC's multi-annual Enlightenment 2.0 research programme. As a follow-up three key areas have been identified for future research:

- Establishing an analytical framework for values
- Determining the impact of technology on political decision-making
- Developing evidence-based communication strategies

8.1 The science of values

In order to address values in political debates, there is a need for an analytical framework for values that can be used by policymakers to support arguments about values trade-offs. Therefore, the JRC will launch and coordinate a new research project on the science of values, combining the contributions of different scientific disciplines (cultural anthropology, psychology, neuroscience, economics, philosophy, law, history, evolutionary science), to develop a taxonomy (or multiple taxonomies if needed) and a practical analytical framework to define, classify and study the 'Science of values'. This work will include the dynamics of values, i.e. how values preferences and priorities of individuals and societies are established and how they develop, how they change through time and what influence rational debate has on them. The project will include a Eurobarometer survey on values and the results will be compared with the findings of the World Values Survey (WVS) and European Values Study (EVS)[i].

> The next step is to develop an analytical framework of values and to understand how they influence political decision making.

This work will serve two key purposes:

1. To classify, analyse and compare the values held by citizens and political movements in order:

2. To provide policymakers with a practical analytical framework with which they can develop, debate and communicate policy options from a values perspective.

8.2 Political influence in the age of technology

The internet has 3.5 billion users. There are 3.03 billion active social media users. There is a new social media user every 15 seconds. The influence of the changing technological environment specifically on political decision-making has not been addressed in-depth by this report.

This new research project aims to establish the extent to which citizens are influenced in their political decision-making by Artificial Intelligence, algorithms, disinformation, deep fake image and video manipulation, and by implication what it means to live in a society where seeing can no longer mean believing.

As part of this project, we aim to establish whether belief in fake news is determined by motivated reasoning or lack of analytical thinking. Maybe motivated reasoning will prevail when analytical thinking cannot be successful. The plausibility of a news item seems to play a role. The more implausible it is, the more likely the willingness to engage analytically, which will in the second step determine whether it is believed or not. But, group identities and values could also play a role in motivated reasoning, e.g. when the maintenance of group beliefs or one's own values would be contradicted by a piece of evidence. How these different influences interact with each other in the online environment will be further investigated.

8.3 Meaningful communication

Building on the analytical framework for values and a deeper understanding of the online environment on political decision-making, this project will investigate how to turn the insights about political communication in this report into practical tools and advice for public bodies to ethically communicate using values, narratives, metaphors and frames as well as causal reasoning.

8.4 A call to the research communities

In the course of this work, several research gaps have been identified. The JRC cannot fill them all so for the purpose of sharing these with the scientific community we recommend investigations in the following areas:

- Are we living in an age of a loss of faith in expertise and authority? We have limited understanding of what is driving these processes, the extent to which they are new and can be reversed;

- There is limited evidence regarding whether trends of geographical polarisation reflect demographic trends (that are being driven by structural socio-economic processes), social sorting or are being shaped by local context (such as via exposure);

- Many of the studies reviewed in the literature were conducted in the U.S. To what extent can these findings, especially about group identity, polarisation, motivated reasoning, and selective trust in scientific sources be generalised and applied to Europe?

- Research is needed on a comprehensive system of indicators for the assessment of the use of evidence in public administration and governance which in turn should link to the work on public governance evaluation and indicators.

JOIN THE DEBATE

Is there a scale of governance that is more conducive to the evelopment of new approaches to policy-making? One could imagine, for instance, that it would be easier to develop more effective forms of co-production at a local and regional scale, as opposed to a national or European one.

Interesting in discussing this?
Forming a community? Please get in touch:
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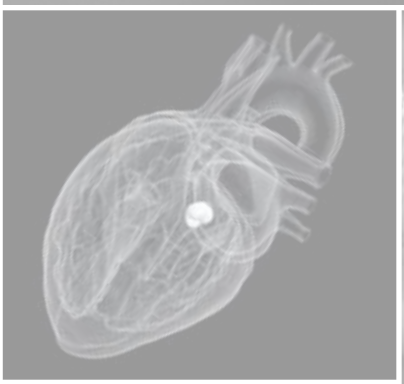

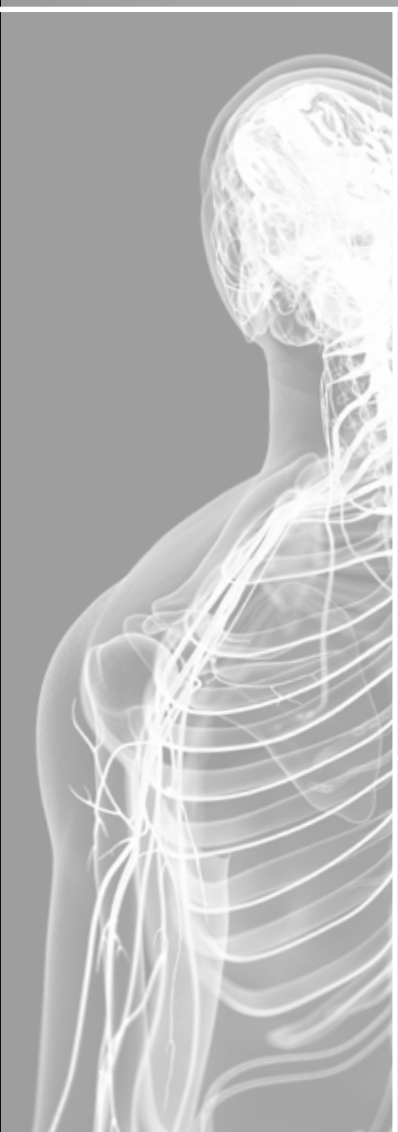


GLOSSARY

This glossary is intended to support the reader in understanding this report. The definitions are neither the only possible ones for each term, nor are they meant to prescribe a certain use of the term. Instead they try to capture how the term is used in this particular context.

Bias / Cognitive Bias: A cognitive bias is a systematic mistake in a cognitive process, such as reasoning, learning or remembering. Mistakes arising from cognitive biases are different from random mistakes, because they are systematic (i.e., the error always goes in the same direction). For example, in the confirmation bias, mistakes arise through systematically taking into account more confirmatory evidence.

Critical thinking: Critical thinking is the intellectually disciplined process of actively and skilfullyconceptualizing, applying, analysing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action.

Deficit Model: In studies of the public understanding of science, the information deficit model (or simply deficit model) or science literacy/knowledge deficit model attributes public scepticism or hostility to science and technology to a lack of understanding, resulting from a lack of information. It is associated with a division between experts who have the information and non-experts who do not. The model implies that communication should focus on improving the transfer of information from experts to non-experts.

EBPM / Evidence Based Policymaking: Evidence Based Policymaking (EBPM) puts very high value on evidence in drafting policies and deciding between policy options. In EBPM evidence is supposed to be integrated in the process of drafting a policy through formalised procedures, it is thought to be the crucial ingredient of policymaking.

EIPM / Evidence Informed Policymaking: Like Evidence Based Policymaking (EBPM) Evidence Informed Policymaking (EIPM) also puts high value on evidence in drafting policies, and deciding between policy options. But, in EIPM evidence is not the one crucial ingredient of policymaking, but rather one ingredient among others, e.g. values and emotions. Also, evidence is incorporated in the policy process more informally in EIPM than in EBPM.

Emotions: There is no agreement on the exact definition of emotions - different concepts capture different perspectives. In this report, emotions are understood to be the mental states of human beings, which are less stable than personality traits, ranging from immediate responses to stimuli to more stable but often diffuse moods. Emotions are in many cases context-related, i.e. reactions to salient objects and experiences, but can also be incidental, subtle, and diffuse. They can be classified as positive and negative and therefore used as signals for what is good and what is bad by the individual.

Filter bubbles: Someone is said to be in a filter bubble, when they receive information or news mostly from people who share the same opinions and experiences. This is especially prevalent in social media, where people choose their own preferences and the sites' algorithms make further suggestions based on these choices. It results in a situation, where people in a filter bubble receive ideologically filtered information.

Heuristics: are hard-wired mental shortcuts that everyone uses every day in routine decision-making and judgment. Heuristics are a way to make a decision or judgement by focusing on the most relevant aspects of complex problems.

Mindfulness / Mindfulness Training: Mindfulness is the conscious awareness of one's own feelings from a less involved perspective. In principle, all humans are to some degree mindful, but differ in the degree of their mindfulness. Mindfulness can be practised through specialised trainings. In general, these trainings aim at increasing awareness of one's own bodily state, and offer labels for emotions thus distinguishing better between different ones and thereby allowing a more targeted reaction. For example, knowing that you get angry, when you are actually hungry, is helpful, because your anger can easily be cured with food. There is increasing evidence that mindfulness also enhances the ability to correctly interpret others' emotional states.

Negativity Bias: Negativity Bias refers to the observation that humans usually attribute more importance to negative events than to positive events, i.e. when they experience highly negative emotions they react with changes in behaviour, which are more drastic than the ones that could be observed if they had experienced a very positive event.

Normative: A theory, idea, study, or generally any statement is called normative, when it aims to set a goal how the world should be or ascribes moral value to certain behaviours. Normative statements therefore can have complete disregard for what the world is actually like.

Personality Trait: Personality Traits can be understood as generalised habits a person engages in. They are believed to be essentially stable through time and different circumstances. Five basic dimensions of personality have been defined and it is broadly considered that everyone can be placed on the spectrums of the following traits: i) Openness to experience (inventive / curious vs. consistent / cautious), ii) Conscientiousness (efficient / organized vs. easy-going / careless), iii) Extraversion (outgoing / energetic vs. solitary / reserved), iv) Agreeableness (friendly / compassionate vs. challenging / detached), and v) Neuroticism (sensitive / nervous vs. secure / confident).

Utilitarian: In reference to consequentialist ethics in which the prime goal is to generate as much happiness as possible or to make as many people happy as possible.

ENDNOTES

a Example of East Asian and Caucasian stimuli. The target answer for each is 'worried'.

b Measurement options: cognitive diversity – AEM Cube, Social Perceptiveness – RME Reading the Mind in the Eye, TEQ Toronto Empathy Questionnaire.

c Original: Le cœur a ses raisons que la raison ne connaît point.

d '...Darwin clearly recognized that evolution shaped not only the physical characteristics of an organism but also its mental processes and behavioural repertoires.' (Nesse and Ellsworth, 2009, p.129.).

e In the rational choice model, individuals make rational decisions to achieve outcomes that are in line with their personal objectives, i.e. achieving the maximum possible benefit (utility) in their highest self-interest.

f 1. Democracy; 2. Equality; 3. Human rights; 4. Individual freedom; 5. Peace; 6. Respect for human life; 7. Religion; 8. Respect for other cultures; 9. Rule of law; 10. Self-fulfilment; 11. Solidarity, support for other cultures; 12. Tolerance.

g The order of all 14 attributes was randomised in the survey and respondents were asked how essential each attribute was for a good society in their view. Answer options: Absolutely essential; Rather essential; Rather not essential; Not at all essential.

h Openwashing: to spin a product or company as open, although it is not. Derived from 'greenwashing'. Source: Michelle Thorn.

i The two surveys, albeit sharing the questionnaires, are run independently and are conducted at different times.

REFERENCES

1 Martens, B., Aguiar, L., Gomez Herrera, E., Muller, F., 'The digital transformation of news media and the rise of disinformation and fake news', *JRC Working Papers on Digital Economy,* Vol. 2018, No 2, Joint Research Centre, Brussels, 2018.

2 Andrejevic, M., *Infoglut: How Too Much Information Is Changing the Way We Think and Know,* Routledge, Abingdon, 2013.

3 MacIntyre, A., 'Epistemological Crises, Dramatic Narrative and the Philosophy of Science', *The Monist,* Vol. 60, No 4, pp. 453, 1977.

4 Bradshaw, S., Howard, P. N., 'Challenging truth and trust: A global inventory of organized social media manipulation', *The Computational Propaganda Project*, Oxford Internet Institute, Oxford, 2018.

5 Dechêne, A., Stahl, C., Hansen, J., Wänke, M., 'The truth about the truth: A meta-analytic review of the truth effect', *Personality and Social Psychology Review*, Vol. 14, No. 2, 2010, pp. 238-257.

6 Borah, P., Xiao, X., 'The importance of ''likes'': The interplay of message framing, source, and social endorsement on credibility perceptions of health information on Facebook' *Journal of Health Communication*, Vol. 23, No 4, 2018, pp. 399-411.

7 Hughes, M. G., Griffith, J. A., Zeni, T. A., Arsenault, M. L., Cooper, O. D., Johnson, G., Hardy, J. H., Connelly, S., Mumford, M. D. 'Discrediting in a message board forum: The effects of social support and attacks on expertise and trustworthiness', *Journal of Computer-Mediated Communication*, Vol. 19, No 3, 2014, pp. 325-341.

8 Duffy, R., *The perils of perception*, Atlantic Books, London, 2018. ISBN 9781786494566.

9 Flaxman, S., Goel, S., Rao, J.M., 'Filter Bubbles, Echo Chambers, and Online News Consumption', *Public Opinion Quarterly*, Vol. 80, No S1, 2016, pp. 298-320. *https://doi.org/10.1093/poq/nfw006*

10 Spohr, D., 'Fake News and Ideological Polarization: Filter Bubbles and Selective Exposure on Social Media', *Business Information Review*, Vol. 34, No 3, 2017, pp. 150-160.

11 Sperber, D., Clement, F., Heintz, C., Mascaro, O., Mercier, H., Origgi, G., Wilson, D., 'Epistemic Vigilance' *Mind & Language*, Vol. 25, 2010, pp. 359-393. *https://doi.org/10.1111/j.1468-0017.2010.01394.x*

12 Epley, N., Gilovich, T., 'The mechanics of motivated reasoning', *Journal of Economic Perspectives*, Vol. 30, No 3, 2016, pp. 133-140.

13 Strickland, A. A., Taber, C. S., Lodge, M., 'Motivated reasoning and public opinion', *Journal of Health Politics, Policy and Law*, Vol. 36, No 6, 2011, pp. 89-122. *https://doi.org/10.1215/03616878-1460524*

14 Lodge, M., Taber, C. S., *The rationalizing voter*, Cambridge University Press, Cambridge, 2013.

15 Redlawsk, D. P., Civettini, A. J. W., Emmerson, K. M., 'The affective tipping point: Do motivated reasoners ever ''Get It''?', *Political Psychology*, Vol. 31, No 4, 2010, pp. 563-593. *https://doi.org/10.1111/j.1467-9221.2010.00772.x*

16 Stanovich, K. E., West, R. F. 'Natural myside bias is independent of cognitive ability', *Thinking & Reasoning*, Vol. 13, No 3, 2007, pp. 225-247.
Washburn, A. N., Skitka, L. J. 'Science denial across the political divide: Liberals and conservatives are similarly motivated to deny attitude-inconsistent science', *Social Psychological and Personality Science*, 2017. *https://doi.org/10.1177%2F1948550617731500*

17 Zaller, J. R., *The nature and origins of mass opinion*, Cambridge University Press, Cambridge, 1992.

18 Kahan, D. M., 'Ideology, motivated reasoning, and cognitive reflection', *Judgment and Decision Making*, Vol. 8, No 4, 2013, pp. 407-424.

19 Kahan, D. M., Jenkins-Smith, H., Braman, D., 'Cultural cognition of scientific consensus' *Journal of Risk Research*, Vol. 14, No 2, 2011, pp. 147-174.

20 Bolsen, T., Druckman, J. N., Cook, F. L., 'Citizens', scientists', and policy advisors' beliefs about global warming', *The ANNALS of the American Academy of Political and Social Science*, Vol. 658, No 1, 2015, pp. 271-295.

21 Drummond, C., Fischhoff, B., 'Individuals with greater science literacy and education have more polarized beliefs on controversial science topics', *Proceedings of the National Academy of Sciences*, Vol. 114, No 36, pp. 9587-9592.

22 Kahan, D. M., Peters, E., Wittlin, M., Slovic, P., Ouellette, L. L., Braman, D., Mandel, G., 'The polarizing impact of science literacy and numeracy on perceived climate change risks', *Nature Climate Change*, Vol. 2, No 10, 2012, 732-735.

Kahan, D. M., 'Climate science communication and the measurement problem', *Political Psychology*, Vol. 36, 2015, pp. 1-43.

Kaplan, T. Gimbel, I., Harris, S., 'Neural correlates of maintaining one's political beliefs in the face of counterevidence', *Nature Scientific Reports*, Vol. 6, Art. 39589, https://doi.org/10.1038/srep39589

23 Duffy, R., *The perils of perception*, Atlantic Books, London, 2018. ISBN 9781786494566

24 Eurostat, 'Integration of Immigrants in the European Union', *Special Eurobarometer*, Vol. 469, 2018.

25 Duffy, R. 'Britons aren't uniquely ignorant, most countries have got their facts wrong' *The Guardian*, 2014. *https://www.theguardian.com/commentisfree/2014/oct/29/britons-not-ignorant-most-countries-facts-wrong* (last access 12 June 2019)

26 Kahneman, D., *Thinking, fast and slow*, Penguin, London, 2011.

27 Hertwig, R., Erev, I., 'The description-experience gap in risky choice', *Trends in Cognitive Sciences*, Vol. 13, 2009, pp. 517-523. *https://doi.org/10.1016/j.tics.2009.09.004*

Wulff, D. U., Mergenthaler-Canseco, M., Hertwig, R., 'A meta-analytic review of two modes of learning and the description-experience gap', Psychological Bulletin, Vol. 144, 2018, pp. 140-176.

28 Duffy, R., *The perils of perception*, Atlantic Books, London, 2018. ISBN 9781786494566

29 Kahneman, D., *Thinking, fast and slow*, Penguin, London, 2011.

30 Duffy, R., *The perils of perception*, Atlantic Books, London, 2018. ISBN 9781786494566

31 Flynn, D., Nyhan, B., Reifler, J., 'The Nature and Origins of Misperceptions: Understanding False and Unsup ported Beliefs About Politics', *Advances in Political Psychology*, Vol. 38, 2017, pp. 127-150. *https://doi.org/10.1111/pops.12394*

32 Kuklinski, J. H., Quirk, P. J., Jerit, J., Schwieder, D., Rich, R. F., 'Misinformation and the currency of Democratic citizenship', *Journal of Politics*, Vol. 62, No 3, pp. 790-816.

33 Duffy, R., *The perils of perception*, Atlantic Books, London, 2018. ISBN 9781786494566

34 Flynn, D., Nyhan, B., Reifler, J., 'The Nature and Origins of Misperceptions: Understanding False and Unsupported Beliefs About Politics', *Advances in Political Psychology*, Vol. 38, 2017, pp. 127-150. *https://doi.org/10.1111/pops.12394*

35 Freed, G. L., Clark, S. J., Butchart, A. T., Singer, D. C., Davis, M. M., 'Parental vaccine safety concerns in 2009', *Pediatrics*, Vol. 125, No 4, 2010, pp. 654-659.

McCright, A. M., Dunlap, R. E., 'The politicization of climate change and polarization in the American public's views of global warming, 2001-2010', *Sociological Quarterly*, Vol. 52, No 2, 2011, pp. 155-194.

36 Jolley, D., Douglas, K. M., 'The social consequences of conspiracism: Exposure to conspiracy theories decreases intentions to engage in politics and to reduce one's carbon footprint', *British Journal of Psychology*, Vol. 105, No 1, 2014, 35-56.

Pennycook, G., Rand, D. G., 'Lazy, not biased: Susceptibility to partisan fake news is better explained by lack of reasoning than by motivated reasoning', *Cognition*, Vol. 188, 2019, pp. 39-50.

37 Vosoughi, S., Roy, D., Aral, S., 'The spread of true and false news online', *Science*, Vol. 359, No 6380, 2018, pp. 1146-1151.

38 Duffy, R., *The perils of perception*, Atlantic Books, London, 2018. ISBN 9781786494566

39 Pennycook, G., Rand, D. G., 'Lazy, not biased: Susceptibility to partisan fake news is better explained by lack of reasoning than by motivated reasoning', *Cognition*, Vol. 188, 2019, pp. 39-50.

40 Freelon, D., 'Personalized information environments and their potential consequences for disinformation, Understanding and Addressing the Disinformation Ecosystem', *Annenberg School for Communications workshop*, 15-16 December, 2017, pp. 38-44. *https://firstdraftnews.org/wp-content/uploads/2018/03/The-Disinformation-Ecosystem-20180207-v2.pdf (last access 12 June 2019)*

41 Martens, B., Aguiar, L., Gomez Herrera, E., Muller, F., 'The digital transformation of news media and the rise of disinformation and fake news', *JRC Working Papers on Digital Economy*, Vol. 2018, No 2, Joint Research Centre, Brussels, 2018.

42 Chan, M. P. S., Jones, C. R., Albarracín, D., 'Countering false beliefs: an analysis of the evidence and recommendations of best practices for the retraction and correction of scientific misinformation', in: Jamieson, K. H., Kahan, D., Scheufele, D. A., (Eds.), *The Oxford Handbook of the Science of Science Communication*, Oxford University Press, New York, 2017, pp. 341-349.

43 Nyhan, B., Reifler, J., 'When corrections fail: The persistence of political misperceptions', *Political Behavior*, Vol. 32, No 2, 2010, pp. 303-330.

44 Haglin, K., 'The limitations of the backfire effect', *Research & Politics*, Vol. 4, No 3, 2017. *https://doi.org/10.1177%2F2053168017716547*

45 Nyhan, B., Reifler, J., 'When corrections fail: The persistence of political misperceptions', *Political Behavior*, Vol. 32, No 2, 2010, pp. 303-330.

Sippitt, A., *The backfire effect: Does it exist? And does it matter for factcheckers?*, Full Fact, London, 2019.

46 Stevenson, A., 'Soldiers in Facebook's war on fake news are feeling overrun', New York Times, 9 October, 2018. *https://www.nytimes.com/2018/10/09/business/facebook-philippines-rappler-fake-news.html (last access 12 June 2019)*

47 Nemr, C., Gangware, W., 'Weapons of Mass Distraction: Foreign state-sponsored disinformation in the digital age' *ParkAdvisors*, 2019.

48 Walter, N., Murphy, S.T., 'How to unring the bell: A meta-analytic approach to correction of misinformation,' *Communication Monographs*, Vol. 85, No 3, 2018.

49 Papageorgis, D., McGuire, W. J., 'The generality of immunity to persuasion produced by pre-exposure to weakened counterarguments', *The Journal of Abnormal and Social Psychology*, Vol. 62, No 3, 1961, pp. 475-481.

50 Cook, J., Lewandowsky, S., Ecker, U. K. H., 'Neutralizing misinformation through inoculation: Exposing misleading argumentation techniques reduces their influence', *PLoS ONE*, Vol. 12, No 5, 2017, pp. 1-21.

51 Roozenbeek, J., Van der Linden, S., 'The fake news game: actively inoculating against the risk of misinformation', *Journal of Risk Research*, 2018, pp. 1-11.

52 Sippitt, A., *The backfire effect: Does it exist? And does it matter for factcheckers?*, Full Fact, London, 2019.

53 Kelly, J. and François, C., 'This is what filter bubbles look like', *MIT Technology Review,* 2018. *https://www.technologyreview.com/s/611807/this-is-what-filter-bubbles-actually-look-like* (last access 12 June 2019)

54 Zaller, J. R., *The nature and origins of mass opinion*, Cambridge University Press, Cambridge, 1992.

55 Arendt, H., 'Hannah Arendt: From an Interview', *The New York Review of Books*, 1978. *https://www.nybooks.com/articles/1978/10/26/hannah-arendt-from-an-interview (Last access 12 June 2019)*

56 Shulman, H. C., Sweitzer, M. D., 'Advancing framing theory: Designing an equivalency frame to improve political information processing' *Human Communication Research*, Vol. 44, No. 2, 2018, pp. 155-175.

57 Visschers, V. H., Meertens, R. M., Passchier, W. W., De Vries, N. N., 'Probability information in risk communication: a review of the research literature', *Risk Analysis: An International Journal*, Vol. 29, No 2, 2009, pp. 267-287.

58 Hoffrage, U., Lindsey, S., Hertwig, R., Gigerenzer, G. 'Communicating statistical information' *Science*, Vol. 290, 2000, pp. 2261-2262.

59 Kahneman, D., *Thinking, fast and slow*, Penguin, London, 2011.

60 Ehrlinger, J., Gilovich, T., Ross, L., 'Peering into the bias blind spot: People's assessments of bias in themselves and others', *Personality and Social Psychology Bulletin*, Vol. 31, No 5, 2005, pp. 680-692.

61 Pronin, E., Kugler, M. B., 'Valuing thoughts, ignoring behavior: The introspection illusion as a source of the bias blind spot', *Journal of Experimental Social Psychology*, Vol. 43, No 4, 2007, pp. 565-578.

62 Bessarabova, E., Piercy, C. W., King, S., Vincent, C., Dunbar, N. E., Burgoon, J. K., Wilson, S. N., 'Mitigating bias blind spot via a serious video game', *Computers in Human Behavior*, Vol. 62, 2016, pp. 452-466.

63 Keysar, B., Hayakawa, S. L., An, S. G., 'The Foreign-Language Effect: Thinking in a Foreign Tongue Reduces Decision Biases', *Psychological Science*, Vol. 23, No 6, 2012, pp. 661-668. *https://doi.org/10.1177/0956797611432178*

64 Nemr, C., Gangware, W., 'Weapons of Mass Distraction: Foreign state-sponsored disinformation in the digital age', *ParkAdvisors*, 2019.

65 Mercier, H., Sperber, D., 'Why do humans reason? Arguments for an argumentative theory' *Behavioral and Brain Sciences*, Vol. 34, No 2, 2011, pp. 57-74.

Sloman, S., Fernbach, P. *The knowledge illusion: Why we never think alone*, Riverhead, New York, 2018.

66 Mercier, H., Sperber, D., 'Why do humans reason? Arguments for an argumentative theory' *Behavioral and Brain Sciences*, Vol. 34, No 2, 2011, pp. 57-74.

Sloman, S., Fernbach, P. *The knowledge illusion: Why we never think alone*, Riverhead, New York, 2018

67 Wason, P. C., 'Reasoning about a rule', *Quarterly Journal of Experimental Psychology*, Vol. 20, No 3, 1968 pp. 273-281. *https://doi.org/10.1080/14640746808400161*

Wason, P. C., 'Reasoning', in: Foss, B. M. (Ed.), *New horizons in psychology*, Penguin, Harmondsworth, 1966.

Wason, P. C., Shapiro, D., 'Natural and contrived experience in a reasoning problem', *Quarterly Journal of Experimental Psychology*, Vol. 23, 1971, pp. 63-71. *https://doi.org/10.1080/00335557143000068*

68 Keil, F., Rozenblit, L., 'The misunderstood limits of folk science: An illusion of explanatory depth', *Cognitive Science*, Vol. 26, 2002, pp. 521-562.

69 Sloman, S., Fernbach, P. *The knowledge illusion: Why we never think alone*, Riverhead, New York, 2018.

70 Allen, N.J., Hecht, T.D., '"The romance teams": Toward an understanding of its psychological underpinnings and implications', *Journal of Occupational and Organizational Psychology*, Vol. 77, No 4, 2004, pp. 439-461.

71 Bowman, J. M., Wittenbaum, G. M., 'Time Pressure Affects Process and Performance in Hidden-Profile Groups' *Small Group Research*, Vol. 43, No 3, 2012, pp. 295-314. *https://doi.org/10.1177/1046496412440055*

Balliet, D., Wu, J., De Dreu, C. K., 'Ingroup favoritism in cooperation: a meta analysis', *Psychological Bulletin*, Vol. 140, No 6, 2014, pp. 1556-1581. *https://doi.org/10.1037/a0037737*

Dunham, Y., 'Mere membership', *Trends in Cognitive Sciences*, Vol. 22, No 9, 2018, pp. 780-793.

Kocher, M., Sutter, M., 'Time pressure, incentives, and the quality of decision-making', *Journal of Economic Behavior & Organisation*, Vol. 61, No 3, 2004, pp. 375-392.

Sohrab, S. G., Waller, M. J., Kaplan, S., 'Exploring the Hidden-Profile Paradigm: A Literature Review and Analysis', *Small Group Research,* Vol. 46, No 5, 2015, pp. 1-47. *https://doi.org/10.1177%2F1046496415599068*

72 Stewart, D. D., Billings, R. S., Stasser, G., 'Accountability and the discussion of unshared, critical information in decision-making groups', *Group Dynamics: Theory, Research, and Practice*, Vol. 2, No 1, 1998, pp. 18-23.

Wittenbaum, G. M., Bowman, J. M., 'Member status and information exchange in decisionmaking groups', in: Thomas-Hunt, M.C., (Ed.) *Research on Managing Groups and Teams. Vol. 7, Status and Groups*, 2005, pp. 143-168.

73 Faulmüller, N., Mojzisch, A., Kerschreiter, R., Schulz-Hardt, S., 'Do you want to convince me or to be understood? Preference-consistent information sharing and its motivational determinants', *Personality and Social Psychology Bulletin*, Vol. 38, No 12, 2012, pp. 1684-1696.

Greitemeyer, T., Schulz-Hardt, S., 'Preference-consistent evaluation of information in the hidden profile paradigm: Beyond group-level explanations for the dominance of shared information in group decisions', *Journal of Personality and Social Psychology*, Vol. 84, No 2, 2003, pp. 322-329.

Janis, I. L., *Groupthink: Psychological studies of policy decisions and fiascoe*, Houghton Mifflin, Boston, 1982.
Mojzisch, A., Grouneva, L., Schulz-Hardt, S., 'Biased evaluation of information during discussion: Disentangling the effects of preference consistency, social validation, and ownership of information', *European Journal of Social Psychology*, Vol. 40, No 6, 2010, pp. 946-956.
Toma, C., Bry, C., Butera, F., 'Because I'm worth it! (more than others...): Cooperation, competition, and ownership bias in group decision-making', *Social Psychology*, Vol. 44, No 4, 2013, pp. 248-255.
Tomkins, S., *Affect imagery consciousness: Volume II: The negative affects*, Springer Publishing Company, 1963.
Van Swol, L. M., Savadori, L., Sniezek, J. A., 'Factors that may affect the difficulty of uncovering hidden profiles', *Group Processes & Intergroup Relations*, Vol. 6, No 3, 2003, pp. 285-304.
Van Swol, L. M., 'Perceived importance of information: The effects of mentioning information, shared information bias, ownership bias, reiteration, and confirmation bias', *Group Processes & Intergroup Relations*, Vol. 10, No 2, 2007, pp. 239-256.
Yaniv, I., Kleinberger, E., 'Advice taking in decision making: Egocentric discounting and reputation formation', Organizational Behavior and Human Decision Processes, Vol. 83, No 2, 2000, pp. 260-281.

74 Dechêne, A., Stahl, C., Hansen, J., Wänke, M., 'The truth about the truth: A meta-analytic review of the truth effect', *Personality and Social Psychology Review*, Vol. 14, No 2, 2010, pp. 238-257.
Van Swol, L. M., Savadori, L., Sniezek, J. A., 'Factors that may affect the difficulty of uncovering hidden profiles', *Group Processes & Intergroup Relations*, Vol. 6, No 3, 2003, pp. 285-304.
Van Swol, L. M., 'Perceived importance of information: The effects of mentioning information, shared information bias, ownership bias, reiteration, and confirmation bias', *Group Processes & Intergroup Relations*, Vol. 10, No 2, 2007, pp. 239-256.

75 Tetlock, P. E., 'Identifying victims of groupthink from public statements of decision makers', *Journal of Personality and Social Psychology*, Vol. 37, No 8, 1979, pp. 1314-1324.
Janis, I. L., *Groupthink: Psychological studies of policy decisions and fiascoe*, Houghton Mifflin, Boston, 1982.
Esser, J. K., 'Alive and well after 25 years: A review of groupthink research', *Organizational Behavior and Human Decision Processes*, Vol. 73, No 2-3, 1998, pp. 116-141.

76 McPherson, M., Smith-Lovin, L., Cook, J. M., 'Birds of a feather: Homophily in social networks', *Annual Review of Sociology*, Vol. 27, 2001, pp. 415-444.

77 Larson, J. R., Christensen, C., Abbott, A. S., Franz, T. M., 'Diagnosing groups: charting the flow of information in medical decision-making teams', *Journal of Personality and Social Psychology*, Vol. 71, No 2, 1996, pp. 315-330.
Larson, J. R., Foster-Fishman, P. G., Keys, C. B., 'Discussion of shared and unshared information in decision-making groups', *Journal of Personality and social Psychology*, Vol. 67, No 3, 1994, pp. 446-461.
Wittenbaum, G. M., Hollingshead, A. B., Botero, I. C., 'From cooperative to motivated information sharing in groups: Moving beyond the hidden profile paradigm', *Communication Monographs*, Vol. 71, No 3, 2004, pp. 286-310.

78 Reynolds, A., Lewis, D., 'Teams Solve Problems Faster When They're More Cognitively Diverse', *Harvard Business Review*, 30 March 2017.

79 Badie, D., 'Groupthink, Iraq, and the war on terror: Explaining US policy shift toward Iraq', *Foreign Policy Analysis*, Vol. 6, No 4, 2010, pp. 277-296.
Barr, K., Mintz, A., 'Public policy perspective on group decision-making dynamics in foreign policy', *Policy Studies Journal*, Vol. 46, No S1, 2018, pp. 69-90.
Esser, J. K., Lindoerfer, J. S., 'Groupthink and the space shuttle Challenger accident: Toward a quantitative case analysis', *Journal of Behavioral Decision Making*, Vol. 2, No 3, 1989, pp. 167-177.
Janis, I. L., *Groupthink: Psychological studies of policy decisions and fiascoe*, Houghton Mifflin, Boston, 1982.
Kramer, R. M., 'Revisiting the Bay of Pigs and Vietnam decisions 25 years later: How well has the groupthink hypothesis stood the test of time?', *Organizational Behavior and Human Decision Processes*, Vol. 73, No 2-3, 1998, pp. 236-271.

Moorhead, G., Ference, R., Neck, C. P., 'Group decision fiascoes continue: Space shuttle Challenger and a revised groupthink framework', *Human Relations*, Vol. 44, No 6, 1991, pp. 539-550.

Payne, K., *The psychology of strategy: Exploring rationality in the Vietnam War*, C Hurst & Co Publishers Ltd., London, 2015.

Turner, S., 'Expertise and Political Responsibility: the Columbia Shuttle Catastrophe', in: Maasen, S., Weingart, P. (Eds.) *Democratization of Expertise? Exploring Novel Forms of Scientific Advice in Political Decision-Making*, Springer, Dordrecht, 2009, pp. 101-122.

80 G. Myers, D., Lamm, H., 'The Group Polarization Phenomenon', *Psychological Bulletin*, Vol. 83, 1976, pp. 602-627. *https://psycnet.apa.org/doi/10.1037/0033-2909.83.4.602*

Isenberg, D. J., 'Group Polarization: A Critical Review and Meta-Analysis', *Journal of Personality and Social Psychology*, Vol. 50, 1986.

Sunstein, C. R., 'The law of group polarization', *Journal of Political Philosophy*, Vol. 10, No 2, 2002, pp. 175-195

81 Keefer, P., Stasavage, D., 'The limits of delegation: Veto players, central bank independence, and the credibility of monetary policy', *American Political Science Review*, Vol. 97, No 3, 2003, pp. 407-423.

Krause, G. A., Douglas, J. W., 'Organizational structure and the optimal design of policymaking panels: Evidence from consensus group commissions' revenue forecasts in the American states', *American Journal of Political Science*, Vol. 57, No 1, 2013, pp. 135-149.

Sunstein, C. R., 'The law of group polarization', *Journal of Political Philosophy*, Vol. 10, No 2, 2002, pp. 175-195.

82 Stasser, G., Taylor, L. A., Hanna, C., 'Information sampling in structured and unstructured discussions of three- and six-person groups', *Journal of Personality and Social Psychology*, Vol. 57, No 1, 1989, pp. 67-78.

83 Turner, J. C., Wetherell, M. S., Hogg, M. A., 'Referent informational influence and group polarization', *British Journal of Social Psychology*, Vol. 28, No 2, 1989, pp. 135-147.

El-Shinnawy, M., Vinze, A. S., 'Polarization and persuasive argumentation: A study of decision making in group settings' *MIS Quarterly*, Vol. 22, No 2, 1998, pp. 165-198.

Sunstein, C. R., 'Deliberative trouble? Why groups go to extremes', *The Yale Law Journal*, Vol. 110, No 1, 2000, pp. 71-119.

84 Yu, R., 'Stress potentiates decision biases: A stress induced deliberation-to- intuition (SIDI) model', *Neurobiology of Stress*, Vol. 3, 2016, pp. 83-95. *https://doi.org/10.1016/j.ynstr.2015.12.006*

85 Jacobson, J., Dobbs-Marsh, J., Liberman, V., Minson, J. A., 'Predicting Civil Jury Verdicts: How Attorneys Use (and Misuse) a Second Opinion', *Journal of Empirical Legal Studies*, Vol. 8, No S1, 2011, pp. 99-119.

86 Woolley, A. W., Chabris, C. F., Pentland, A., Hashmi, N., Malone, T. W., 'Evidence of a Collective Intelligence Factor in the Performance of Human Groups', *Science*, Vol. 330, New York, 2010, pp. 686-688. *https://doi.org/10.1126/science.1193147*

87 Credé, M., Howardson, G., 'The Structure of Group Task Performance - A Second Look at "Collective Intelligence": Comment on Woolley et al. (2010)', *Journal of Applied Psychology*, Vol. 102, No 10, 2017, pp. 1483-1492.

88 Frith, C. D., Frith, U., 'Mechanisms of social cognition', *Annual Review of Psychology*, Vol. 63, 2012, pp. 287-313. *https://doi.org/10.1146/annurev-psych-120710-100449*

89 Engel D., Woolley A. W., Jing L. X., Chabris, C. F., Malone, T. W., 'Reading the Mind in the Eyes or Reading between the Lines? Theory of Mind Predicts Collective Intelligence Equally Well Online and Face-To-Face', *PLOS ONE* , Vol. 9, No 12, 2014. *https://doi.org/10.1371/journal.pone.0115212*

90 Shi, F., Teplitskiy, M., Duede, E., Evans, J., 'The wisdom of polarized crowds', *Nature Human Behaviour*, Vol. 3, 2019, *https://doi.org/10.1038/s41562-019-0541-6*

91 Surowiecki, J., *The Wisdom of Crowds*, Anchor Books, 2005.

Servan-Schreiber, E., *Supercollectif, la nouvelle puissance de nos intelligences*, Fayard, 2018.

92 Bernstein, E., Shore, J., Lazer, D., 'How intermittent breaks in interaction improve collective intelligence', *Harvard Business School Working Paper, Proceedings of the National Academy of Sciences*, 2019. *https://doi.org/10.1073/pnas.1802407115*

93 Pentland, A., 'The New Science of Building Great Teams', *Havard Business Review*, Vol. 4, 2012, pp. 3-11.
Horton, C., 'V the people', *MIT Technology Review, Technology is threatening our democracy. How to save it?*, Vol. 121, No 5, 2018, pp. 74-79.

94 MIT Deliberatorium, *http://deliberatorium.mit.edu:8000/ci/login* (last access 12 June 2019).
Atasanov, P., Rescober, P., Stone, E., Swift, S. A., Servan-Schreiber, E., Tetlock , P., Ungar, L., Mellers, B., 'Distilling the Wisdom of the Crowds: Prediction Markets vs. Prediction Polls', *Management Science*, Vol. 63, No 3, 2016, pp. 691-706.

95 Woolley, A. W., Chabris, C. F., Pentland, A., Hashmi, N., Malone, T. W., 'Evidence of a Collective Intelligence Factor in the Performance of Human Groups', Science, Vol. 330, New York, 2010, pp. 686-688. *https://doi.org/10.1126/science.1193147*

96 Kray, L. J., Galinsky, A. D., 'The debiasing effect of counterfactual mind-sets: Increasing the search for disconfirmatory information in group decisions', *Organizational Behavior and Human Decision Processes*, Vol. 91, No 1, 2003, pp. 69-81.
Lilienfeld, S. O., Ammirati, R., Landfield, K., 'Giving debiasing away: Can psychological research on correcting cognitive errors promote human welfare?', *Perspectives on Psychological Science*, Vol. 4, No 4, 2009, pp. 390-398.

97 Ackermann, F., 'Problem structuring methods ''in the Dock'': Arguing the case for Soft OR', *European Journal of Operational Research*, Vol. 219, No 3, 2012, pp. 652-658.

98 Stewart, G., Murray R., 'Team Structure and Performance: Assessing the Mediating Role of Intrateam Process and the Moderating Role of Task Type', *The Academy of Management Journal*, Vol. 43, No 2, 2000, pp. 135-148.

99 Mingers, J., Rosenhead, J., 'Problem structuring methods in action', *European Journal of Operational Research*, Vol. 152, No 3, 2004, pp. 530-554.

100 Website of the software *Rationale*: *http://www.austhink.com* (last access 12 June 2019)
Website of the software *pol.is*: *https://pol.is/home* (last access 12 June 2019)

101 Iandoli, L., Quinto, I., Spada, P., Klein, M., Calabretta, R., 'Supporting argumentation in online political debate: Evidence from an experiment of collective deliberation', *New Media & Society*, Vol. 20, No 4, 2018, pp. 1320-1341.

102 Edmondson, A., 'Psychological safety and learning behavior in work teams', *Administrative Science Quarterly*, Vol. 44, No 2, 1999, pp. 350-383.

103 Nyhan, B., Zeitzoff, T., 'Fighting the past: Perceptions of control, historical misperceptions and corrective information in the Israeli-Palestinian conflict', *Political Psychology*, Vol. 39, No 33, 2018, pp. 611-631.

104 Edmondson, A. C., Lei, Z., 'Psychological safety: The history, renaissance, and future of an interpersonal construct.' *Annual Review of Organizational Psychology and Organizational Behavior*, Vol. 1, No 1 2014, pp. 23-43.

105 Bristow, J., 'Mindfulness in Politics and Public Policy', Current Opinion in Psychology, Vol. 28, pp. 87-91. *https://doi.org/10.1016/j.copsyc.2018.11.003*

106 Srivastava, A., Bartol, K. M., Locke, E. A., 'Empowering leadership in management teams: Effects on knowledge sharing, efficacy, and performance', *Academy of Management Journal*, Vol. 49, No 6, 2006, pp. 1239-1251.
Lam, C. K., Huang, X., Chan, S. C., 'The threshold effect of participative leadership and the role of leader information sharing', *Academy of Management Journal*, Vol. 58, No 3, 2015, pp. 836-855.

107 McHugh, K. A., Yammarino, F. J., Dionne, S. D., Serban, A., Sayama, H., Chatterjee, S., 'Collective decision making, leadership, and collective intelligence: Tests with agent-based simulations and a field study', *The Leadership Quarterly*, Vol. 27, No 2, 2016, pp. 218-241.

108 Stasser, G., Stewart, D. D., Wittenbaum, G. M., 'Expert roles and information exchange during discussion: The importance of knowing who knows what', *Journal of Experimental Social Psychology*, Vol. 31, No 3, 1995, pp. 244-265.
Stasser, G., Vaughan, S. I., Stewart, D. D., 'Pooling unshared information: The benefits of knowing how access to information is distributed among group members' *Organizational Behavior and Human Decision Processes*, Vol. 82, No 1, 2000, pp. 102-116.

109 Keestra, M., 'Metacognition and Reflection by Interdisciplinary Experts: Insights from Cognitive Science and Philosophy', *Issues in Interdisciplinary Studies*, Vol. 35, 2018, pp. 121-171.

110 Yang, T.-M., Maxwell, T. A., 'Information-sharing in public organizations: A literature review of interpersonal, intra-organizational and inter-organizational success factors', *Government Information Quarterly*, Vol. 28, No 2, 2011, pp. 164-175.

Franz, T. M., Larson Jr, J. R., 'The impact of experts on information sharing during group discussion', *Small Group Research*, Vol. 33, No 4, 2002, pp. 383-411.

111 Stanley, J. D., 'Dissent in organizations', *Academy of Management Review*, Vol. 1, 1981, pp. 13-19.

112 Schulz-Hardt, S., Brodbeck, F. C., Mojzisch, A., Kerschreiter, R., Frey, D., 'Group decision making in hidden profile situations: dissent as a facilitator for decision quality', *Journal of personality and social psychology*, Vol. 91, No 6, 2006, pp. 1080-1093.

113 Kray, L., Galinsky, D., 'The debiasing effect of counterfactual mind-sets: Increasing the search for disconfirmatory information in group decisions', *Organisational Behaviour and Human Decision Processes*, Vol. 91, 2003, pp. 69-81.

114 Meissner P., Wulf, T., 'Cognitive benefits of scenario planning: Its impact on biases and decision quality', *Technology forecasting & Social Change*, Vol. 80, No 4, 2013, pp. 801-814.

115 Greitemeyer, T., Schulz-Hardt, S., 'Preference-consistent evaluation of information in the hidden profile paradigm: Beyond group-level explanations for the dominance of shared information in group decisions', *Journal of Personality and Social Psychology*, Vol. 84, No 2, 2003, pp. 322-329.

116 Hallsworth, M., Egan, M., Rutter, J., McCrae, J., 'Behavioural Government. Using behavioural science to improve how governments make decisions', The Behavioural Insights Team, The Institute for Government, London, 2018.

117 Hornsey, M. J., Oppes, T., Svensson, A. 'It's OK if we say it, but you can't': Responses to intergroup and intra group criticism', *European Journal of Social Psychology*, 32, 2002, pp. 293-307.

Hornsey, M. J., Trembath, M., Gunthorpe, S., 'You can criticize because you care: Identity attachment, constructiveness, and the intergroup sensitivity effect', *European Journal of Social Psychology*, Vol. 34, No 5, 2004, pp. 499-518

118 Sloman, S.A., Rabb, N., 'Thought as a determinant of political opinion', *Cognition*, Vol. 188, pp. 1-7.

119 Compton, R. J., 'The interface between emotion and attention: A review of evidence from psychology and neuroscience', *Behavioral and Cognitive Neuroscience Reviews*, Vol. 2, No 2, 2003, pp. 115-129.

Santos, A., Silva, C., Rosset, D., Deruelle, 'Just another face in the crowd: Evidence for decreased detection of angry faces in children with Williams syndrome', *Neuropsychologia*, Vol. 48, No 4, 2010, pp. 1071-1078.

120 Brader, T., 'Striking a responsive chord: How political ads motivate and persuade voters by appealing to emotions', *American Journal of Political Science*, Vol. 49, 2005, pp. 388-405.

Hanson, J. L., Chung, M. K., Avants, B. B., Rudolph, K. D., Shirtcliff, E. A., Gee, J. C., Davidson, R. J., Pollak, S. D., 'Structural Variations in Prefrontal Cortex Mediate the Relationship between Early Childhood Stress and Spatial Working Memory', *The Journal of Neuroscience*, Vol. 32,No 23, 2012, pp. 7917-7925. *http://www.jneurosci.org/content/32/23/7917* (last access 11 June 2019)

121 Okon-Singer, H., Stout, D.M. Stockbridge, M. D., Gamer, M., S. F., Andrew and Shackman, A. J., 'The Interplay of Emotion and Cognition', in: Fox, A. S., Lapate, R. C., Shackman, A. J., Davidson, R. J. (Eds.), *The nature of emotion: Fundamental questions*, Oxford University Press, New York, 2018, pp.181-185.

122 Winter, E., 'Feeling Smart. Why Our Emotions Are More Rational Than We Think', Public Affairs, New York, 2014.

123 Pessoa, L., *The Cognitive-Emotional Brain. From interactions to integration*, MIT-Press, Cambridge MA, 2013.

Phelps, E. A., Lempert, K. M., Sokol-Hessner, P., 'Emotion and Decision Making: Multiple Modulatory Neural Circuits', *Annual Review of Neuroscience*, Vol. 37, No 1, 2014, pp. 263-287. *https://doi.org/10.1146/annurev-neuro-071013-014119*

Groenendyk, E., 'The anxious and ambivalent partisan: The effect of incidental anxiety on partisan motivated recall and ambivalence', *Public Opinion Quarterly*, Vol. 80, 2016, pp. 460-479.

Huntsinger, J.R., Isbell, L. M., Clore, G. L., 'The Affective Control of Thought: Malleable, Not Fixed', *Psychological Review*, Vol. 121, No 4, 2014, pp. 600-618. *http://dx.doi.org/10.1037/a0037669*

124 Pessoa, L., *The Cognitive-Emotional Brain. From Interactions to Integration*, MIT-Press, Cambridge MA, 2013.

Volz, K. G., Hertwig, R., 'Emotions and decisions: Beyond conceptual vagueness and the rationality muddle', *Perspectives on Psychological Science*, Vol. 11, No 1, 2016, pp. 101-116.

Okon-Singer, H., Stout, D.M. Stockbridge, M. D., Gamer, M., Andrew, S. F., Shackman, A. J., 'The Interplay of Emotion and Cognition', in: Fox, A. S., Lapate, R. C., Shackman, A. J., Davidson, R. J. (Eds.), *The nature of emotion: Fundamental questions*, Oxford University Press, New York, 2018, pp. 181-185.

125 Clore. G.L., 'Psychology and the Rationality of Emotion', Modern Theology, Vol. 27, No 2, 2011, pp. 325-338. *https://doi.org/10.1111/j.1468-0025.2010.01679*

Forgas, J.P., 'Can Sadness Be Good for you? On the Cognitive, Motivational, and Interpersonal Benefits of Negative Affect', in: W.G. Parrott (Ed.), *The Positive Side of Negative Emotions*, Guilford Publications, 2014.

Nesse, R. M., Ellsworth, P. C., 'Evolution, emotions, and emotional disorders', *American Psychologist*, Vol. 64, No 2, 2009, pp. 129-139. *http://dx.doi.org/10.1037/a0013503*

Volz, K. G., Hertwig, R., 'Emotions and decisions: Beyond conceptual vagueness and the rationality muddle', *Perspectives on Psychological Science*, Vol. 11, No 1, 2016, pp. 101-116.

126 Pessoa, L., *The Cognitive-Emotional Brain. From Interactions to Integration*, MIT-Press, Cambridge MA, 2013.

127 Feldman-Barrett, L., *How Emotions are Made: The Secret Life of the Brain*, MacMillan, 2017.

Okon-Singer, H., Stout, D.M. Stockbridge, M. D., Gamer, M., Andrew, S. F., Shackman, A. J., 'The Interplay of Emotion and Cognition', in: Fox, A. S., Lapate, R. C., Shackman, A. J., Davidson, R. J. (Eds.), *The nature of emotion: Fundamental questions*, Oxford University Press, New York, 2018, pp. 181-185.

Pessoa, L., *The Cognitive-Emotional Brain. From Interactions to Integration*, MIT-Press, Cambridge MA, 2013.

128 Nesse, R. M., Ellsworth, P. C., 'Evolution, emotions, and emotional disorders', *American Psychologist*, Vol. 64, No 2, 2009, pp. 129-139. *http://dx.doi.org/10.1037/a0013503*

129 Meshulam, M., Winter, E., Shakhar, G. B., Aharon, I., 'Rational emotions', Social Neuroscience, Vol. 7, No 1, 2012, pp. 11-17. *https://doi.org/10.1080/17470919.2011.559124*

130 Groenendyk, E., 'The anxious and ambivalent partisan: The effect of incidental anxiety on partisan motivated recall and ambivalence', *Public Opinion Quarterly*, Vol. 80, No 2, 2016, pp. 460-479.

131 Lehrer, J., *How We Decide*, Houghton Mifflin Harcourt, Boston, 2009.

132 Brader, T., 'Striking a responsive chord: How political ads motivate and persuade voters by appealing to emotions', *American Journal of Political Science*, Vol. 49, 2005, pp. 388-405.

Damasio, A. R., *Descartes' Error: Emotion, Reason, and the Human Brain*, Grosset/Putnam, New York, 1994.

Lehrer, J., *How We Decide*, Houghton Mifflin Harcourt, Boston, 2009.

Okon-Singer, H., Stout, D.M. Stockbridge, M. D., Gamer, M., Andrew, S. F., Shackman, A. J., 'The Interplay of Emotion and Cognition', in: Fox, A. S., Lapate, R. C., Shackman, A. J., Davidson, R. J. (Eds.), *The nature of emotion: Fundamental questions*, Oxford University Press, New York, 2018, pp.181-185, p.181.

Winter, E., 'Feeling Smart. Why Our Emotions Are More Rational Than We Think', Public Affairs, New York, 2014.

133 Okon-Singer, H., Stout, D.M. Stockbridge, M. D., Gamer, M., Andrew S. F., Shackman, A. J., 'The Interplay of Emotion and Cognition', in: Fox, A. S., Lapate, R. C., Shackman, A. J., Davidson, R. J. (Eds.), *The nature of emotion: Fundamental questions*, Oxford University Press, New York, 2018, pp.181-185, p. 184.

134 van Reekum, C. M., Johnstone, T., 'Emotion Regulation as a Change of Goals and Priorities', in: Fox, A. S., Lapate, R. C., Shackman, A. J., Davidson, R. J. (Eds.), *The nature of emotion: Fundamental questions*, Oxford University Press, New York, 2018, pp.165-169.

135 Volz, K. G., Hertwig, R., 'Emotions and decisions: Beyond conceptual vagueness and the rationality muddle', *Perspectives on Psychological Science*, Vol. 11, No 1, 2016, pp. 101-116.

136 Shackman, A. J., Fox, A. S., Seminowicz, D., 'The cognitive-emotional brain: Opportunities and challenges

for understanding neuropsychiatric disorders', *Behavioral and Brain Sciences*, Vol. 38, No 86, 2015, *https://doi.org/10.1017/S0140525X14001010*

137 Pessoa, L., 'The Cognitive-Emotional Brain', in: Fox, A. S., Lapate, R. C., Shackman, A. J., Davidson, R. J. (Eds.), *The nature of emotion: Fundamental questions*, Oxford University Press, New York, 2018, pp. 202-206.

138 Bargh, J. A., 'The automaticity of everyday life', in: Wyer, R. (Ed.), *Advances in Social Cognition*, Vol. 10, Erlbaum, Mahwah, NJ, 1997, pp. 1-61.

139 Greifeneder, R., Bless, H., Pham, M. T., 'When do people rely on affective and cognitive feelings in judgment? A review', *Personality and Social Psychology Review*, Vol. 15, No 2, 2011, pp. 107-141.

140 Azevedo, R. T., Garfinkel, S. N., Critchley, H. D., Tsakiris, M., 'Cardiac afferent activity modulates the expression of racial stereotypes', Nature Communications, Vol. 8, Art. 13854, 2017. *https://doi.org/10.1038/ncomms13854*
Greifeneder, R., Bless, H., Pham, M. T., 'When do people rely on affective and cognitive feelings in judgment? A review', *Personality and Social Psychology Review*, Vol. 15, No 2, 2011, pp. 107-141.

141 Greifeneder, R., Bless, H., Pham, M. T., 'When do people rely on affective and cognitive feelings in judgment? A review', *Personality and Social Psychology Review*, Vol. 15, No 2, 2011, pp. 107-141.

142 Denton, D.A. McKinley, M.J., Farrell. M., Egan G. F., 'The role of primordial emotions in the evolutionary origin of consciousness', *Consciousness and Cognition*, Vol. 18, No 2, 2009, pp. 500-514. *https://doi.org/10.1016/j.concog.2008.06.009*

143 Inbar, Y., Pizarro, D., Iyer, R., Haidt, J., 'Disgust Sensitivity, Political Conservatism, and Voting', Social Psychological and Personality Science, Vol. 3, No 5, 2012, pp. 537-544. *https://doi.org/10.1177/1948550611429024*
Schnall, S., Haidt, J., Clore, G.L., Jordan, A. H., 'Disgust as Embodied Moral Judgment', *Personality And Social Psychology Bulletin*, Vol. 34, No 8, 2008, pp. 1096-1109. *https://doi.org/10.1177%2F0146167208317771*

144 Inbar, Y., Pizarro, D., Iyer, R., Haidt, J., 'Disgust Sensitivity, Political Conservatism, and Voting', Social Psychological and Personality Science, Vol. 3, No 5, 2012, pp. 537-544. *https://doi.org/10.1177/1948550611429024*

145 Inbar, Y., Pizarro, D., Iyer, R., Haidt, J., 'Disgust Sensitivity, Political Conservatism, and Voting', Social Psychological and Personality Science, Vol. 3, No 5, 2012, pp. 537-544. *https://doi.org/10.1177/1948550611429024*

146 Hodson, G., Costello, K., 'Interpersonal Disgust, Ideological Orientations, and Dehumanization as Predictors of Intergroup Attitudes', *Psychological Science*, Vol. 18, No 8, 2007, pp. 691-698. *https://doi.org/10.1111/j.1467-9280.2007.01962.x*

147 Clifford, S., Wendell, D.G., 'How Disgust Influences Health Purity Attitudes', *Political Behaviour*, Vol. 38, No 1, 2016, pp. 155-178.
Scott, S. E., Inbar, Y., Rozin, P., 'Evidence for Absolute Moral Opposition to Genetically Modified Food in the United States', *Perspectives on Psychological Science*, Vol. 11, No 3, 2016, pp. 315-324. *https://doi.org/10.1177%2F1745691615621275*

148 Aarøe, L., Petersen, M. B.,Arceneaux, K., 'The Behavioral Immune System Shapes Political Intuitions: Why and How Individual Differences in Disgust Sensitivity Underlie Opposition to Immigration', *American Political Science Review*, Vol. 111, No 2, 2017, 277-294. *https://doi.org/10.1017/S0003055416000770*
Clifford, S., Wendell, D.G., 'How Disgust Influences Health Purity Attitudes', *Political Behaviour*, Vol. 38, No 1, 2016, pp. 155-178.

149 Hanson, J. L., Chung, M. K., Avants, B. B., Rudolph, K. D., Shirtcliff, E. A., Gee, J. C., Davidson, R. J., Pollak, S. D., 'Structural Variations in Prefrontal Cortex Mediate the Relationship between Early Childhood Stress and Spatial Working Memory', *The Journal of Neuroscience*, Vol. 32,No 23, 2012, pp. 7917-7925. *http://www.jneurosci.org/content/32/23/7917* (last access 11 June 2019)

150 Yu, R., 'Stress potentiates decision biases: A stress induced deliberation-to- intuition (SIDI) model', *Neurobiology of Stress*, Vol. 3, 2016, pp. 83-95. https://doi.org/10.1016/j.ynstr.2015.12.006

151 Schwabe, L., Wolf, O. T., 'Stress prompts habit behavior in humans. The Journal of Neuroscience: The Official Journal of the Society for Neuroscience', Vol. 29, No 22, 2009, pp. 7191-7198. *https://doi.org/10.1523/JNEUROSCI.0979-09.2009*

152 Phelps, E. A., Lempert, K. M., Sokol-Hessner, P., 'Emotion and Decision Making: Multiple Modulatory Neural Circuits', *Annual Review of Neuroscience*, Vol. 37, No 1, 2014, pp. 263-287. *https://doi.org/10.1146/annurev-neuro-071013-014119*

153 Brader, T., Marcus, G., 'Emotion and political psychology', in: Huddy, L., Sears, D., Levy, J. S. (Eds.), *The Oxford handbook of political psychology* (2nd ed.) Oxford University Press, New York, 2013, pp. 165-204.

154 Weber, C., 'Emotions, campaigns, and political participation', *Political Research Quarterly*, Vol. 66, No 2, 2013, pp. 414-428.

155 Valentino, N. A., Brader, T., Groenendyk, E. W., Gregorowicz, K., Hutchings, V. L., 'Election night's alright for fighting: The role of emotions in political participation', Journal of Politics, Vol. 73, No 1, 2011, 156-170.

156 Suhay, E. Erisen, C., 'The Role of Anger in the Biased Assimilation of Political Information', *Political Psychology*, Vol. 39, No 4, pp. 793-810.

157 MacKuen, M., Wolak, J., Keele, L., Marcus, G. E., 'Civic engagements: Resolute partisanship or reflective deliberation', *American Journal of Political Science*, Vol. 54, No 2, 2010, pp. 440-458.
Suhay, E. Erisen, C., 'The Role of Anger in the Biased Assimilation of Political Information', *Political Psychology*, Vol. 39, No 4, pp. 793-810.

158 MacKuen, M., Wolak, J., Keele, L., Marcus, G. E., 'Civic engagements: Resolute partisanship or reflective deliberation', *American Journal of Political Science*, Vol. 54, No 2, 2010, pp. 440-458, p. 441.

159 Hutchings, V. L., Valentino, N., Philpot, T., White, I. K., 'Racial cues in campaign news: the effects of candidate strategies on group activation and political attentiveness among African Americans', in: Redlawsk, D. (Ed.), *Feeling politics*, Palgrave Macmillan, New York, 2006, pp. 165-186.

160 Groenendyk, E., 'The anxious and ambivalent partisan: The effect of incidental anxiety on partisan motivated recall and ambivalence', *Public Opinion Quarterly*, Vol. 80, No 2, 2016, pp. 460-479.

161 MacKuen, M., Wolak, J., Keele, L., Marcus, G. E., 'Civic engagements: Resolute partisanship or reflective deliberation', *American Journal of Political Science*, Vol. 54, No 2, 2010, pp. 440-458.
Pessoa, L., *The Cognitive-Emotional Brain. From interactions to integration*, The MIT Press, Cambridge MA, 2013.
Phelps, E. A., Lempert, K. M., Sokol-Hessner, P., 'Emotion and Decision Making: Multiple Modulatory Neural Circuits', *Annual Review of Neuroscience*, Vol. 37, No 1, 2014, pp. 263-287. *https://doi.org/10.1146/annurev-neuro-071013-014119*

162 Huddy, L., Feldman, S., Cassese, E., 'On the distinct political effects of anxiety and anger.' in: Neuman, W. R., Marcus, G. E., Crigler, A. N., MacKuen, M. (Eds.), *Affect effect: Dynamics of emotion in political thinking and behavior*, Chicago University Press, Chicago, 2007, pp. 202-230.

163 De Vries, C. E., Hoffmann, I., 'The Hopeful, the Fearful and the Furious. Polarization and the 2019 European Parliamentary Elections', *eupinions | what do you whink?*, No 2019/1, Bertelsmann Stiftung, 2019. *https://www.bertelsmann-stiftung.de/en/publications/publication/did/eupinions-the-hopeful-the-fearful-and-the-furious/* (last access 11 June 2019)

164 De Vries, C. E., Hoffmann, I., 'The Hopeful, the Fearful and the Furious. Polarization and the 2019 European Parliamentary Elections', *eupinions | what do you whink?*, No 2019/1, Bertelsmann Stiftung, 2019. *https://www.bertelsmann-stiftung.de/en/publications/publication/did/eupinions-the-hopeful-the-fearful-and-the-furious/* (last access 11 June 2019)

165 Eisenberger, N. I., Lieberman, M. D., Williams, K. D., 'Does rejection hurt? An FMRI study of social exclusion', *Science*, Vol. 302, Art. 5643, 2003, pp. 290-292.
Panksepp J., 'Affective neuroscience of the emotional BrainMind: evolutionary perspectives and implications for understanding depression', *Dialogues in Clinical Neuroscience*, Vol. 12, No 4, 2010, pp. 533-545.

166 Bernhardt, B. C., Singer, T., 'The neural basis of empathy', *Annual Review of Neuroscience*, Vol. 35, No 1, pp. 1-23. DOI: 10.1146/annurev-neuro-062111-150536

167 Decety, J., 'A social cognitive neuroscience model of human empathy', in: Harmon-Jones, E., Winkelman, P. (Eds.),

Social Neuroscience: Integrating Biological and Psychological Explanations of Social Behavior, Guilford Publications, New York, 2007, pp. 246-270.

168 Bernhardt, B. C., Singer, T., 'The neural basis of empathy', Annual Review of Neuroscience, Vol. 35, No 1, pp. 1-23. DOI: 10.1146/annurev-neuro-062111-150536

169 Engen, H. G., Singer, T., 'Empathy circuits', *Current Opinion in Neurobiology*, Vol. 23, No 2, 2013, pp. 275-282.

170 Hatfield, E., Rapson, R. L., Le, Y-C. L. , 'Emotional Contagion and Empathy', in: Decety, J. and Ickes, W. (Eds.), *The Social Neuroscience of Empathy*. MIT Press, 2009. *http://dx.doi.org/10.7551mitpress/9780262012973.003.0003*

171 Decety, J., 'A social cognitive neuroscience model of human empathy', in: Harmon-Jones, E., Winkelman, P. (Eds.), *Social Neuroscience: Integrating Biological and Psychological Explanations of Social Behavior*, Guilford Publications, New York, 2007, pp. 246-270.

172 Bernhardt, B. C., Singer, T., 'The neural basis of empathy', *Annual Review of Neuroscience*, Vol. 35, No 1, pp. 1-23. DOI: 10.1146/annurev-neuro-062111-150536

173 Hart R. P., Wade J. B., Martelli M. F., 'Cognitive impairment in patients with chronic pain: the significance of stress', *Current Pain and Headache Reports*, Vol. 7, No 2, 2003, pp. 116-126.

174 Societal Impact of Pain Platform *SIP position paper of the 9th EU Framework Program*, 2018. *https://www.sip-platform.eu/files/editor/media/EU%20Initiatives/SIP%20Position%20Paper%20on%20the%209th%20Framework%20Programme.pdf* (last access 13 June 2019)

175 d'Hombres, B., Schnepf, S., Barjakovà, M., Teixeira Mendonça, F., 'Loneliness – an unequally shared burden in Europe', Science for Policy Briefs, European Commission Joint Research Centre, 2019. *https://ec.europa.eu/jrc/sites/jrcsh/files/fairness_pb2018_loneliness_jrc_i1.pdf* (last access 17 June 2019)

176 Grabbe, H., Lehne, S., *Emotional Intelligence for EU Democracy*, Carnegie Europe, Brussels, 2015. *https://carnegieendowment.org/files/emotional_intelligence_eu_democ.pdf* (last access 11 June 2019)

177 E.g. *https://www.isdglobal.org/programmes/research-insight/digital-analysis/; https://www.splcenter.org/hate-map.* See also: *http://www.isdglobal.org/wp-content/uploads/2017/06/CN-Monitoring-and-Evaluation-Handbook.pdf*

178 E.g. European Pain Federation, *Declaration of Miami*, Sixth World Congress of the World Institute of Pain, 2012. *https://europeanpainfederation.eu/declaration-of-miami/* (last access 13 June 2019)

179 Richards, B., 'The Emotional Deficit in Political Communication', *Political Communication*, Vol. 21, No 3, 2004, pp. 339-352. *https://doi.org/10.1080/10584600490481451*

180 Halman, L. C. J. M., 'Values', in: Anheier, H., Toepler, S. (Eds.), *International encyclopedia of civil society*, Springer, New York, 2010, pp. 1599-1604. *https://pure.uvt.nl/ws/portalfiles/portal/1191624/SOC_Halman_Values_hfdst__Int_Ency_Civ_Soc_2010.pdf (last access 12 June 2019)*

181 Lieberman, M. D., *Social: Why our brains are wired to connect*. Crown Publishers/Random House New York, 2013.

182 Eisenberger, N. I., Lieberman, M. D., Williams, K. D., 'Does rejection hurt? An FMRI study of social exclusion', *Science,* Vol. 302, No 5643, 2003, pp. 290-292. *https://doi.org/10.1126/science.1089134*

183 McGowan, M., Shiu, E., Hassan, L. M., 'The influence of social identity on value perceptions and intention', *Journal of Consumer Behaviour*, Vol. 16, No 3, 2017, pp. 242-253.

184 Colombo, C., Kriesi, H., 'Party, policy–or both? Partisan-biased processing of policy arguments in direct democracy', *Journal of Elections, Public Opinion and Parties*, Vol. 27, No 3, 2017, pp. 235-253. *https://doi.org/10.1080/17457289.2016.1254641*

185 Ramos, A. M., Griffin, A., Neiderhiser, J. M., Reiss, D., 'Did I Inherit My Moral Compass? Examining Socialization and Evocative Mechanisms for Virtuous Character Development', *Behavior Genetics,* Vol. 49, No 2, 2019, pp. 175-186. *https://doi.org/10.1007/s10519-018-09945-4*

186 Erisen, C., Redlawsk, D., Erisen, E., 'Complex thinking as a result of incongruent information exposure', *American Politics Research*, Vol. 46, No 2, 2018, pp. 217-245.

187 Huddy, L., Bankert, A., 'Political Partisanship as a Social Identity', *Oxford Research Encyclopedia of Politics*, USA, Oxford University Press, online publication: May 2017. *https://dx.doi.org/10.1093/acrefore/9780190228637.013.250*

188 Cohen, L.G., 'Party Over Policy: The Dominating Impact of Group Influence on Political Beliefs', *Journal of Personality and Social Psychology*, Vol. 85, No 5, 2003, pp. 808-822. *http://dx.doi.org/10.1037/0022-3514.85.5.808*

189 Colombo, C., Kriesi, H., 'Party, Policy – or both? Partisan-biased processing of policy arguments in direct democracy', *Journal of Elections, Public Opinion and Parties*, Vol. 27, No 3, 2017, pp. 235-253. *https://doi.org/10.1080/17457289.2016.1254641*

190 Walter, A.S., Redlawsk, D.P., 'Voters' Partisan Responses to Politicians' Immoral Behavior', *Political Psychology,* 2019. *https://doi.org/10.1111/pops.12582*

191 Jost, J. T., Federico, C. M., Napier, J. L., 'Political ideology: Its structure, functions, and elective affinities', *Annual Review of Psychology*, Vol. 60, 2009, pp. 307-337. *https://doi.org/10.1146/annurev.psych.60.110707.163600*

192 Carney, D. R., Jost, J. T., Gosling, S. D., &Potter, J., 'The secret lives of liberals and conservatives: Personality profiles, interaction styles, and the things they leave behind', *Political Psychology*, Vol. 29, 2008, pp 807-840.
Burke, B., Kosloff, S., & Landau, M., 'Death goes to the polls: A meta-analysis of mortality salience effects on political attitudes', *Political Psychology*, Vol. 34, 2013, pp. 183-200.
Jost, J., 'Ideological asymmetries and the essence of political psychology', *Political Psychology*, Vol. 38, 2017, pp. 167-208.

193 Arts, W., Hagenaars, J., Halman, L. (Eds.), *The Cultural Diversity of European Unity. Findings, Explanations and Reflections from the European Values Study*, Brill Academic, Leiden/Boston, 2003.
Inglehart, R. *Modernization and Postmodernization: Cultural, Economic, and Political Change in 43 Societies.* Princeton University Press, Princeton, 1997.

194 Eichhorn, J., Kupsch, V., Molthof, L., Mohr, M., 'How European Publics and Policy Actors Value an Open Society', *Voices on Values*, Open Society Foundation, European Policy Institute, 2019. *http://situationroom.dpart.org/images/finalreports/OSI-019-18-Key-Insights_v5.pdf* (last access 12 June 2019)

195 Eichhorn, J., Kupsch, V., Molthof, L., Mohr, M., 'How European Publics and Policy Actors Value an Open Society', *Voices on Values*, Open Society Foundation, European Policy Institute, 2019. *http://situationroom.dpart.org/images/finalreports/OSI-019-18-Key-Insights_v5.pdf* (last access 12 June 2019)

196 Duclos, J., Esteban, J., Ray, D. 'Polarization: Concepts, Measurement, Estimation', *Econometrica,* Vol. 72, 2004, pp. 1737-1772.

197 Evans, J. H., 'Have Americans' Attitudes Become More Polarized?—An Update', *Social Science Quarterly*, Vol. 84, No 1, 2003, pp. 71-90. *https://doi.org/10.1111/1540-6237.8401005*

198 Pew Research Centre, 'The Partisan Divide on Political Values Grows Even Wider', *Trust, Facts and Democracy*, 2017. *https://www.people-press.org/2017/10/05/the-partisan-divide-on-political-values-grows-even-wider/* (last access 12 June 2019)

199 Mason, L, *Uncivil Agreement. How politics became our identity*, University of Chicago Press, Chicago, 2008

200 Bolsen, T., Druckman, J. N., Cook, F. L., 'Citizens', scientists', and policy advisors' beliefs about global warming', *The ANNALS of the American Academy of Political and Social Science*, Vol. 658, No 1, 2005, 271-295. *https://doi.org/10.1177/0002716214558393*

201 Oesch, D., Rennwald, L., 'Electoral competition in Europe's new tripolar political space: Class voting for the left, centre-right and radical right', 2018. *https://doi.org/10.1111/1475-6765.12259*

202 Lewis, P., Clarke, S., Barr, C., Holder, J., Kommenda, N., 'Revealed: one in four Europeans vote populist - Exclusive research shows how populists tripled their vote over the past two decades', *The Guardian*, 20 November 2018. *https://www.theguardian.com/world/ng-interactive/2018/nov/20/revealed-one-in-four-europeans-vote-populist* (last access 12 June 2019)

203 IOM - International Organisation for Migration, 'Why Values, not Economics, Hold the Key to the Populist Right - and to Crafting New Migration Narratives', 2017. *https://publications.iom.int/system/files/pdf/why_values_not_economics.pdf* (last access 12 June 2019)

204 Campbell, J., *The hero with a thousand faces: The collected works of Joseph Campbell*. New World, Novato CA, 2012.

205 Ruggles, C. L. N., (Ed.) Handbook of Archeoastronomy, Springer, New York, 2015.

206 Foucault, M., *The archeology of knowledge*, Tavistock Publications Limited, London, 1972.

207 Evans, G., 'Social class and the cultural turn: Anthropology, sociology and the post-industrial politics of 21st century Britain', *The Sociological Review*, Vol. 65, No 1, 2017, pp. 88-104. *https://doi.org/10.1177/0081176917693549*

Gingrich, A., Banks, M., (Eds.), *Neo-nationalism in Europe and Beyond: Perspectives from Social Anthropology*, Berghahn Books, New York/Oxford, 2006.

Hugh, G., 'From Brexit to Trump: Anthropology and the rise of nationalist populism', *American Ethnologist*, Vol. 44, No 2, 2017, pp. 209-214.

Makovicky, N., 'Work pays': Slovak neoliberalism as 'authoritarian populism'', *Focaal: Journal of Global and Historical Anthropology*, Vol. 67, 2013, pp. 77-90.

208 Etnam, R.E., 'Framing: Toward Clarification of a Fractured Paradigm' *Journal of Communication*, Vol. 43, No 4, 1993, pp.51-58, *https://doi.org/10.1111/j.1460-2466.1993.tb01304.x*

209 Goffmann, E., *Frame analysis: an essay on the organization of experience*, Harvard University Press, Cambridge MA, 1974.

Fillmore, C. J., 'An Alternative to Checklist Theories of Meaning', Proceedings of the First Annual Meeting of the Berkeley Linguistics Society, 1975, pp. 123-131. *http://dx.doi.org/10.3765/bls.v1i0.2315*

Minsky, M., 'A framework for representing knowledge', Technical Report 306, MIT AI Laboratory. Memo 306, June 1974. *https://dspace.mit.edu/handle/1721.1/6089* (last access 12 June 2019)

210 Tversky, A., Kahneman, D., 'The framing of decisions and the psychology of choice', *Science*, Vol. 211, No 4481, 1981, pp. 453-458. *https://doi.org/10.1126/science.7455683*

211 Levinger, M., 'Love, Fear, Anger: The Emotional Arc of Populist Rhetoric', Narrative and Conflict: Explorations in Theory and Practice', Vol. 6, No 1, 2017, pp. 1-21. *https://doi.org/10.13021/G8ncetp.v6.1.2017.1954*

212 O'Keefe, D. J., Jensen, J. D., 'The Relative Persuasiveness of Gain-Framed Loss-Framed Messages for Encouraging Disease Prevention Behaviors: A Meta-Analytic Review', *Journal of Health Communication*, Vol. 12, 2007, No 7, pp. 623-644, *https://doi.org/10.1080/10810730701615198*

213 Gal, D., Rucker, D. D., 'The loss of loss aversion: Will It Loom Larger Than Its Gain?', *Journal of Consumer Psychology*, Vol. 28, No 3, 2018, pp. 497-516. *https://doi.org/10.1002/jcpy.1047*

214 Baekgaard, M., Christensen, J., Dahlmann, C., Mathiasen, A., Petersen, N., 'The role of evidence in politics: Motivated reasoning and persuasion among politicians', *British Journal of Political Science*, 2017, pp. 1-24, published online. *https://doi.org/10.1017/S0007123417000084*

215 Dixon, G., Hmielowski, J., Ma, Y., 'Improving climate change acceptance among U.S. conservatives through value-based message targeting', *Science Communication, Vol.* 39, No 4, 2017, pp. 520-534.

216 Druckman, J. N., 'On the limits of framing effects: Who can frame?', *Journal of Politics*, Vol. 6, No 4, 2001, pp. 1041-1066.

217 Musolff, A., 'Truths, lies and figurative scenarios - Metaphors at the heart of Brexit', *Journal of Language and Politics*, Vol. 16, No 5, 2017, pp. 641-657.

218 Gheorghiu, A. I., Callan, M. J., Skylark, W. J., 'Facial appearance affects science communication', *Proceedings of the National Academy of the Sciences of the United States of America*, Vol. 114, No 23, 2017, pp. 5970-5975. *https://doi.org/10.1073/pnas.1620542114*

219 Pollio, H., Barlow, J., Fine, H., Pollio, M., *The Poetics of Growth: Figurative Language in Psychology.* Erlbaum, Hillsdale NJ, 1977.

Pollio, H. R., Smith, M. K., Pollio, M. R., 'Figurative language and cognitive psychology', *Language and Cognitive Processes*, Vol. 5, No 2, 1990, pp. 141-167. *https://doi.org/10.1080/01690969008402102*

220 Gibbs, R., *The poetics of mind. Figurative thought, language, and understanding*, Cambridge University Press, Cambridge, 2002.

221 Lakoff, G., Johnson, M., *Metaphors we live by.* Chicago, University of Chicago Press, 2008.

222 Drulak, P., 'Metaphors Europe Lives by: Language and Institutional Change of the European Union', EUI Working Paper SPS, No 2004/15, Florence, European University Institute, 2004.

223 Musolff, A., *Metaphor and Political Discourse. Analogical Reasoning in Debates about Europe.* Basingstoke, Palgrave Macmillan, 2004.

224 Boyd, M., 'Metaphor and theory change', in: Ortony, A. (Ed.), *Metaphor and Thought*, Cambridge University Press, Cambridge, Second Edition, 1993, pp. 481-533.

225 Bougher, L. D., 'The case for metaphor in political reasoning and cognition', *Political Psychology*, Vol. 33, No 1, 2012, pp. 145-163. *https://doi.org/10.1111/j.1467-9221.2011.00865.x*
Mio, J. S., 'Metaphor and politics', *Metaphor and Symbol*, Vol. 12, No 2, 1997, pp. 113-133. *http://dx.doi.org/10.1207/s15327868ms1202_2*

226 Charteris-Black, J., 'Britain as a container: Immigration metaphors in the 2005 election campaign', *Discourse & Society*, Vol. 17, No 5, 2006, pp. 563-581. *https://doi.org/10.1177/0957926506066345*

227 Ottati, V., Renstrom, R., Price, E., 'The metaphorical framing model: Political communication and public opinion', in: Landau, M., Robinson, M. D., Meier, B. P. (Eds.), *The power of metaphor: Examining its influence on social life*, Washington DC, American Psychological Association, 2014, pp. 179-202.

228 Boyd, B., 'The evolution of stories: from mimesis to language, from fact to fiction', *Wiley Interdiciplinary Reviews Cognitive Science*, Vol. 9, No 1, Art. 1444, 2018, pp. 1-16. *https://doi.org/10.1002/wcs.1444*

229 da Silva, S. G., Tehrani, J. J., 'Comparative phylogenetic analyses uncover the ancient roots of Indo-European folktales', *Royal Society Open Science*, Vol. 3, Art. 150645, 2016, pp. 1-11. *https://doi.org/10.1098/rsos.150645*

230 Gottschall, J., *The storytelling animal: How stories make us human*, Houghton Mifflin Harcourt, Boston, 2012.

231 Bruner, J. S., *Acts of meaning*, Harvard University Press, Cambridge MA, 1990. ISBN 978-0-674-00361-3.

232 Gerrig, R. J., *Experiencing Narrative Worlds: On the Psychological Activities of Reading*, Yale University Press, New Haven, 1993.

233 Fisher, W., 'Narration as a human communication paradigm: The case of public moral argument', *Communication Monographs*, Vol. 51, No 1, 1984, pp. 1-22. *https://doi.org/10.1080/03637758409390180*

234 Anderson, C. A., Lepper, M. R., Ross, L., 'Perseverance of social theories: The role of explanation in the persistence of discredited information', *Journal of Personality and Social Psychology*, Vol. 39, No 6, 1980, pp. 1037-1049. *http://dx.doi.org/10.1037/h0077720*

235 Shanahan, E. A., Jones, M. D., McBeth, M. K., Radaelli, C. M., 'The Narrative Policy Framework', in: Weible, C. M., Sabatier, P. A. (Eds.), *Theories of the Policy Process*, (4th ed.), Westview Press, New York, 2017, pp. 173-213.

236 Shanahan, E. A., Jones, M. D., McBeth, M. K., Radaelli, C. M., 'The Narrative Policy Framework', in: Weible, C. M., Sabatier, P. A. (Eds.), *Theories of the Policy Process*, (4th ed.), Westview Press, New York, 2017, pp. 173-213.

237 Jones, M. D., McBeth, M. K., Shanahan, E. A., 'Introducing the Narrative Policy Framework', in: Jones, M. D., McBeth, M. K., Shanahan, E. A., (Eds.) *The Science of Stories: Applications of the Narrative Policy Framework in Public Policy Analysis,* Macmillan Palgrave, New York, 2014, pp. 1-25.
Niederdeppe, J., Shapiro, M. A., Kim, H. K., Bartolo, D., Porticella, N., 'Narrative Persuasion, Causality, Complex Integration, and Support for Obesity Policy', *Health Communication*, Vol. 29, No 5, 2014, pp. 431-444, *https://doi.org/10.1080/10410236.2012.761805*

238 Zak P. J., 'Why inspiring stories make us react: the neuroscience of narrative', *Cerebrum: the Dana forum on brain science*, 2015. PubMed PMID: 26034526. *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4445577/* (last access 12 June 2019)

239 Barraza, J. A., Alexander, V., Beavin, L.E., Terris, E. T., Zak, P.J., 'The heart of the story: Peripheral physiology during narrative exposure predicts charitable giving', *Biological Psychology*, Vol. 105, 2015, pp. 138-143. *https://doi.org/10.1016/j.biopsycho.2015.01.008*

240 Lasswell, H. D., 'The triple-appeal principle: A contribution of psychoanalysis to political and social science', *American Journal of Sociology*, Vol. 37, No 4, 1932, pp. 523-538.

241 Kahneman, D., *Thinking, fast and slow*, Penguin, London, 2011.
242 Riker, W., *The Art of Political Manipulation*, Yale University Press, New Haven, 1986.
243 Alkin, M. C., King, J. A., 'Definitions of Evaluation Use and Misuse, Evaluation Influence, and Factors Affecting Use', *American Journal of Evaluation*, Vol. 38, No 3, 2017, pp. 434-450. *https://doi.org/10.1177/1098214017717015*
244 Alkin, M. C., King, J. A., 'Definitions of Evaluation Use and Misuse, Evaluation Influence, and Factors Affecting Use', *American Journal of Evaluation*, Vol. 38, No 3, 2017, pp. 434-450. *https://doi.org/10.1177/1098214017717015*
Stevens, C. J., Dial, M., 'What constitutes misuse?', *New Directions for Program Evaluation,* Special Issue No 64, 1994, pp. 3-13. *https://doi.org/10.1002/ev.1690*
245 Quigley, A., 'Public Attitudes to Science 2014', Ipsos Mori, 2014. *https://www.ipsos.com/ipsos-mori/en-uk/public-attitudes-science-2014* (last access 11 June 2019)
246 Danielson, D. R., 'Web credibility', in: Ghaoui, C. (Ed.), *Encyclopedia of human computer interaction*, IGI Global, Hershey, 2006, pp. 713-721.
Lankes, R. D., 'Trusting the Internet: New approaches to credibility tools', in: Metzger, M. J., Flanagin, A. J. (Eds.), *Digital media, youth, and credibility*, MIT-Press, Cambridge MA, 2008, pp. 101-122.
Metzger, M. J., Flanagin, A. J., Eyal, K., Lemus, D. R., McCann, R. M., 'Credibility for the 21st century: Integrating perspectives on source, message, and media credibility in the contemporary media environment', Annals of the International Communication Association, Vol. 27, No 1, 2003, pp. 293-335.
Seifert, C. M., 'The distributed influence of misinformation', *Journal of Applied Research in Memory and Cognition*, Vol. 6, No 4, 2017, pp. 397-400.
247 Pornpitakpan, C., 'The persuasiveness of source credibility: A critical review of five decades' evidence' *Journal of Applied Social Psychology*, Vol. 34, No 2, 2004, pp. 243-281.
Harris, A. J., Hahn, U., Madsen, J. K., Hsu, A. S., 'The appeal to expert opinion: quantitative support for a Bayesian network approach', *Cognitive Science*, Vol. 40, No 6, 2016, pp. 1496-1533.
Shafto, P., Eaves, B., Navarro, D. J., Perfors, A., 'Epistemic trust: Modeling children's reasoning about others' knowledge and intent', *Developmental Science*, Vol. 15, No 3, 2012, pp. 436-447.
248 ALLEA, 'Trust in Science and Changing Landscapes of Communication', *ALLEA Discussion Paper*, No 3, 2019, Berlin, *https://www.allea.org/wp-content/uploads/2019/01/ALLEA_Trust_in_Science_and_Changing_Landscapes_of_Communication-1.pdf* (last access 11 June 2019)
249 Harris, A. J., Hahn, U., Madsen, J. K., Hsu, A. S., 'The appeal to expert opinion: quantitative support for a Bayesian network approach', *Cognitive Science*, Vol. 40, No 6, 2016, pp. 1496-1533.
Pornpitakpan, C., 'The persuasiveness of source credibility: A critical review of five decades' evidence' *Journal of Applied Social Psychology*, Vol. 34, No 2, 2004, pp. 243-281.,
Renn O., Levine D., 'Credibility and trust in risk communication', in: Kasperson, R. E., Stallen, P. J. M. (Eds.), *Communicating risks to the public: Technology, risk, and society*, Vol. 4, Springer, Dordrecht, 1991, pp. 175-218.
Shafto, P., Eaves, B., Navarro, D. J., Perfors, A., 'Epistemic trust: Modeling children's reasoning about others' knowledge and intent', *Developmental Science*, Vol. 15, No 3, 2012, pp. 436-447.
250 Goldman, A., Blanchard, T., 'Social Epistemology', in: Edward N. Zalta (Eds.), *The Stanford Encyclopedia of Philosophy*, 2015. *https://plato.stanford.edu/entries/epistemology-social/* (last access 11 June 2019)
251 Hinchman, E., 'Telling as Inviting to Trust', *Philosophy and Phenomenological Research*, Vol. 70, 2005, pp. 562-587.
Moran, R., 'Getting Told and Being Believed', in: Lackey, J., Sosa, E. (Eds.) *The Epistemology of Testimony*, Oxford University Press, Oxford, 2006, pp. 272-306.
252 Lupia, A., McCubbins, M. D., 'The democratic dilemma', Cambridge University Press, Cambridge, 1998.
253 Marks, J., Copland, E., Loh, E. Sunstein, C., Sharot, T., 'Epistemic spillovers: Learning others' political views reduces the ability to assess and use their expertise in nonpolitical domains', *Cognition*, Vol. 188, 2019, pp. 74-84.
254 Gauchat, G., 'Politicization of science in the public sphere: A study of public trust in the United States, 1974 to 2010', *American Sociological Review*, Vol. 77, No 2, pp. 167-187.
255 European Commission, 'Science and Technology', *Special Eurobarometer*, Vol. 340, European Publication Office,

2010. *http://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/ResultDoc/download/DocumentKy/55671* (last access 11 June 2019)

256 European Commission, 'Public Perceptions of Science, Research, and Innovation', *Special Eurobarometer*, Vol. 419, European Publication Office, 2014. *http://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs_419_en.pdf* (last access 23 May 2019)

257 Anderson E., 'Use of value judgments in science: a general argument, with lessons from a case study of feminist research on divorce', *Hypatia*, Vol. 19, No 1, 2004, pp. 1-24.

258 Elliott, K., *A Tapestry of Values: An Introduction to Values in Science*, Oxford University Press, Oxford, 2017.

259 Longino, H.E., *Science as social knowledge: Values and objectivity in scientific inquiry*, Princeton University Press, Princeton, 1990.

Rudner, R., 'The scientist qua scientist makes value judgments', *Philosophy of science*, Vol. 20, No 1, 1953, pp. 1-6.

260 Brown, Matthew J., 'Values in Science beyond Underdetermination and Inductive Risk', *Philosophy of Science*, Vol. 80, No 5, 2013, pp. 829-839.

Elliott, K., *Is a Little Pollution Good for You? Incorporating Societal Values in Environmental Research*, Oxford University Press, Oxford, 2011.

Hempel, C. G., 'Science and Human Values.' *Aspects of Scientific Explanation*, The Free Press, New York, 1965, pp. 81-96.

261 Longino, H.E., *Science as social knowledge: Values and objectivity in scientific inquiry*, Princeton University Press, Princeton, 1990.

262 Oreskes, N., Conway, E. M. *Merchants of doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming*, Bloomsbury Publishing USA, 2011.

Mercier, H., Sperber, D., 'Why Do Humans Reason? Arguments for an Argumentative Theory', *Behavioral and Brain Sciences*, Vol. 34, No 2, 2011, pp. 57-74.

Steele, K., 'The scientist qua policy advisor makes value judgments', *Philosophy of Science*, Vol. 79, No 5, 2012, pp. 893-904.

263 Hicks, D. J., 'A new direction for science and values', *Synthese*, Vol. 191, No 14, 2014, pp. 3271-3295.

264 Elliott, K., *A Tapestry of Values: An Introduction to Values in Science*, Oxford University Press, Oxford, 2017.

265 Crease, R. P., 'Lights out: the ebb of scientific authority', *Nature*, Vol. 567, 2019, pp. 309-310.

[Comment based on: Crease, R. P. *The Workshop and the World: What Ten Thinkers Can Teach Us About Science and Authority*, W.W. Norton & Company, 2019.

266 Turner, S., 'What is the problem with expert judgement?', *Social Studies of Science*, Vol. 31, No 1, 2001, pp. 123-149.

267 Iandoli, L., Klein, M., Zollo, G., 'Enabling On-Line Deliberation and Collective Decision-Making through Large-Scale Argumentation', *International Journal of Decision Support System Technology*, Vol. 1, No 1, 2009, pp. 69-92.

268 Lemos, M.C., Morehouse, B.J., 'The co-production of science and policy in integrated climate assessments', *Global Environmental Change*, Vol. 15, 2005, pp. 57-68.

269 Fishkin, J., Luskin, R., 'Bringing deliberation to the democratic dialogue', in: McCombs, M., Reynolds A. (Eds.), *A Poll with a Human Face: The National Issues Convention Experiment in Political Communication*, Lawrence Erlbaum, Mahwah, NJ, 1999, pp. 3-38.

270 Lampe, C., Zube, P. Lee, J., Park, C.H., Johnston, E., 'Crowdsourcing civility: A natural experiment examining the effects of distributed moderation in online forums', *Government Information Quaterly*, Vol. 32, No 4, 2014, pp. 317-326.

271 Davies, S., Selin, C., Gano, G., Guimaraes Pereira, A., 'Citizen engagement and urban change: Three case studies of material deliberation', *Cities*, Vol. 29, No 6, 2011, pp. 351-357. *https://doi.org/10.1016/j.cities.2011.11.012*

272 Parkinson, J., *Deliberating in the Real World: Problems of Legitimacy in Deliberative Democracy*, Oxford University Press, Oxford/New York, 2006.

Davies, S., Selin, C., Gano, G., Guimaraes Pereira, A., 'Citizen engagement and urban change: Three case studies of material deliberation', *Cities*, Vol. 29, No 6, 2011, pp. 351-357. *https://doi.org/10.1016/j.cities.2011.11.012*

273 Fishkin, J., Luskin, R., 'Experimenting with a Democratic Ideal: Deliberative Polling and Public Opinion', *Acta Politica*, Vol. 40, 2005, pp. 284-298. *https://doi.org/10.1057/palgrave.ap.5500121*

274 Fishkin, J., Luskin, R., 'Experimenting with a Democratic Ideal: Deliberative Polling and Public Opinion', *Acta Politica*, Vol. 40, 2005, pp. 284-298. *https://doi.org/10.1057/palgrave.ap.5500121*

275 Nascimento, S., Pólvora, A., 'Social sciences in the transdisciplinary making of sustainable artifacts', *Social Science Information*, Vol. 55, No 1, 2015, pp. 28-42. *https://journals.sagepub.com/keyword/Culture+%E2%80%98maker%E2%80%99*

Sanders, E. B. N., van Stappers, P. J., *Convivial toolbox: Generative research for the front end of design*, BIS Publishers, Amsterdam, 2013.

276 Dryzek, J. S., Bächtiger, A., Chambers, S., Cohen, J., Druckman, J. N., Felicetti, A., Landemore, H. et al., 'The crisis of democracy and the science of deliberation', *Science*, Vol. 363, No 6432, 2019, pp. 1144-1146.

277 Website of the Irish citizen assemblies: *https://www.citizensassembly.ie/en/* (last access 12 June 2019)

278 Curato, N., Dryzek, S., Ercan, S, Hendriks, C., Niemeyer, S., 'Twelve Key Findings in Deliberative Democracy Research', *Daedalus*, Vol. 146, No 3, 2017, pp. 23-38.

279 Lampe, C., Zube, P. Lee, J., Park, C.H., Johnston, E., 'Crowdsourcing civility: A natural experiment examining the effects of distributed moderation in online forums', *Government Information Quaterly*, Vol. 32, No 4, 2014, pp. 317-326.

280 Iandoli, L., Quinto, I., Spada, P., Klein, M., Calabretta, R., 'Supporting argumentation in online political debate: Evidence from an experiment of collective deliberation', *New Media & Society*, Vol. 20, No 4, 2018, pp. 1320-1341.

281 Chadwick, A., 'Explaining the failure of an online citizen engagement initiative: The role of internal institutional variables', *Journal of Information Technology and Politics*, Vol. 8, No 1, 2011, pp. 21-40.

282 Strandberg, K., Grönlund, K., 'Online Deliberation and Its Outcome-Evidence from the Virtual Polity Experiment', *Journal of Information Technology and Politics*, Vol. 9, No 2, 2012, pp. 167-184.

283 Kahan, D. M, Landrum, A., Carpenter, K., Helft, L., Jamieson, K. H., 'Science Curiosity and Political Information Processing', Advances in Political Psychology, Vol. 38, No 1, 2017, pp. 179-199.

284 Sloman, S., Fernbach, P., 'The knowledge illusion: Why we never think alone', Riverhead, New York, 2018.

285 Boswell, J., Corbett, J., 'Deliberative Bureaucracy: Reconciling Democracy's Trade-off Between Inclusion and Economy', *Political Studies*, Vol. 66, No 3, 2018, pp. 618-634

286 Website of the citizen engagement/deliberation platform vTaiwan: *https://info.vtaiwan.tw* (last access 11 June 2019)

287 Website of the citizen engagement/deliberation platform MyCountry/Europe Talks: *https://www.mycountrytalks.org/* (last access 11 June 2019)

288 Pardes, A., '"Change My View", Reddit Community Launches Its Own Website' *Wired*, 6 April 2019, *https://www.wired.com/story/change-my-view-gets-its-own-website/* (last access 11 June 2019)

289 European Commission, *Citizens' dialogues and citizens' consultations. key conclusions*,Publications Office of the European Union, Luxembourg, 2019.*https://ec.europa.eu/commission/sites/beta-political/files/euco-sibiu-citizensdialogues_en.pdf* (last access 16 June 2019)

290 Majone, G., *Evidence, Argument and Persuasion in the Policy Process*, Yale University Press, New Haven, 1989.

291 Majone, G., *Evidence, Argument and Persuasion in the Policy Process*, Yale University Press, New Haven, 1989.

292 Suskind, R., 'Faith, Certainty and the Presidency of George W. Bush', *The New York Times Magazine*, 17 October 2004. *https://www.nytimes.com/2004/10/17/magazine/faith-certainty-and-the-presidency-of-george-w-bush.html* (last access 12 June 2019)

293 Gajduschek, G., Zemandl, E., 'Change disturbances and pathological uncertainty in CEE public administration: A conceptual map and proposed theory of low administrative performance', *26th NISPAcee Annual Conference*, Iasi (Romania), 24-26 May 2018.

294 Heywood, P., Meyer-Sahling, J., *Corruption risks and the management of the ministerial bureaucracy in Poland*, Ernst & Young Polska Sp, Warsaw, 2008.
Wilson, L. 'State control over academic freedom in Hungary threatens all universities', *The Guardian*, 6 September 2018. *https://www.theguardian.com/higher-education-network/2018/sep/06/state-control-over-academic-freedom-in-hungary-threatens-all-universities* (last access 12 June 2019)
295 Tollefson, J. 'Science under siege: Uncertainty, hostility and irrelevance are part of daily life for scientists at the US Environmental Protection Agency', *Nature*, Vol. 559, 2018, pp. 316-319. *https://www.nature.com/magazine-assets/d41586-018-05706-9/d41586-018-05706-9.pdf* (last access 12 June 2019)
296 Suskind, R., 'Faith, Certainty and the Presidency of George W. Bush', *The New York Times Magazine*, 17 October 2004. *https://www.nytimes.com/2004/10/17/magazine/faith-certainty-and-the-presidency-of-george-w-bush.html* (last access 12 June 2019)
297 Castellani, T., Valente, A., Cori, L., Bianchi, F., 'Detecting the use of evidence in a meta-policy', *Evidence & Policy: A Journal of Research, Debate and Practice*, Vol. 12, No 1, 2016, pp. 91-107.
Davies, P., 'Making Policy Evidence-Based: The UK Experience', Presentation at the World Bank Middle East and North Africa Region - Regional Impact Evaluation Workshop, Cairo, Egypt, 13-17 January 2008.
298 Aravind, M., Chung, K. C., 'Evidence-based medicine and hospital reform: tracing origins back to Florence Nightingale', *Plastic and reconstructive surgery*, Vol. 125, No 1, 2010, pp. 403-409. *http://doi.org/10.1097/PRS.0b013e3181c2bb89*
299 Pielke, R. J., *The Honest Broker: Making Sense of Science in Policy and Politics*, Cambridge University Press, Cambridge, 2011.
300 Newman, J., Cherney, A., Head, B. W., 'Do Policy Makers Use Academic Research? Reexamining the "Two Communities" Theory of Research Utilization', *Public Administration Review*, Vol. 76, No 1, 2016, pp. 24-32. *https://doi.org/10.1111/puar.12464*
301 Newman, J., Cherney, A., Head, B. W., 'Do Policy Makers Use Academic Research? Reexamining the "Two Communities" Theory of Research Utilization', *Public Administration Review*, Vol. 76, No 1, 2016, pp. 24-32. *https://doi.org/10.1111/puar.12464*
van der Heide, I., van der Noordt, M., Proper, K. I., Schoemaker, C., van den Berg, M. and Hamberg-van Reenen, H. H., 'Implementation of a tool to enhance evidence-informed decision making in public health: identifying barriers and facilitating factors', *Evidence & Policy: A Journal of Research, Debate and Practice*, Vol. 12, No 2, 2016, pp. 183-197. *https://doi.org/10.1332/174426415X14356748943723*
302 Oliver, K., Innvar, S., Lorenc, T., Woodman, J. and Thomas, J. 'A systematic review of barriers to and facilitators of the use of evidence by policymakers', *BMC Health Services Research*, Vol.14, No 2, 2014, pp. 1-12, published online. *https://doi.org/10.1186/1472-6963-14-2*
303 Bannister, J., O'Sullivan, A., 'Evidence and the antisocial behaviour policy cycle', *Evidence & Policy: A Journal of Research, Debate and Practice,* Vol.10, No 1, 2014, pp. 77-92. *https://doi.org/10.1332/174426413X662824*
304 Fukuyama, F., 'The end of History?', The National Interest, No 16, 1989, pp. 3-18.

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