Projektbeskrivning / Project description

Knowledge Resistance: Causes, Consequences and Cures

1 Introduction and main objectives

Why do people, in certain situations, fail to accept available knowledge? This question has recently surfaced as of vital importance for contemporary society. We live in an age of information and a world where we have increasingly sophisticated ways of acquiring and communicating knowledge, but at the same time, efforts to communicate this knowledge often encounter an unexpected obstacle: Knowledge resistance.

The phenomenon of knowledge resistance is both puzzling and troubling, given that knowledge has great instrumental value, both to individuals and the community at large. For an individual to reach her goals, she must have knowledge of the means to her desired end. For instance, if the individual wants to quench her thirst she needs to know where to find something to drink, and if she wants to stay healthy she needs to know which precautions to take. Hence, the individual will normally seek and value knowledge. Similarly, if the community wishes to grow better crops they need to know which steps to take, and if they want to stop the spread of communicable diseases they need to know how diseases spread.

Resistance to knowledge will therefore have consequences. Indeed, on a communal level the consequences can be disastrous. Skepticism about vaccines has recently led to a resurgence of measles, rubella and whooping cough. The spread of skepticism about the causes of AIDS is associated with lower condom use (Bogart & Throbun 2005). In these types of cases, it is sufficient that a fairly small group is knowledge resistant for the consequences to be dire – not just to the group itself but to other, vulnerable groups. The effects may be global, as in the case of climate skepticism, which has led important actors, such as the US Environmental Protection Agency under the current administration, to resist the types of changes required in our use of carbon based fuels to prevent irreversible climate catastrophe. A striking aspect of this is that non-experts question the knowledge of experts, even when there is wide spread agreement among the latter. Although approximately 97% of climate scientists believe that global warming is caused by carbon emissions 32% of the US population doubt that climate change is caused by human activity (Cook et.al. 2016). Even in Sweden, only 43% agree completely that global warming is happening (VoF 2015). In addition, false beliefs about certain groups of people, such as Muslims, drives negative attitudes that can cause substantial harm to these groups and disrupt the community.

Relatedly, knowledge resistance poses challenges for a democratic society. The very idea of representative democracy rests on the assumption that citizens are well-informed (Carpini and Keeter 1996). To evaluate public policy, citizens need knowledge, not just about political institutions, but about policy relevant facts, and this knowledge must inform their voting preferences. If an individual is ignorant or misinformed about a set of facts, perhaps concerning welfare, immigration or global warming, her voting behavior will not reflect her actual preferences. Moreover, since politicians respond to public opinion, as expressed in polls and elections, misinformed citizens will support bad policy decisions.

Indeed, knowledge resistance poses a threat to the democratic society as such. When misinformation about central democratic institutions (such as media and the courts) combines with tribal and ideological motivations, populist politicians can appeal to peoples' fears in order to dismantle these institutions. As Timothy Snyder writes "you submit to tyranny when you renounce the difference between what you want to hear and what is actually the case" (2017, 66).

It is therefore urgent to understand the nature of knowledge resistance and the mechanisms behind it. This is the *main objective* of this ambitious interdisciplinary program. The work on knowledge resistance so far has been scattered across disciplines, and there has hitherto been no attempt to provide a coherent, unified framework within which to properly investigate this phenomenon. For the first time, this program brings together groups of researchers from philosophy, psychology, political science and media research, using a wide range of empirical and analytical methods to systematically investigate knowledge resistance, its nature, causes and consequences. Throughout, we will focus on knowledge resistance relating to issues that are of great importance to contemporary society, such as vaccines, global warming and immigration.

It is important to note at the outset that knowledge resistance is not simply a matter of ignorance, of a "knowledge deficit". For instance, in the case of science denial, the problem is not that knowledge is not made available to the individual, be it about vaccines or global warming, but that the individual avoids taking in this knowledge once it is made available to her. Similarly, knowledge resistance is not simply a matter of deficient reasoning abilities. Indeed, research shows that cognitive sophistication is correlated with a greater tendency for certain types of knowledge resistance (Hornsey & Fielding 2017, Kahan 2016). What, then, drives knowledge resistance? Different factors, psychological and social, play a role and will be investigated within the program.

First, knowledge resistance typically involves a type of *motivated cognition*: The tendency to believe what one wants to believe, leading one to dismiss, incorrectly weigh or misunderstand relevant evidence may have a variety of deep, underlying psychological "roots", such as affect, worldviews, and social identity needs (Hornsey & Fielding 2017). For instance, it has been shown that people with a hierarchical worldview show more climate skepticism than those with a more rather than an egalitarian worldview (Hornsey, Harris, Bain, & Fielding 2016). Knowledge resistance can also involve conspiracy theories driven by beliefs about power centers of the world, be they political, economic or more outlandish. In the program, the role of such motivational antecedents in the case of science denial will be investigated experimentally.

Second, knowledge resistance must be understood in light of how the normal, well-functioning cognitive system works. Knowledge involves *reasoning*, the formation of beliefs on the basis of evidence. It therefore requires evidence sensitivity, for instance, to the deliverances of the senses, and a capacity for inference. But cognitive systems are *vulnerable* and can be *exploited* in a variety of ways. For instance, even a well-functioning system can behave in a knowledge-resistant way if most of what it gets as input is unreliable or biased information. But cognitive systems can be less than well-functioning in a variety of *internal* ways, too. Whether resulting from external influences, or from affective or other motivational sources, knowledge resistant cognitive systems show characteristic patterns of insufficient sensitivity to evidence. A central hypothesis of the program is that even knowledge resistant cognitive systems process information in a recognizably cognitive way. These systems are *skewed* in certain ways, but their irrationality is far from total; even knowledge resistant reasoning is *reasoning*. There are, for instance, predictable patterns of misestimating the strength of available evidence or the reliability of its source that are quintessentially knowledge-resistant. This explains the important observation that individuals who score highest on the capacity for critical reasoning "are consistently found to be the most polarized on the existence of climate change, the efficacy of gun control and other contested empirical issues" (Kahan 2016, 12).

Third, knowledge resistance is a result of the complex interaction between individual cognition and the environment. Human knowledge is essentially social in the sense that our knowledge of the world is largely based not simply on what we experience, as individuals, but on personal or impersonal interaction with others. Indeed, in modern society, our knowledge largely consists of beliefs that we have acquired from others, either directly or through media and other sources. This holds not just for scientific beliefs but for any number of beliefs about the world, concerning gardening, cooking, car repairs or health. Here trust, or credulity, plays a central role. We generally trust what other people tell us, especially those we take to be reliable and who belong to our group, which allows us to acquire knowledge that would otherwise have been beyond our reach. However, this tendency also makes us vulnerable to manipulation and deceit. The spread of fake news during recent years illustrates this vulnerability and what the absence of trust might result in. Similarly, in an environment of partisanship the tendency to trust the in-group and distrust the out-group may lead to knowledge resistance. In this program, we will study this complex interaction between internal causes of knowledge resistance, both cognitive and non-cognitive, and the environment.

The program is unique in several respects. It is the first inter-disciplinary effort to investigate knowledge resistance in a systematic way, combining theoretical and experimental research to develop an original model of the nature and mechanisms of knowledge resistance. Precisely because knowledge resistance involves the complex interaction between emotions, cognition, social interaction and the flow of information, a serious investigation of the phenomenon must be inter-disciplinary and must involve precisely the four disciplines that are involved in this program. The program brings together leading national and international scholars from these disciplines who are highly qualified to work on these issues, and it builds on an already established international network.

2 Detailed project description and organisation

The program is organized around four inter-connected sub-projects:

(I) Foundational questions concerning the *nature* of knowledge resistance, examining the specific types of irrationality involved in knowledge resistant belief formation, and how the well-functioning cognitive system is exploitable to produce knowledge resistance. The central hypothesis to be investigated is that knowledge resistant reasoning exhibits certain predictable patterns. This sub-project will be led by the philosophers, who will examine knowledge resistance from the point of view of formal and social epistemology, philosophy of mind, philosophy of language, philosophy of psychology and cognitive science.

II) This sub-project will address issues regarding motivational roots to knowledge rejection. In particular, it examines how individuals' social identity needs may interact with contextual factors to both increase and mitigate rejection of evidence, and how changes in motivated reasoning affect attitudes towards, and relations to own and other groups. The project is led by the psychologists, who will conduct a series of studies using experimental, correlational and qualitative methods.

III) In the political realm, there are many potential consequences of knowledge resistance on the democratic process. While predispositions such as partisanship and ideology can serve as valuable, cost saving, too strongly held beliefs may lead citizens to err in judgment, embrace biased perceptions and misevaluate evidence. But when do such predispositions go from helpers to blinders? This sub-project will be managed by the political scientists. By a long series of survey experiments, the aim is to assess if, to what extent, and under what conditions ideological predispositions serve to moderate the effects of new information on individuals' evaluations of evidence. The core hypothesis is that the tendency to resist knowledge is stronger among the ideologically aligned and the partisans.

IV) In this sub-project the role of media, media use, and media trust will be investigated through a series of studies, examining the supply of misinformation on different types of both traditional news media and digital media; processes of selective exposure and how these are influenced by pre-existing attitudes and beliefs; processes of selective attention and how these are influenced by pre-existing attitudes and beliefs; and the mediating and moderating role of media trust and hostile media perceptions in terms of influencing selective exposure, selective attention, and respondents' attitudes and beliefs. This sub-project will be led by a team of media and communication scholars, who will investigate the role of media, media use, and media trust by using a combination of automated content analysis, quantitative and qualitative content analysis, a four-year panel survey, and survey experiments.

2.1 Sub-project I: Knowledge Resistant Reasoning

2.1.1 Research Question and Aims

Our central research question is foundational: What *is* knowledge resistance? We shall distinguish between a *narrow* sense and a *wide* sense of the term knowledge resistance . In both cases, it has to do with the cognitive reaction to, and the weighing of, evidence. Evidence itself is the basis of knowledge and the epistemic reason for belief. In the narrow sense of the term, knowledge resistance is a kind of *insensitivity*, or *undersensitivity*, to evidence. In the wide sense, knowledge

resistance is the improper formation of belief, or preservation of belief, in the face of evidence. This sometimes involves *oversensitivity* to the evidence. In the narrow sense, we don't believe what we have good reasons to believe, and in the wide sense, our pattern of beliefs is skewed, for instance by believing one thing but not another, although the evidence for them are equally good.

Knowledge resistance (KR) therefore involves a form of irrationality. By focusing on knowledge resistance, we shall limit ourselves to *theoretical* irrationality – the form of irrationality particular to belief. Belief and the assessment of evidence is one of the two main components of decision making, where the other is *value*, or *preference*. Decision making has its own forms of irrationality, partly practical, but we aim here to isolate the theoretical kind for study.

The central aim in the philosophical sub-project is to characterize the patterns of irrationality in KR. We shall not be concerned merely with logical fallacies but with evidential support more generally and in particular with responses to empirical evidence. We aim to map out and investigate the varieties of improper empirical belief formation, i.e. belief formation where the evidence itself is of an empirical nature. We assume that there are sound ways in which beliefs are formed in humans in normal natural and social environments. We are interested in the variety of ways in which belief formation can go wrong, sometimes for internal cognitive reasons, and sometimes because of misleading evidence from the environment or pressure from non-cognitive states. We shall be especially interested in cases where rational belief forming mechanisms combine with some particularly abnormal external factors to produce highly irrational belief outputs.

The sub-project will be structured around three inter-related sets of research questions:

(i). The reasoning patterns of KR systems: What are the specific patterns of irrationality exhibited by such systems and how can these be modeled? What are the features of the normal set up of the cognitive system that makes us vulnerable and allow for exploitability by external factors?

(ii). The psychological mechanisms of KR systems: What is the nature of the psychological states involved in a knowledge resistant system? Is it a matter of arational states, or irrational beliefs?

(iii). The social epistemological aspects of KR systems: How do external, social factors contribute to KR in individual psychology? How does the exploitability of the mind interact with social factors such as fake news and propaganda?

Our *main hypothesis* is that in the in the vast array of phenomena comprising evidence-related KR there is significantly *more rational structure* than might be apparent at first glance. In cases of KR, the cognitive system is not *overridden*, as is standardly assumed, but *skewed* in a variety of ways. To the extent that knowledge resistant systems fall short of full rationality in dealing with evidence, these failures demonstrate certain predictable patterns. This, we maintain, is crucial not only to fully understanding the nature of KR reasoning, and the psychological mechanisms involved, but also for thinking about ways of either curing or at least immunizing against KR.

2.1.2 Theory and Method

Background

What is a rational pattern of belief formation? A dominant view in philosophy—especially in epistemology (Ramsey 1926, de Finetti 1937, Jeffrey 1983, Bovens and Hartmann 2003) and philosophy of science (Earman 1992)—depicts the rational mind as a *Bayesian updating* system. Such a system conditionalizes on the received evidence and updates its credences (degrees of belief) in accordance with the axioms of probability. That is, at a time t, the rational agent A has a credence C(E), a value between 0 and 1 (where 1 corresponds to maximal degree of belief and 0 to maximal degree of disbelief), in the proposition E, and a conditional credence C(P|E) in the proposition P given the proposition E. The rational subject has a credence C(P) that equals the sum C(P|E)*C(E) + C(P|-E)*C(-E) (where -E is the negation of E). These are the prior credences. The agent combines the support of E for P with the support of -E for P, weighted by the respective credences. If the agent at time t′ learns that E, then E becomes part of the subject's evidence and acquires the posterior credence C'(E)=1. Hence C (-E)=0. The evidential value of E does not change. If the agent updates rationally, on this model, the posterior credence C′(P) equals the prior conditional credence: C′(P)= C'(P|E)=C(P|E).

These credences serve as a component of rational decision-making classically understood (Savage 1954). To be rational, the agent's credences must be independent of her goals and preferences, and thereby of factors that influence those parameters, such as friendships, group identifications, social background, political affiliation etc. Rational belief states rely on evidence, on all the available evidence and on nothing else (Conee & Feldman 2004). When all goes well, if the evidence E becomes available to the subject qua evidence, and the conditional prior credence corresponds to good evidential support between E and P, the posterior credence in P will result in a well-supported and high degree of belief that could amount to knowledge. This is a paradigm of rational belief change.

The Bayesian model is not the only viable model of rational belief formation and belief change, and not the only model we shall use (cf. Belief Revision Theory (Gärdenfors 1988), Inference to the Best Explanation (Lipton 2004)), but it is a good starting point, well suited for a systematic study of proper evidential support and belief change as well as the ways things can go wrong. For instance, a very low prior credence (strong disbelief) in P together with high prior conditional credence $C(P|E)$ could lead an agent to irrationally *reject* the new evidence E in order to save the disbelief in P. This would be a typical form of knowledge resistance in the narrow sense. Again, if instead the agent irrationally comes to give a high credence to E, for instance because of fake news, then an update that is *itself* in accordance with a Bayesian updating rule still results in giving an irrationally high credence to P. This would be a typical form of knowledge resistance in the wide (but not in the narrow) sense. The high credence in P could have resulted in knowledge, but not on the basis of updating that is so blatantly erroneous.

Theory

(i) The reasoning patterns of KR systems (Glüer, Levi, Pagin, Wikforss)

The dominant view in the literature treats KR as largely *a*rational, portraying its manifestations as the outputs of arational psychological sub-systems (see sub-project II). For instance, Kahneman (2011) argues that KR and other forms of irrationality are products of the operation of 'system 1', the evolved set of heuristics and biases that allow us to respond quickly and intuitively to stimuli. Others treat KR and other forms of irrationality as the product of the operation of non-propositional states altogether (Gendler 2011).

In line with this, the literature stresses the *irrationality* of knowledge resistance – or evidence partiality of almost any kind – including manifestations that are the outputs of arational psychological sub-systems. In contrast, we will emphasize the often overlooked and under-investigated degree to which there is a residual rationality in the way knowledge resistant systems work. The irrationality of a KR system, we hypothesize, involves certain predictable patterns that can be fruitfully investigated from an epistemological perspective.

Starting from accounts of well-functioning cognitive systems, we propose to model the most important ways in which cognitive systems can be skewed. This involves investigating both internal factors, for instance by setting certain parameters to unusual values, and the external, i.e. non-epistemic factors effecting this, such as overly emotional reasoning, but also social influences and pressures. Here, we shall review and systematize the relevant psychological and philosophical literature on distorted reasoning, such as conspiracy theorizing, and on motivated cognition, as well as literature on perception in mental illness (e.g. delusions, paranoia). We shall also draw on the new empirical data from the other sub-projects, in particular data on reasoning patterns in motivated cognition.

Special attention will be given to describing the ways in which our cognitive systems are naturally *exploitable*, i.e. potentially subject to external influences that compromise their ability to make optimal use of available evidence, even when otherwise functioning perfectly well. The aim is to identify the features of a well-functioning cognitive system which make us vulnerable to different types of external disturbances. For instance, there is 'truth bias', the tendency to believe other speakers. Though this is a reliable psychological system in normal contexts, it is easily exploited, as in cases of lying and deception. Furthermore, our model of KR as partially rational connects individual cognition with social structures. It aims to shed new light on exactly how KR, both in the narrow and in the wide sense, tends to emerge and to get reinforced in an epistemically unfavorable social environment because of the nature of human cognition.

Our central hypothesis is that once a knowledge resistant system is in place, within an individual, a social or political group, or a media sphere, there are characteristic reasoning patterns distinctive of KR. Here we list some central features, to be investigated in the project:

- unequal standards of explanatory power: overemphasis on the explanation of recalcitrant data, or misjudgment of what needs to be explained;
- unequal standards of evidence: standards of evidence aren't uniform across similar claims; for some claims, little evidence is take to suffices, for some a lot is demanded (as in holocaust denials). Even the absence of evidence might be taken as evidence for one's theory;
- unequal standards of trust: some speakers are deemed not trustworthy because of belonging to a certain group, or because of holding certain views, typically represented as self-serving ("scientists just say what will get them funding");
- overfitting: conspiracy theories seem to thrive on the fact that, at a certain point in time, their hypothesis fits the data better than any others (which leads to loss of predictive power and, consequently, ever more ad-hoc additions to the theory);

These styles of reasoning live a double life. On the one hand, they can be implicit in the cognitive system of an agent. For instance, the double standards of evidence can simply be part of a Bayesian structure, with high conditional credences for views the agent likes and therefore easily finds supported by evidence, and with low conditional credences for views that are disliked. On the other hand, they can also be made more or less explicit in public propaganda and highly politicized media. Moreover, these public forces, and propaganda in particular, are often directed exactly at *exploiting the weaknesses* of cognitive systems in order to instill KR.

Our account of KR as partially rational therefore connects individual cognition with social structures. It aims at shedding new light on exactly how knowledge resistance, both in the narrow and in the wide sense, tends to emerge and to get reinforced in an epistemically unfavorable social environment.

(ii) Psychological Mechanisms (Glüer, Hattiangadi, Spectre, Wikforss)

Using the model of KR developed under (i) we shall investigate the nature of the psychological states and mechanisms involved.

Core attitudes. A subject's core attitudes are central to their social identity, such as religious, political, or moral attitudes. They seem to have an undue influence on the uptake of evidence. According to some, they are non-cognitive states, more like desires than like beliefs (Haidt 2013, Lakoff 2004). This aligns with a prominent but controversial view that all normative judgments are non-cognitive (Blackburn 1998, Gibbard 2003, Schroeder 2008). On this view, disagreements between subjects with opposing core attitudes cannot be rationally resolved. Our hypothesis, by contrast, is that many core attitudes, such as religious, moral or political attitudes, are *beliefs*. It will follow that core attitudes are *not* immune to rational revision.

Delusions. Distinctive of delusions are extreme experiences; in Capgras syndrome, for instance, the subject has a strong sense that a person very close to them has been replaced by an impostor. Schizophrenic delusion in general can involve hallucinatory experiences of very unusual kinds. Such delusions are maintained despite overwhelming contrary evidence, including sensory evidence. How to characterize and account for delusions is a matter of ongoing debate, but here, too, there are models emphasizing partial rationality. One such model in current cognitive science and psychology is the "predictive processing model" according to which the brain is a hierarchical Bayesian prediction machine (cf. Friston 2009, Frith 2009, Clark 2013, 2015, Hohwy 2013, 2016). On this model, delusion maintenance is the partially rational output of a Bayesian machine working with faulty precision estimates of its own sensory input (Hohwy 2013): forming delusions in the face of unusual experience is a built-in possibility of the mechanisms of perceptual inference. We shall examine this and other views of delusion and address the question, much discussed in the philosophy of mind, whether delusions are beliefs (Bortolotti 2009, Currie 2000, Wilkinson 2013). On our hypothesis, delusions involve skewed reasoning patterns very

similar to those in KR, showing enough rationality to play the role of belief (Glüer and Wikforss 2013).

Framing effects. Some cases of KR are presented as counterexamples to Bayesian models of rationality (Tversky & Kahneman 1981, 1983). In framing cases, a subject's response to the evidence is influenced by how it is described. This violates at least one of the assumptions in standard Bayesian models, for instance, by assigning different probabilities to logically equivalent propositions. In some cases, subjects say that an event *e* is likely when contrasted with several less likely events, even though they agree that *e*'s occurring is less likely than *e* s not occurring (cf. Windschitl and Wells 1998). On our hypothesis, these subjects are still partially rational. It has been argued that such seemingly irrational judgments reflect surprising aspects of our notions of likelihood and belief (cf. Yalcin 2010, Hawthorne, Rothschild & Spectre 2016). Standard theory can be modified by giving a more finegrained representation of evidence, sensitive to the subject's perspective (cf. Chalmers 2011). This, together with the use of contrast classes, allows modelling framing cases as examples of rational belief formation. The subject is still irrational in the sense of failing to *recognize* that they respond to a piece of evidence differently depending on how it is represented.

(iii) Social Epistemological Aspects of KR (Chabris, Hattiangadi, Pagin, Spectre, Wikforss)

Our knowledge is based largely on the *testimony* of others and epistemologists examine the conditions of knowledge through testimony (Fricker 2007, Lackey 2008, Goldberg 2010). Testimonial knowledge requires both hearer trust others and speaker reliability. The central cases of KR involve resisting testimonial evidence. KR occurs also when the evidence is experiential (Kahan 2016), but it seems then easier to overcome (Ripberger, et.al 2017). We shall map the epistemic social relations relevant to KR.

Truth bias and assertion. Trust can be exploited, through disinformation and fake news (Baurmann 2007, Origgi 2011). *Truth bias* has been demonstrated in a number of studies. These include accuracy assessments of video-presented accounts (Street and Richardson 2015), belief formation under cognitive stress (Gilbert 1991), and neuroimaging during the formation of belief and disbelief (Harris et al. 2008). Results indicate that belief is faster, easier, and fairly automatic, while both disbelief and judgment suspension is slower and more demanding. This explains the efficacy of disinformation.

It has even been claimed (Gilbert 1991, Mandelbaum 2014) that belief (acceptance) is part of the very comprehension of a sentence; the mere entertaining of a proposition in thought involves provisionally believing it. However, the empirical basis equally well supports the alternative view that belief is the reaction to the assertoric *presentation* of a proposition. The alternative account (Pagin 2011) is a theory of assertion according to which the impulse to believe is part of the recognition of a sentence token as assertoric. We aim to work out the relative merits of these views, also for accounting for the effects of propaganda.

Doubt and distrust. Trust can also be undermined, either because sources have proven unreliable or as a result of disinformation about the reliability of a source (as when established media is accused of 'fake news'). In an increasingly unreliable media climate (see sub-project IV), testimonial knowledge becomes more difficult to acquire.

A well-known strategy to block people from accepting the testimony of experts is the so called 'method of doubt', employed by the tobacco companies in the 1960's (Oreskes and Conway 2011). The method involves sowing doubt on scientific claims by setting excessively high standards on disputed claims (such as the claim that smoking causes cancer or that global warming is caused by carbon dioxide emissions). We shall investigate how the method of doubt exploits our cognitive system with a particular focus on how the method has been employed by climate deniers.

Motivated rejection. The interaction between individual psychological mechanisms and the social environment is also at play in the *motivated rejection of science* (Hornsey and Fielding 2017). In contemporary society there is a division of cognitive labor, such that we are dependent on experts whose competence it is difficult for us as laypersons to determine. This makes us vulnerable to disinformation about scientific experts, as when experts are said to be biased because they have a political agenda. This may make us reject the testimony of experts, even when there is a very

large agreement among them (as in the case of climate change). We shall examine the distrust in experts from the point of view of social epistemology and science communication research.

Here we shall work closely with Chris Chabris who will examine popular misconceptions about human brain function, human genetics, and artificial intelligence. Surveys and field experiments will be conducted to determine how prevalent and robust are popular misbeliefs (and correct beliefs) about the brain ("neuromyths"). Understanding why people resist scientific knowledge in these domains will help in designing interventions to help overcome this resistance. Chabris will also investigate the 'A/B illusion', an anomaly of judgment in which people view an experiment (or other research effort) designed to study the effects of an existing or proposed practice (an 'A/B test') as more morally suspicious than a universal implementation of an untested practice (A or B). Because of the complex causal structure of human behavior, large-scale experiments are the best means of learning what policies will work and what their costs and benefits will be; therefore, it is important to study why people resist acquiring knowledge through these means.

Method

In developing a systematic model of KR, we will, to begin with, review the empirical literature documenting examples of KR in both the psychology of the individual and in her relation to the social environment. This will we brought to bear on philosophical questions concerning the specific forms of irrationality involved in cases of KR and the nature of the psychological mechanisms involved. To this end, we will use the standard methods of analytic philosophy: conceptual analysis, systematization, formalization and inference to the best explanation. In the detailed modeling of KR, we will use tools from formal epistemology, such as Bayesianism, formal theories of belief revision, social epistemology and cognitive science. Surveys and empirical experiments will be used in the investigation of the motivated rejection of science.

2.2 Sub-project II: Psychological Causes and Cures

2.2.1 Research Questions and Aims

A highly worrying observation is that during the past few years, beliefs counter to scientific consensus seem to be increasing rather than being on decline (Leshner, 2015). Such unfounded beliefs predict a range of maladaptive perceptions and behaviors, including poor health choices, climate change denial and decreased civic virtue (Asser & Swan, 1998; Grebe & Nattrass, 2012; Jolley & Douglas, 2014; The Public Health Agency of Sweden, 2015). One of the most pressing issues for social sciences at current is to understand why so many people choose to not trust science and reason, and how this trend can be countered. In the current sub-project, we aim to address these questions, using theoretical perspectives from different social science disciplines, and a combination of experimental, correlational, and qualitative methods. Specifically, we will focus on a set of questions related to how social identity needs may influence how science-related information is processed, and how this in turn affects people's beliefs, attitudes and behavior.

(i).Under what conditions do social identity needs motivate biased processing and rejection of scientific evidence?

(ii). How and to what extent does this motivated processing deviate from rational reasoning models?

(iii). To what extent does motivated reasoning affect group identification, attitudes, and behavior toward outgroups?

(iiii). How can social identity needs be used to mitigate antiscientific attitudes?

2.2.2 Theory and Method

Background: Motivated cognition and antiscientific beliefs

A vast body of psychological research from the past 50 years demonstrates that our perceptions, interpretations, and beliefs about the world are strongly influenced by factors such as our preconceptions, feelings and personal motives to view the world in one way rather than the other. Thus, studies show that people selectively attend to information consistent with their interests or previous beliefs (Baron, 2000; Maccoun, 1998; Wason, 1960), interpret neutral or even counter-attitudinal evidence in a belief confirming manner (Jones & Kohler, 1958; Kahan, 2013; Lord, Lee & Lepper, 1979; Vallone, Ross & Lepper, 1985), and distort or selectively remember objective facts in a way that supports their attitudes and decisions (Croxton, Eddy & Morrow, 1984; Festinger, 1964; Svenson, Salo & Lindholm, 2009). The bottom line then, is that people regularly don't form their attitudes and beliefs by a rational weighing of evidence and data. Rather, our reasoning is motivated by desires to view the world as we expect it to be, or as we want it to be (e.g. Kunda, 1990), and we engage in biased searches for information aimed at reinforcing these preexisting beliefs.

Theory: Social identity needs and motivated cognition

Given the evidence that our reasoning often is guided by how we want things to be rather than by facts and evidence, a critical issue is to understand the motives that guide our biased thinking. A recent line of research suggests that people's attitudes can be viewed as expressions of "attitude roots", that is, of underlying structures that sustain and motivate people to endorse specific attitudes, such as science skepticism (Hornsey & Fielding, 2017).

One of the most fundamental and potent human motivations is the need to belong to groups (Baumeister & Leary, 1995). Throughout human evolution, belonging to groups have been the primary survival strategy of the species, and the fact that individuals favor, are loyal and conform to their own membership groups, in-groups, is among the most well-established phenomena in psychology (Brewer, 2007; Hogg, Abrams, Brewer, 2017).

Membership in social groups often become associated with specific standings on attitude issues. Holding an attitude contrary to that of one's own group may risk one's position and membership in the group, and individuals are therefore often strongly motivated to adhere to assertions that align with the dominant beliefs within their most important groups. Indeed, research has demonstrated that people often employ motivated processing strategies guiding them to perceive facts in a way more congruent with their affinity groups than with the best available evidence (e.g., Cohen, 2003; Kahan, 2011; 2013).

Group membership thus acts as a motivation to process information in a biased and selective way. However, the motivation to protect attitudes associated with one's social identity is likely to vary across situations. One factor that is known to mediate intergroup biases in general is social threat (e.g., Bettencourt, Miller, & Hume, 1999; Maass, Ceccarelli, & Rudin, 1996). Specifically, a body of research shows that social threat, such as being in numerical minority, increases group identification, adherence to group values, and the propensity to defend them (for reviews see Jonas.et al., 2014). Groups in society that promulgate minority views are often stigmatized by the majority, and their views may be ridiculed or trivialized in attempts to discredit them. Perceiving discrimination or ridicule by a majority towards one's group is known to further increase in-group protection, and loyalty to the group's values (Branscombe, Schmitt, & Harvey, 1999). Chronic levels of such group threat can be expected to motivate highly entitative groups with orthodox belief systems, spawning radicalization and hostility towards the majority (Doosje, et al., 2012: Hogg, et al., 2007; Schmuck et al., 2017).

While a range of studies attest to the effects of social threat on group identification and defense of group values, no studies to date have investigated how group membership may interact with threat in motivating biased information search, and how this in turn may affect people's group identification and attitudes toward out-groups. Given an increase in motivated cognition during threat, this may fuel minority members' view that the out-group is deluded, furthering social distance to, and perceived illegitimacy of the majority's viewpoint. In the current sub-project we aim to delineate how social threat towards one's group may alter people's processing of scientific information associated with the group's beliefs. In particular, we will in collaboration with the philosophy group examine how social threat influences patterns of sequential information updating and belief formation, and potential deviances from rational reasoning models.

Furthermore, we will examine how such biased processing may affect group identification, as well as attitudes and behavioral intentions toward the out-group.

First, we hypothesize to replicate previously demonstrated patterns of motivated cognition such that individuals will selectively attend to, credit and dismiss information in a way that conforms to their group's beliefs. We expect that information update and belief formation will deviate from rational reasoning models in certain predictable ways, preliminary hypothesizing that this will occur primarily due to biased evidence weighing. A further important, main hypothesis is that these tendencies will increase under high as compared to low identity threat, and that this in turn will promote the individual's identification with and loyalty to the group. Moreover, we expect that increases in motivated cognition during threat will predict social distance to, and behavioral intentions towards the out-group.

A final aim of the current project is to explore how social identity needs can be used to mitigate fact-distorting processing and knowledge resistance. Research on persuasion shows that as a general rule, people respond more positively to information that comes from a source belonging to their own group rather than an out-group (e.g., Clark & Maass, 1988; Kahan, et al., 2010; Schultz & Fielding, 2014). For example, in a study on risk perceptions regarding a mandatory program for HPV vaccination, Kahan and colleagues (2010) showed that participants' perceptions of risk corresponded strongly with worldview (along the hierarchical/egalitarian, individual/communitarian axes) when the argument was both congruent with participants' worldview and communicated by a source that could be identified as an in-group member. Interestingly however, when arguments were presented by an in-group member, and *incongruent* with participant's worldview, participants' worldviews did no longer predict risk perceptions. While people are generally highly reluctant to change their attitudes, this finding can be taken to suggest that social identity needs can also motivate people to look more openly at evidence in attitude issues. In our final set of studies, we will use this finding as a first step in developing an intervention to mitigate knowledge rejection.

The topics of the current project will be examined in a series of experimental, correlational and qualitative studies conducted in Sweden, the US, and Poland, three countries that vary considerably in ideological, political and religious perspectives (Pew Research Center, http://pewrsr.ch/1XGAkVn). We choose to examine groups across social dimensions known to influence people's position on a range of issues. Hence, investigated groups will be based on ideology (e.g., liberal vs. conservative in the US, left vs. right orientation in Sweden and Poland), worldview (hierarchical vs. egalitarian), partisanship (Republicans vs. Democrats in the US/ Sweden democrats vs. Swedish Green Party in Sweden, authoritarian conservative governing party (PIS) vs. democratic opposition in Poland), and religious beliefs (dogmatic believers and atheists in Poland and the US). Attitude topics relevant to the target groups and national contexts will be selected (e.g., climate change risks/nuclear waste risks for groups based on ideology and worldview; migration for groups based on partisanship; evolutionary theory/free abortion rights for groups based on religion). In the current project we will also examine our target questions using the minimal group paradigm (MGP, Tajfel et al., 1971), in which participants are categorized to groups on random or trivial criteria. With this method, we remove any prior history between the groups that may fuel potential effects, and can study the minimal conditions for these processes to occur.

Dan Kahan, in close connection with this subproject, is expected to make three related contributions. The first is the construction of "cultural cognition cultural worldview" scales capable of measuring different risk-perception predispositions in a Swedish sample. Patterned on a scheme developed by anthropologist Douglas (1985), such scales measure cultural worldviews along two dimensions: hierarchy-egalitarianism, and individualism-communitarianism. The second involves the mapping of public risk perceptions using the Swedish version of the cultural worldview scales. Variance in perceptions in climate change risk will be one focus of this phase of the research. Third, Kahan will be in charge of a series of experiments featuring the Swedish cultural worldview scales. When applied to U.S. and other national samples, the scales have been shown to predict biased information processing and information search (Kahan et al. 2009, 2010, 2017a, 2071c). The scales also interact with measures of critical reasoning proficiency, which, perversely, has been shown to *increase* polarization in public perceptions of risk and like facts (Kahan et al. 2017b). The goal, then, of this part of the research will be to examine whether similar patterns characterize the search for and assessment of risk information by members of the public in Sweden.

Method

The general methodology for the experimental studies will be based on established paradigms from the social psychology and political science literature. In this line of studies, participants will be preselected based on their ideological, religious or partisanship identification, except in experiments using the MGP. In the studies addressing how social identity may fuel motivated cognition, we will vary intergroup threat by manipulating alleged majority and minority numerical status of participants' groups. Numerical status imply dominance of one group over another and thus, high threat for those in the minority. This manipulation has been shown to interact with other factors to illuminate intergroup biases and social identity concerns (e.g., Kenworthy & Miller, 2002; Otten et al., 1996). Furthermore, we will manipulate the other group's view of participants' in-group, by presenting alleged out-group messages giving negative, neutral or positive evaluations of the in-group (e.g., Kenworthy & Miller, 2002).

To examine effects of these manipulations on motivated cognition, we will employ a variety of methods derived from previous research. For example, after manipulating social identity threat, we will examine participants' search for science-related information from sources congruent or incongruent with their group's beliefs (e.g., Yeo, et al, 2015), or their evaluations of information on policies ostensibly attributed to either in-group or out-group sources (Cohen, 2003; Kahan, 2010). Dependent variables will include participants' degree of biased information search (e.g., Yeo et al., 2015), congruency of beliefs with that of their in-group (e.g., Milfont & Sibley, 2017), and group-based distortions of information when reproducing it from memory (Svenson, Salo, & Lindholm, 2009). Attitudes to in-group and out-group will be measured as participants' group identification (e.g., Hogg, et al., 2010), their perceptions of the rationality of in-group and out-group attitudes (e.g., Kenworthy & Miller, 2002), and their views on legal and illegal actions to promote their group's beliefs (Doosje, et al., 2012). In a limited number of experiments, we will assess participants actual aggression tendencies towards out-group members, using the so called Taylor Aggression Paradigm (e.g., Phillips & Giancola, 2008) in which participants deliver sound shocks to bogus participants in what is described as a reaction time game. To establish the influence on the latter variables specifically due to motivated cognition, control groups will be presented with information on neutral topics unrelated to any specific group.

In parallel with our experimental studies, we will examine our target issues in a large scale survey study, where we in collaboration with political scientists investigate links between group threat (operationalized as minority status, such as religious groups in Sweden, or atheists in Poland), group identification, and biased information processing manifested for example in support for anti-scientific attitudes. For this part of the project, we plan to analyze data from existing sources (e.g., European Social Survey).

In addressing the question of how social identity needs can be used to mitigate KR, we will begin by using a paradigm similar to that of Kahan and colleagues (2010) presumably replicating their findings. After this procedure, we will study whether people who have previously been exposed to a belief-incongruent argument by an in-group member will show less biases in their subsequent information search on the target topic (e.g., Yeo et al., 2015), and less belief-congruent distortions in their recall of the information (Svenson et al., 2009) than those presented with the same argument by out-group- or congruent information by in-group members. Importantly, we will also use qualitative text analyses to investigate whether this intervention may affect participants' own communication on the target topic to in-group and out-group audiences. Should participants show a more neutral communication on the topic after this intervention, this could result in dissonance reducing motivations also furthering a more open processing of data on the target issue (e.g., Festinger, 1957; Harmon-Jones, Harmon-Jones & Levy, 2015). Should we find the hypothesized effects, this would constitute a promising initial step for developing efficient interventions to counter motivated rejection of scientific evidence.

2.3 Sub-project III: Partisanship and Ideological Predispositions

2.3.1 Research Questions and Aims

From research on public opinion and political behavior, we know that stable and enduring political predispositions are essential for individual citizens in their efforts to understand the political world. They help structure political attitudes, influence policy positions and simplify information processing (Zaller 1992). However, strong predispositions can potentially also hinder individuals to carry out their democratic duties (fc holding representatives accountable) by fueling biased perceptions and expedite the misuse of evidence and the resistance to new relevant facts.

While sub-project II studies the psychological mechanisms behind such reactions, in this subproject the focus is on the role of these mechanisms in a changing information environment, particularly with an increasing use of social media. In this project, we seek to learn more about under what circumstances strongly held predispositions are helpers or blinders for democratic citizenship in an increasingly versatile and heterogeneous information environment. The research will help identify the conditions where KR tends to occur.

2.3.2 Theory

Political science research has convincingly demonstrated that citizens perceptual screens is the result of predispositions. This project focuses on two of the most discussed types of predispositions: partisanship and ideology. A large body of literature shows that party identification, most often defined as emotional attachment to parties, is one of the most powerful movers of politically relevant attitudes and behavior (Lavine, Johnston & Steenbergen 2013). Across national contexts, this group-based attachment is deemed key to a well-functioning representative democracy (Dalton, Farrell & McAllister 2011) since it provides a strong link between voters and elected representatives. For instance, political parties can effectively guide voters in making decisions and form attitudes that are more consistent (Levendusky 2010).

Aside partisan attachments, left-right ideology is the other dominant predisposition in most political systems. Like party identification, it influences a range of politically relevant concepts such as policy positions and how information is processed (Trier & Hillygus 2009). However, it differs from party identification in that rather than being formed around a group identity, ideology is a world-view and a set of attitudes about how society should function (Erikson & Tedin 2014).

While strong attachments to particular parties traditionally have often served as a stabilizing force for democratic systems, we now see evidence of the opposite: increasing polarization, destabilization, increasing voter volatility, and a harsher and non-constructive political debate (Mason 2015). Similar effects are seen for political ideology, with enduring misperceptions about political facts that contradict belief systems (Nyhan & Reifler 2010). These developments are shifting the scholarly focus to entirely new phenomena such as *fake news*.

In today's information environment, where news and other information – both correct and incorrect – are more accessible than ever, citizens can be expected to become increasingly dependent on political predispositions to search for political information and to make sense of what is going on (Zaller 1992; Valdesolo & Graham 2016). A new versatile and heterogeneous information environment is a difficult challenge both to the functioning of representative democracy and the public discourse on a systemic level, and to democratic citizens on an individual level. Consequently, there is a pressing need for more empirical research on how social-psychological mechanisms affect citizens' information processing in a new information context.

Thus, our overarching research question is to what extent strong predispositions are beneficial or detrimental to the workings of democracy? More specifically, under what conditions do ideology and attachments to parties serve as helpers or blinders for democratic citizens when they evaluate or act upon political information that take the form of a 'fact' or 'evidence'? Decades of research on the role of predispositions for political information processing lead us to expect that the effects of exposure to fabricated political information will be moderated by predispositions. The main hypothesis is that the tendency to resist knowledge – i.e misuse or misevaluate evidence – will be stronger among the ideologically aligned and the partisans.

Most research so far has been conducted in the United States. A problem with the strong focus on the US context is that it is atypical in contrast to the multi-party egalitarian welfare systems in the world where voters are more knowledgeable to begin with, and where ideology plays a more important role for parties and voters. We aim to supplement the many studies of *partisanship* with predispositions – namely *left-right ideology* – and move the focus from the U.S. to a particular

European multi-party context: Sweden. *In doing so, we will have the opportunity not only to focus more on ideology as a predisposition, but also to provide theory testing that may possibly expand the universal validity of previous findings*.

The democratic implications of studies of KR are straightforward, as most normative democratic theories highlight the key importance of citizen's level of *politicalsophistication* (Oscarsson & Repali 2017). According to Dahl (1971), democracy cannot operate without 'capable' citizens. Knowledge about the political world, and balanced perceptions and world views are often conceived as "the currency of citizenship" (Berelson 1952; Kuklinski 2001). These arguments can be expanded: A capable democratic citizen is knowledgeable but never knowledge resistant. When exposed to politically relevant new information, the ideal democratic citizen will put some effort into the evaluation of it, regardless of the strength of ideological predisposition. We aim to assess if, to what extent, and under what circumstance such predispositions serve to moderate the effects of new information on individuals' evaluations of evidence. The key research question is to identify the causal mechanisms of KR: When and why do citizens tend to not update – resist – new information that potentially would have made them better at carrying out their democratic duties, f.c. rationally prospective mandate giving and retrospective accountability.

2.3.3 Method

The program will engage in a long series of survey experiments on panelists of the Swedish Citizen Panel, which is managed by the Laboratory of Opinion Research (LORE) at University of Gothenburg. The panel is the largest academically run panel in the world with 50 000+ panelists recruited both from opt-in and from probability-based samples. The LORE is part of the national research infrastructure with support from the national science foundation (VR), and is a facility specialized on carrying out survey embedded experiments (www.lore.gu.se). The Swedish Citizen Panel is approved by the regional ethics review board (EPN).

The typical experimental treatment will consist of information that–at least according to normative theories of democracy–is regarded as highly relevant to a voter's perceptions of the political world or evaluation of political objects. The information will concern issues currently on the top of the agenda (economy, welfare, immigration). In contrast to most experiments, a null result, particularly in groups with strong predispositions, would be considered support of KR insofar as the expected change in evaluations/perceptions does not surface.

In contrast to most experimental research, we will design and conduct a long coherent series of 50+ survey experiments focusing on only one single causal mechanism (knowledge resistance) and its key moderator (predispositions). We will design the experiments closely following the most recent methodological advancements, with pre-registration of hypotheses, variation of treatment levels, and using only panelists recruited from probability based samples. Each single experiment will be thoroughly documented as short research notes as the project develops, fully accessible to the research community. Key experiments will be reported in journals like the Journal of Experimental Political Science. However, the ultimate goal is to publish a state of the art meta-analysis of all survey experiments we have conducted in one single article.

2.4 Sub-project IV: The Role of Media, Media Use, and Media Trust

2.4.1 Research Questions and Aims

Research suggests that media constitute the most important source of information about politics and current affairs (Mitchell, Gottfried, Barthel & Shearer, 2016; Mutz, 1998; Shehata & Strömbäck, 2014). Media, in this context, includes traditional news media as well as digital and social media (Mitchell et al., 2016; Shehata & Strömbäck, 2018). Media thus play a key role in all processes of learning about societal affairs – as well as in all processes leading to misinformation and KR. To understand misinformation and KR thus requires understanding the role of media.

More specifically, understanding the role of media in the context of misinformation and KR requires understanding (1) the supply of misinformation by different traditional, digital, and social media, (2) processes of selective exposure, (3) processes of selective attention, and (4) the

moderating and mediating role of trust in media. Below we will detail how 1-4 will be addressed and list scholars with the main responsibility for each topic. In each case, the focus will be on Sweden, where there is very limited research related to each of the areas covered below.

2.4.2 Theory and Method

(i) Charting the supply of misinformation (Strömbäck, Boomgaarden)

Theory

It is often assumed that the supply of misinformation has increased, but to date, there are very few studies of the supply of misinformation in traditional, digital, and social media (but see Allcott & Gentzkow, 2017; and Graves, 2016, on fact-checking journalism). Although the related term "fake news" has become popular, there is also very little consensus on what fake news entails. In this part of the project, misinformation will be defined as information that is verifiably false, i.e., information that do not correspond to extra-media data such as official statistics and scholarly evidence (Allcott & Gentzkow, 2017; Rosengren, 1970; Wikforss, 2017). To chart the supply of misinformation, two studies will be done. The main hypothesis guiding this part of the study is that the prevalence of misinformation has increased, particularly online, but also that it varies across issues and is shaped by contextual factors such as, for example, real-world events and political debates surrounding the issues.

The first study will focus on the supply of misinformation with respect to five issues, selected to represent a variety of societally important issues while also allowing us to delimit the scope of the study: the human health effects of genetically modified food (GMO); the health risks posed by vaccine; the impact of humans on global warming; the development of violent crime; and the economic impact of immigration. In each case, the supply of misinformation will be charted in traditional news media as well as on digital media and social media, web pages and blog posts that discuss these issues.

The second study will focus on news stories – broadly defined – that Viralgranskaren, the Swedish fact-checker, has assessed as false. In this part of the study, all news stories assessed as false, regardless of the topic, will be included in the analysis.

 Method

To investigate the supply of misinformation, a combination of computerized and manual quantitative content analysis will be done to identify media content that deals with each of the topics described above. The factual information provided by these will then be compared with official statistics and scholarly evidence, to assess the prevalence of misinformation and how that varies across individual media and media types as well as across time. To capture changes across time, the time period for this study will be 2015–2022.

To investigate news stories assessed by Viralgranskaren as falls, a combination of quantitative and qualitative content analysis will be done to investigate the topics, structure, contents, sources, and dissemination patterns of these fake news stories. A key part of this project will be to analyze what linkages there are between topics, structure, and content on the one hand, and sources and dissemination patterns on the other. The time period for this study will be 2015–2022.

(ii) Processes of selective exposure (Strömbäck, Vliegenthart & Boomgaarden)

Theory

Since Festinger's pioneering work (1957), the literature on selective exposure has become voluminous (Knobloch-Westerwick, 2014; Messing & Westwood, 2014; Smith, Fabrigar & Fabrigar, 2008; Stroud, 2008). While research shows that people exhibit a confirmation bias (Nickerson, 1998) and prefer attitude-consonant information, research also suggests that a preference for attitude-consonant information does not equal avoidance of attitude-discrepant information (Garrett, Carnahan & Lynch, 2013). Other motivations than a desire for attitude-consonant information, such as accuracy-driven motivations or general political interest, might

trump people's preference for attitude-consonant information (Garrett, 2009; Kunda, 1990; Messing & Westwood, 2014). Importantly however, the extent to which attitude-consonant selective exposure occurs remains unclear – not least in the Swedish case where there is very limited research on processes of selective exposure, and none that takes the use of alternative media into account (Skovsgaard, Shehata & Strömbäck, 2016; Strömbäck, 2017). Also important is that most research on selective exposure has been based the U.S. case. The extent to which findings from extant research can be generalized remains unclear, with research largely failing to take different opportunity structures for selective exposure into account (Skovsgaard, Shehata & Strömbäck, 2016).

To remedy shortcomings in previous research and investigate processes of selective exposure and how that pertains to KR, and extend research to the Swedish context, this part of the project will focus on the dynamics of attitude-consonant selective exposure based on party preferences, ideological leaning and issue-specific attitudes related to the same issues as will be investigated in the study charting the supply of misinformation, i.e., GMO, vaccines, global warming, crime, and immigration. The main hypotheses are that selective exposure is prevalent; that previous research has underestimated selective exposure by focusing too much on the use of traditional news media and by not taking digital media fully into account; and that there are reinforcing spirals at work.

Method

To investigate processes of selective exposure, this part of the project will be based on a four-wave, four-year, and nationally representative online panel study covering the years 2019- 2022, with the goal of having 2000 respondents participate in all four waves. This will allow us to investigate the dynamics of attitude-consonant selective exposure at the individual level. It will also allow us to investigate if there are reinforcing spirals (Slater, 2015) at work, where certain attitudes lead to attitude-consonant selective exposure, which in turn leads to stronger attitudes, etc. The panel survey will investigate respondents' use of a wide range of traditional and alternative news and information provides, their general and issue-specific attitudes and beliefs; their knowledge of political and societal matters; and moderators and mediators such as attitude certainty, extremity and strength, interpersonal communication, and trust. The panel survey will be done in close collaboration and coordination with Sub project III and the Laboratory of Opinion Research (LORE) at University of Gothenburg.

(iii) Processes of selective attention (Strömbäck, Vliegenthart & Tsfati)

Theory

While processes of attitude-congruent selective exposure are important, equally if not more important are how people process information. It is at the stage of information processing that cognitive biases such as selective attention, directional motivated cognition, and confirmation bias influences how people process information and whether they accept or reject information that they are exposed to (Kahneman 2011; Kunda, 1990; Lodge & Taber, 2006; Nickerson, 1998). This part of the project will therefore investigate processes of selective attention and how people process attitude-congruent and attitude-discrepant information. Attitudes, in this context, refers to party preferences as well as ideological leaning and issue-specific attitudes related to GMO, vaccines, global warming, crime, and immigration. The main hypotheses guiding this part of the project is that respondents' processing of information is contingent on whether the information is attitude-congruent or attitude-discrepant and that this influences respondents' general and issue-specific attitudes and beliefs, but also that it varies across issues and depends on respondents' attitude certainty, extremity, and strength.

Method

To investigate processes of selective attention, five online survey experiments – one related to each issue – will be done to test the effects of pre-existing attitudes on how people interpret attitude-congruent and attitude-discrepant information; how that in turn influences their general and issue-specific attitudes and beliefs as well as their knowledge of political and societal matters; how that influences what knowledge they accept or resist; and the impact of moderators and

mediators such as attitude certainty, extremity, and strength. Each survey experiment will include about 800 respondents. The survey experiments will be done in close collaboration with the Laboratory of Opinion Research (LORE) at University of Gothenburg.

(iv) The moderating and mediating role of trust in media (Strömbäck & Tsfati)

Theory

Of potential importance in all processes of selective exposure to different media and media content and how people process information that they are exposed to is the degree of media trust or, inversely, media skepticism. At the same time, conceptually it is not clear how trust in media should be conceptualized, what it actually means to say that one has trust in a news media, and how trust at the institutional level is linked to trust in individual news stories. The exact importance of media trust is also unclear. On the one hand, research suggests that media skepticism is negatively related to exposure to mainstream news media (Tsfati & Capella, 2003) and positively related to the use of alternative news providers (Tsfati, 2010). On the other hand, many still expose themselves to news media in which they do not trust (Tsfati & Capella, 2003; Weibull, 2014). Also relevant is that trust in media has become increasingly politicized, with widening gaps in media trust depending on partisan affiliation (Andersson et al., 2017; Barthel & Mitchell, 2017; Strömbäck & Karlsson, 2017). Research on the hostile media phenomena furthermore suggests that people tend to perceive the media as unfairly biased against their side (Vallone et al., 1985; Perloff, 2015; Strömbäck & Johansson, 2017). This might influence the linkage between media trust and media perceptions one the one hand and media exposure on the other, but also how people with different levels of media trust and perceptions of hostile media process information provided by the media. Based on this, this part of the project will provide a conceptual analysis of media trust at different analytical levels and their relationship; develop and test new ways of investigating media trust alongside using traditional measures; and investigate the role and effect of media trust and hostile media perceptions on information processing and what knowledge respondents accept. The main hypotheses guiding this part of the project is that hostile media perceptions both influence and are influenced by media trust; that hostile media perceptions and media trust influences respondents' trust in and acceptance of the information provided by media, and that this in turn influences their attitudes and beliefs.

Method

To investigate the moderating and mediating role of media trust, variables related to media trust and hostile media perceptions will be included in the panel survey as well as in the panel experiments described above. Aside from that, two survey experiments will be done focusing specifically on hostile media perceptions and their influence on (a) what respondents learn from news stories, (b) respondents' general media trust, (c) respondents' trust in information provided in the stimuli material, and (d) how that influences their attitudes and beliefs. Each survey experiment will include about 800 respondents. The experiments will be done in close collaboration with the Laboratory of Opinion Research (LORE) at University of Gothenburg.

3 Implementation, dissemination, and practical organisation

This program will provide a unique opportunity for world-leading researchers to collaborate across disciplinary boundaries to study the multi-faceted phenomenon of knowledge resistance. We have a team of core researchers and a large group of affiliated researchers, who are prominent in their respective fields. Core researchers all have appointments within the program and they are expected to contribute research towards the aims of the project, by conducting experiments, producing research outputs in the form of publications in journals, book chapters and monographs, and engaging in public outreach activities. Affiliated researchers, who do not draw a salary from the program, will contribute by attending workshops and conferences organized by

the program. The affiliated both strengthen the research within subprojects by connecting that work to a strong international network and, in some cases, provides perspectives on KR that are not represented within the project, such as a historical perspective (Jarrick, Moss). See list of publications for a complete list of the core team and list of affiliated researchers. In 2017 Åsa Wikforss, co-organized the first international conference on knowledge resistance, together with Arne Jarrick and Dan Larhammar (funded by The Wenner-Gren Foundation). The conference drew leading researchers from across the world, and several of these will be involved in the program, either as core researchers or as affiliated.

We plan to publish two edited anthologies on knowledge resistance, comprising the best contributions to our workshops and conferences across all disciplines involved in the project. The first anthology will focus on the nature of KR and its causes, and the second anthology on how to counteract KR. Oxford University Press has already expressed an interest in publishing such an anthology. We expect all participants to publish regularly in top ranked international journals both within the respective disciplines (e.g. Psychological Science, Journal of Experimental Social Psychology, Mind, Mind and Language) and in more general scientific outlets (e.g. Science, PLoS ONE) during the whole period of the program. This is clearly feasible, given the stellar publication records of both core researchers and affiliated researchers.

An important feature of this program will be a series of intensive interdisciplinary workshops in which research outputs central to the program will be exposed to sustained discussion from different disciplinary perspectives. Both core researchers and affiliates will attend these workshops. In addition, in the 3rd and 6th years of the project, there will be a large, international conference, drawing together core researchers, affiliates and internationally renowned guest speakers.

We plan to hold 2 workshops each year in years 1, 2, 4, and 5. In years 3 and 6, there will be one workshop and one larger international conference. These workshops will cover the following five topics, 2 workshops for each topic: Formal epistemology and irrationality; Trust, partisanship and fake misinformation; Science denial and conspiracy theories; The social psychology of KR; and Curing KR.

In addition to meeting at workshops and conferences, the core team of researchers, will meet frequently at the Institute for Futures Studies (IF), where Wikforss is an affiliated researcher. We will hold 2 meetings each year at which work-in-progress will be presented, and future workshops will be discussed. These meetings will be facilitated by IF's video conferencing equipment, allowing the international researchers to participate.

The program will benefit from collaboration with:

- The Institut Jean Nicod (CNRS-EHESS-ENS) in Paris (http://www.institutnicod.org/): a multidisciplinary CNRS cognitive science laboratory.

- The Center for Mathematical Philosophy at the LMU Munich (http://www.mcmp.philosophie.uni-muenchen.de/index.html): a center devoted to the applications of logical and mathematical methods to all kinds of philosophical problems.

- The Cognition and Philosophy Lab at the Dept. of Philosophy, Monash University, Australia (http://artsonline.monash.edu.au/philosophy/philosophy-of-mind-and-cognition/): an interdisciplinary laboratory conducting research in the areas of philosophy, psychology, and neuroscience.
- PLM (http://projects.illc.uva.nl/PLM/index.html), a network of the most important centers active in philosophy of mind and language, as well as cognitive science, in Europe.

–The Cultural Cognition Project: funded by NSF, where Dan Kahan is a researcher.

 –The Swedish National Election Stuides program (www.snes.gu.se)

–The SOM Institute at the University of Gothenburg

–The Comparative Study of Electoral Systems (CSES)

–Network of European Political Communication Scholars (Nepocs)

–The Emotion Lab at Karolinska Institute, directed by Andreas Olsson.

– The Social Psychology lab at Stockholm university, directed by Prof. Torun Lindholm is fully equipped with all technical and other material needed to conduct the planned experimental studies.

Dissemination of research outputs will take place not merely in Sweden, but at international venues. For instance, core researchers in sub-project I will apply to present a symposium at the American Philosophical Association, the Canadian Philosophical Association, and the Australian Association of Philosophy. The philosophers and psychologists also plan disseminate their work at the meetings of the European Society for Philosophy and Psychology. The psychology group will disseminate results at symposia at the General meeting of the European Association for Social Psychology 2020, at annual meetings of the American Society for Personality and Social Psychology (from 2020 and onwards), as well as in national academic contexts. In 2021, core researchers in the Media and Communication sub-project will apply to present at the International Communication Conference. The political science group plan for panels at ECPR joint sessions, ECPR annual conference, MPSA and APSA.

An important aim of this program is to engage in public outreach activities. Several of the members and affiliated researchers have extensive experience of outreach activities. Wikforss (PI) has recently published a popular book for a Swedish audience on knowledge resistance, entitled *Alternativa fakta: Om kunskapen och dess fiender*. She has participated in numerous public events, including on TV and radio, and lectures regularly for both journalists and politicians. Lindholm has an extensive network of media contacts, providing good opportunities of spreading information about the project to a wider public. Media contacts in turn usually generate further invitations to inform about the project to a variety of interest groups (e.g., politicians, authorities). Strömbäck has published numerous books aimed at a broader audience than scholars and students, and is a widely engaged public speaker. Ekengren Oscarsson is director of the Swedish National Election Studies (SNES), and former research director of the SOM Institute (2010-2017). He is engaged in outreach and research communication, for instance in Public Service (SVT) as an expert during election night presenting the results from exit polls. Kahan and Chabris both appear regularly in leading international media outlets, such as the New York Times.

Public dissemination of research outputs will also be greatly facilitated by the extensive experience in public outreach and policy development at IF. IF has a long tradition of reaching different target groups, using various channels and media and cooperating with NGOs, think tanks, policy makers, firms, and other actors. The association with IF will give this program access to an existing network of audiences across these sectors.

Finally, dissemination will be facilitated further by the establishment of a program website. We expect the website to be up and running within a few months. On the website, we will post news about our activities, such as workshops and conferences, and we will post open access publications to increase the impact of our research on the wider public.

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