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Denial of the Mainstream Consensus: A Case-Based Complexity Approach

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Denial of the Mainstream Consensus

A Case-Based Complexity Approach

by

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Declaration

I, Anton I. Botha, confirm that no part of the material presented in this thesis has been previously submitted by me or any other person for a degree in this or any other university. In all cases, where it is relevant, material from the work of others has been acknowledged.

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Dedication

This thesis is dedicated to Shaun Johnson, a great man whom I had the good fortune to know. Few have impacted the lives of so many so positively. You left the world in a better state than you found it, and for that, we all owe you an eternal debt. May your legacy live a hundred generations, and then a hundred more.

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Abstract

In the shadow of the recent pandemic, and with the spectre of the ever more serious effects of climate change looming, the denial of the scientific consensus on these issues continues to demand attention. Denial of climate change, pandemics, and vaccinations leads to increased collective risk to our interconnected global society. Using a case-based complexity approach, this thesis constructed and tested a multi-level theoretical framework that attempts to explain denial in a way that does not reduce this phenomenon down to ignorance, mendacity, or any other single psychological or sociological attribute. Rather it seeks to explore the largely non-obvious and unaware, complex interrelated processes and drivers that lead to this outcome.

At the psychological level, the theory asserts that our affectively-ladened motivated reasoning is the cognitive process chiefly responsible for our conclusions on issues of significant societal risk. In turn, our motivated reasoning is triggered by our epistemic and institutional trust relationships relative to the constellation of mainstream organisations leading the charge in researching, communicating, and driving policies related to these issues. The theory continues by positing that equifinality is likely at play, meaning that people may come to the same conclusions on these issues for different reasons. These differences stem primarily from variations in our psycho-social make-up and how these attributes interrelate. Specifically, this theory posits that differences in adult attachment orientations, personal values, and core beliefs, when interacting with our gender and cultural identities impacts our dispositional trust. It continues by illustrating how all these facets are richly interconnected to form different pathways to an outcome of denial.

To test this theory, data were collected on several scales measuring trust, attachment, values, beliefs, gender, and culture using an analytical cross-sectional survey design drawing on a quota sample of n= 1,199. This sample was roughly equally divided between respondents from the US, the UK, the Global North (less the US and UK), and the Global South with equal gender representations in each group.

The findings suggest that trust, in particular institutional trust, was a key determining factor in the support or rejection of the mainstream consensus and that this trust was in turn

influenced by a host of factors contingent on variations in one's psychological and sociological make-up. By employing case-based computational modelling, several distinct clusters were identified resulting in a set of three theoretical profiles distributed as follows: Accepters, (43%) Hesitants (36%), and Denialists (21%). Accepters by and large embraced the mainstream consensus on climate change, pandemics, and vaccinations as true, while for Denialists it was the opposite. Hesitants, however, largely accepted climate change as true but were more sceptical about pandemics and vaccinations. Accepters and Denialists were mainly found to be diametrically opposed to each other in terms of their mainstream institutional trust and their core beliefs. Hesitants on the other hand, while not as mistrusting of institutions as Denialists, had distinct epistemic trust and attachment patterns.

These profiles were then mapped over the demographic variables of regional grouping and gender allowing us to reverse engineer the unique sociological characteristics of each profile. The highest proportion of Denialists were found in the US amongst males (35%) and females (30%) while the lowest were found among UK females (11%) and Global North/South females (16%, 14%). However, Global South males and females (62%, 61%) made up the highest proportion of Hesitants.

The results of the study generally support our theory and the conclusion that denial is the result of a complex interplay of psychological and sociological influences, with neither one capturing sufficient nuance to paint a high enough resolution picture of what is occurring. However, by embracing case-based complexity as a research methodology we were able to more adequately capture this nuance so as not to fall prey to the limitations of more traditional positivistic approaches.

The thesis concludes with a set of recommendations which advises that mainstream institutions take note of the phenomenological and nuanced nature of the trust relationships they have with these different profiles. In essence, our findings suggest that most of the resources spent on combating misinformation and science education may be misspent and would be better allocated towards building broad-based institutional trust by reducing the anxiety of those in the Denialists and the Hesitants profiles.

Foreword

This doctoral thesis, like so many before it in the social sciences, is largely a product of its time. What started off as a general interest in human motivation was progressively shaped by contemporary forces like the on-going climate crisis, the COVID-19 pandemic, and the subsequently emboldened anti-vaccine movement, into an attempt to better understand what motivates denialist views on these issues. This may seem a rather ambitious undertaking for a doctoral thesis, even outlandishly hubristic by some accounts, and truth be told it is, and remains so given the complexities at play. But if we are to make real progress in the social sciences, sometimes, one must take hubristic leaps, or as the American author Cynthia Heimel once put it:

> *"When in doubt, make a fool of yourself. There is a microscopically thin line between being brilliantly creative and acting like the most gigantic idiot on earth. So, what the hell, leap."*

This thesis is such a leap. It will be left to the reader to decide in which category its author falls.

The hubris to which I refer stems not just from the ambition of the research question, but also from the large number of domains such a study demands one pays attention too. These include everything from sociology, social-psychology, neurobiology, cognitive science, evolutionary psychology, globalization studies, history, political science, comparative international studies, behavioural economics, complexity studies, to mention but a few.

The story of this research is thus not a traditional one. One might say that I deliberately set out to fail given the ambitions of this research project and the knowledge domains it encompasses. Rather than narrow the scope of the study as is so often demanded of sensible researchers, I left it broad and ambitious and in doing so one could say I failed. I failed fast, I failed often, but ultimately, as you will hopefully see, I failed forward.

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Chapter 1 – Introduction

The purpose of this thesis is to take you on a journey of my *attempt* to answer, what is in my opinion, one of the most perplexing questions in the social sciences today.

> **Why do people hold denialist views, that appear to run contrary to their own self-interests, on issues of significant societal risk[1] such as climate change, pandemics, and vaccinations in general?**

1.1. Reflective Statement - The Story of John[2]

Before I delve into how I attempted to answer this question, I must first share with you the story of what sparked my interested in it. It's the story of a long, fruitful, but ultimately fraught friendship, based on the rather significant personal divisions that have emerged over the last decade around some of the most pressing global challenges we face, from the COVID-19 pandemic, to vaccinations, to climate change.

In the early 2000's I worked in London for the British Civil Service as an IT engineer. While at the Lord Chancellors, I met Trish, who was also a network engineer at the time. Trish is a law school graduate from Trinity College, and we got on famously. When she fell pregnant, her partner John, who was also a network engineer and a graduate of computer and electrical engineering of both Edinburgh University and University College London, stepped into her role while she was on maternity leave. John and I immediately became friends based on our shared love of SCUBA diving, our taste in cinema, high-end audio equipment, red wine, and multiplayer PC gaming. Before long I was hanging out regularly with John, Trish, and their newly arrived daughter Riley, whom I baby sat, grew to love dearly, and consider family.

John is incredibly intelligent and someone who has an excellent general knowledge. There just didn't seem to be a technical problem he couldn't solve if he put his mind to it. Before digital audio players were even a thing, he built a desktop PC into the boot of his car, loaded it with his favourite music and was listening to thousands of songs while the rest of us were

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[1] Aka Global Social Problems or issues of significant societal risk as it will be referred to going forward.

[2] The names of the family members along with other identifiable details have been changed to protect their anonymity.

still fiddling around with CDs. He taught himself to play the piano and always had some or other side project going to keep his mind occupied, everything from building a smart home to learning a new language.

When Riley was of the age where she was ready to receive her MMR vaccinations, John had picked up in the media that there were health concerns with the vaccine and didn't want her to get them. This was a few years after the publication of the controversial, and now retracted, Andrew Wakefield article in The Lancet which claimed to link the vaccine to colitis and autism spectrum disorders as reported in Nature Medicine (2010). Even though the UK health authorities went to great lengths to reassure the public about the safety of the vaccine (Boseley 2002), John remained sceptical. In fact, the research he did online only further confirmed his suspicions about the MMR vaccine. Trish and I, on the other hand, wanted Riley to be vaccinated, out of a concern for her well-being. A compromise was negotiated and the three of them went on a trip to France where Riley received a separate vaccine for measles, mumps, and rubella.

About a year later I moved back to my home country of South Africa, but I always kept contact with the family. Whenever I was subsequently in the UK, I would spend at least a few days with them to catch up. Over the course of two decades, I got to see Riley grow into a fine young adult, but John and I always seem to find areas of disagreement. When teenage girls in the UK were offered the HPV vaccine, John refused to allow Riley to get it. This again led to some heated debates around vaccines in general, but we also sparred on climate change, gun control, Brexit, etc. John always came prepared with evidence, data, and logical arguments ready for everything I might throw at him.

Given my respect for John, I thought I at least owed it to him to remain curious and see if I could understand where he was coming from on some of these issues. So, one morning, I asked him if he could walk me through the evidence which refuted climate change. Gleefully, he opened Google and started searching for "*evidence that climate change isn't real*". One of the links he found took him to a site which had graphs and data which showed that over the last few decades atmospheric temperatures had, in fact, dropped overall, not increased. He also found a site that showed that the surface areas of the arctic ice sheets were expanding each winter. Now, I am no climate scientist, but when I looked at the first

graph, which showed that temperatures were dropping over time, I noticed that it was reporting atmospheric temperatures at a specific high altitude only. No data were shown for other altitudes, at surface level, or ocean temperatures. I also pointed out that there was a difference between ice sheet surface area and the thickness of sea ice. Because of the cube law of volume, the thickness of the ice is far more important than the overall surface area covered by it. John remained unconvinced, why were temperatures dropping at any altitude if the planet was warming? Why weren't we being given the full picture? Why is data like this not part of the mainstream narrative?

I asked John if I could share the research that had informed my views on the topic – albeit, again, I am not a climate scientist any more than John is. I typed in "*evidence for climate change*" into Google. The first site that appeared was NASA's, which provided evidence that obviously supported my view. The website contained large volumes of additional data and analysis from some of the world's top climate scientists – again, researchers that most people would trust, but also, given their status, that might also be seen as untrustworthy.

John dismissed all this evidence out of hand based on the source alone. *NASA*, he said, *can't be trusted*. I asked him what possible agenda they could have to perpetrate such a deception on the world, to which he replied simply, *money*. According to him, the more evidence NASA could produce in favour of the mainstream view on climate change, the more funding they would receive from the government. This conversation took place in 2018 at the height of the Trump administration, which was publicly sceptical about climate change. I pointed out that surely, given who was in power, if NASA could disprove climate change, then that would attract more funding, not less.

My argument was dismissed as naïve and lacking in a deeper understanding of how the US government and research grant system operates – which is not necessarily untrue, as science and scientists are not a monolith and governments, universities, research institutes, funding agencies, and politics and culture are deeply intertwined. He told me that climate change was a well-orchestrated conspiracy by socialists and scientists, with a socialist agenda, to

overthrow Capitalism[3]. At this stage our tempers had gotten the better of us and we left it there. This was the last time we spoke on the subject.

Once the pandemic started, I did not have an opportunity to see the family again in-person, but I had been helping Riley remotely with her post-graduate University applications. I asked her about her dad's views on the COVID pandemic and whether he was planning to get a vaccine. She told me that he believed the dangers of the pandemic were vastly overstated and that the vaccines were just a big pharma money grab, were untested, and he would not be getting one. I, on the other hand, followed the social distancing guidelines, was first in the queue to get a COVID vaccine, and got all my boosters.

Once again, a major global social problem had emerged, and once again my friend and I went to find answers in very different places. Why, I asked myself? How could two reasonably intelligent people arrive at such different conclusions?

Over the years, my interactions with John and people like him, have always given me pause for thought. In some instances, it made me stop and reflect on my own understanding of the world and my knowledge of it. How was I so sure that I was right about climate change, the COVID pandemic, the effectiveness of vaccines, etc.? Why is my evidence any better than John's? It was as if people like John existed in different realities when it came to these topics. John and I could agree on many things like where the best places to SCUBA dive were, or which home audio speakers were superior, but on issues of actual importance there was simply no convincing him or others, otherwise. Nor was I convinced by their arguments.

I also wondered how our views had become so predictable. Why is it that I already knew John's stance on the pandemic and the COVID vaccines without a single conversation on the topic? Surely, if we were both rational, we would hold a diversity of positions on these issues, sometimes with, and sometimes against the mainstream consensus? However, John seemed to reliably gravitate towards denial of the authoritative consensus on these issues while I leaned more towards acceptance.

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[3] The irony that these socialist scientists were only in it for the money wasn't lost on me.

1.2. The Research on Denial

Given the importance of global social problems such as climate change, pandemics, and vaccinations or '*issues of significant societal risk*' as I like to call them, there is a substantial body of research which investigates denialist views of these issues. However, what one finds is that most studies fall prey to one of five shortcomings. Firstly, researchers tend to investigate just one dependent variable. There are studies that looked at climate change denial (Jylhä, Tam et al. 2020), vaccine hesitancy (Hornsey, Harris et al. 2018), or COVID-19 (Bailey, Whelen et al. 2021), but few, if any, consider denial on these issues together or as related to the same underlying construct.

Secondly, studies have largely been looking for a silver bullet, that one independent variable to rule them all. Researchers have looked at everything from sociological variables like gender (Vassallo, Shajahan et al. 2021), education (Drummond and Fischhoff 2017), race/ethnicity (Momplaisir, Kuter et al. 2021) nationality (Wagner, Masters et al. 2019, Solis Arce, Warren et al. 2021), socio-economics status (Bertoncello, Ferro et al. 2020), etc. to psychological variables such as cognitive reflection styles (Martinelli and Veltri 2021), personality dimensions (Murphy, Vallières et al. 2021), locus of control (Amit Aharon, Nehama et al. 2018), disgust sensitivity (Luz, Brown et al. 2019, Reuben, Aitken et al. 2020), etc.

Unsurprisingly, while researchers have found statistically significant relationships between some of these variables and the denialist views under investigation, as we will see in Chapter 2, these relationships tend to be weak and explain only a fraction of the observed variance. As such, we can safely say that no silver bullet has been found.

Thirdly, researchers have tended to equate denialist views with conspiracy theories which allows one to write these views off as cuckoo (Bacon and Taylor 2021, Islam, Kamal et al. 2021). Fourthly, research on denialism has largely been restricted to the confines of a particular national border. This jingoistic approach makes findings harder to generalise as it is difficult to know what is attributable to local conditions versus something more fundamental and universal.

And finally, researchers have tended to treat their research populations as homogeneous, meaning that they assume the same variables are at play for everyone. Few, if any, studies consider the fact that a multitude of divergent motivational forces may lead individuals to the same conclusions on issues of significant societal risk for very different reasons with a study by Rothmund, Farkhari et al. (2022) being among the rare exceptions here. As such, while this body of research is certainly illuminating, there are still some significant gaps that remain unaddressed.

1.3. When it comes to denial, trust is key!

It wasn't until I can across an interview with Daniel Kahneman, the Nobel Prize winning psychologist[4], that I had my first '*aha*' moment regarding John and my interactions over the years. Kahneman pointed out what now seems blindingly obvious. According to him, there is something entirely else at play when it comes to denial – and that is trust[5]. In this interview Kahneman said that while he is no climate scientist, he *trusts* the scientific community when they tell us that climate change is real, that it poses a risk, and requires action. He pointed out that non-climate scientists, like himself, even with a PhD and a Nobel Prize, are not qualified to weigh in on the merits of the data because we are not experts in this area. In his view, climate data, given its complexity and voluminousness, in the hands of everyday people would be subject to biased reviews which could be used to support any view. He continued by highlighting that when people like me say that *climate change is real*, what I am in fact saying is that I <u>trust</u> *that climate scientists, governments, and the media are reporting the truth about this issue, and I have no good reason to doubt them*. On the other hand, when people like John say *climate change isn't real*, they are really saying, *I don't trust scientists on climate change, and I have good reasons to distrust governments and the media on this issue"* (Kahneman 2013).

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[4] Or Behavioural Economist, depending on who you ask.

[5] Of course, the link between trust and belief in the truth on such issues has long established…see Tyler, T. and P. Degeoy (1996). Trust in organizational authorities: the influence of motive attributions on willingness to accept decisions. <u>Trust in organizations: Frontiers of theory and research</u>. R. Kramer and T. Tyler. California, United States, SAGE Publications, Inc.**:** 331-356. and Kramer, R. M. (1999). "TRUST AND DISTRUST IN ORGANIZATIONS: Emerging Perspectives, Enduring Questions." <u>Annual Review of Psychology</u> **50**(1): 569-598. And Hetherington, M. (2018). <u>Why Trust Matters: Declining Political Trust and the Demise of American Liberalism</u>. New Jersey, USA, Princeton University Press.

It dawned on me that over the years, John and I had been fooling ourselves into thinking we were rationally debating the merits of the evidence and the facts on issues like climate change, vaccines, etc. John with his brilliant technical mind, and me with my five college degrees, convinced ourselves that we had evaluated the available evidence on these topics dispassionately. Yet, we seemed to disagree on almost every major issue related to one form of societal risk or another. More than that, we both believed that our inferences regarding these issues were so well-reasoned that we would expect other rational observers to come to the same conclusions if presented with the same facts. When we failed to do so, we got mad at each other because ultimately, we were not just trying to convince the other of our position, we were actively undermining each other's core beliefs and epistemic foundations.

It would be too easy to write off our differences as ignorance or stupidity. I can humbly assure you, the reader, that this is not the case for either party involved here. To the contrary, John and I were engaged in a sincere discussion on issues with not only real-world consequences for us, but more so ultimately the world and health Riley would inherit. Given our deep affections for her, the stakes simply couldn't be any higher.

Rather, and perhaps unwittingly so, John and I have been engaged in a multi-decade battle centred around *epistemic trust*. As such, at the core of our debates were neither the facts nor the strength of our reason, but which sources of information can be **trusted, and which cannot**.

This revelation raised several questions to which I found both satisfactory and unsatisfactory answers in the research.

1. How do people convince themselves that they possess the "*truth*" on a particular issue when they themselves are no expert in that issue? – the answer may lie in something called motivated reasoning.
2. How do people come to trust the consensus on certain issues?
3. Do these differences in one's views on issues of societal risk ultimately matter?
4. Can people be persuaded to change their stance on these issues, particularly those who hold strong oppositional views?

As you will see as we progress, the answers to these questions are, perhaps unsurprisingly, complex. When it comes to understanding why individuals behave the way they do there is rarely a single underlying cause or motivation that can be ascribed to all (Ryan 2012). However, once we are motivated towards a certain conclusion on an issue, the cognitive processes at play are, for the most part, pretty-well understood and generalizable. These cognitive processes fall under the umbrella term '*motivated reasoning'* and help us understand why we tend to come to different conclusions on issues and more importantly, why it is that we feel so strongly that these conclusions are the *truth*.

1.4. Motivated Reasoning

We explore motivated reasoning, its definition, history, mechanism, evolutionary purpose, and its neurobiological underpinnings in Chapter 3. However, it warrants a quick introduction to help set the necessary conceptual framework for our study. It also helps to provide at least a partial answer to our first research question.

In short, motivated reasoning describes the '*rational'* processes employed by the mind to come to the conclusions it unconsciously wants to come to on certain issues. To be clear, and as we will see, motivated reasoning isn't simply a case of ignorance where additional information would change someone's mind on an issue (Kunda 1987, Bardon 2020).

At the face of it this might seem like the opposite of *rational*, but what is rationality if not an attempt to get to the '*truth'* by employing the tools of evidence gathering, data, mathematics, statistics, hypothesis testing, logic, heuristics, etc. Motivated reasoning is also not just simply a case of '*hot headedness'* or '*I feel therefore I think this*'(Newman 1999). As such, motivated reasoning does not free us to believe just anything, rather, there are still demands for evidence (Kunda 1990). However, what is considered evidence and how it is evaluated is another matter entirely. When affectively activated, motivated reasoning leads to biased memory searches, a tendency to require less evidence when testing hypotheses which supports a desired view, a search for inferential rules that could yield favoured conclusions, and the creative blending of assessed knowledge to construct beliefs that resonate with existing ones (Kunda and Sinclair 1999). Thus, the motivated reasoner is trying to construct a conclusion that a dispassionate observer, having evaluated '*the evidence'*, would also come to (Kunda 1987, Bardon 2020).

Perhaps the best way to help illustrate what motivated reasoning is, is through the example provided by Kahan, Peters et al. (2017). In 2016, they conducted a series of experiments to determine if a participant's ability to draw conclusions from data was impacted by their numerical ability and political orientation. As one would expect, when given a neutral subject area, like the treatment outcomes of a new medical skin cream, those high on numeracy were able to identify from the provided data that the treatment was in fact effective or ineffective -depending on how the labels on the same data set were manipulated- with a high degree of accuracy. However, when the same data set was re-labelled 'gun-control', those high on numeracy and high on a conservative political orientation were no more likely to come to the correct conclusion than participants with low numeracy skills when the data supported gun control as a conclusion. Liberals, on the other hand, got it right in accordance with their numerical ability as with the neutral subject. To further demonstrate this effect, the labels on the data were once more swapped, so that this time gun control measures were shown to be ineffective. Now respondents that identified as liberal were more likely to get it wrong while their conservative counterparts once again got it right in accordance with their numerical ability. This is an effect that Kahan repeated on a variety of subjects such as GMOs, nuclear power safety, climate change, etc. Each time the data had a neutral subject or supported the desired conclusion of those who scored high on general numeracy, the more likely they were to draw the right conclusion from the data. However, as soon as the data ran contrary to their ideological beliefs on a subject, their numeracy ability, when evaluating that data, reduced to the same levels of accuracy as those who scored low on general numeracy. Is it any wonder these findings were labelled "*The most depressing discovery about the brain, ever!*[6]"

As we will see in Chapter 3, this is but one example of many illustrating the power of motivated reasoning, even raw objective data is not immune to it. However, that there is an

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[6] See Marty Kaplan's 2013 article.

unconscious process that quite literally interferes with our rational cognition to steer us to a desired conclusion, as we will see, is no longer in dispute[7].

However, not everything we need to know about motivated reasoning is well understood. The question of what **motivates** motivated reasoning remains largely an open question. To understand what could be driving motivated reasoning on issues related to denialism, we first turn to the literature on trust.

1.5. General Trust, Intuitional Trust, and Epistemic Trust

As suggested by Kahneman (2013), when it comes to establishing our views on complex issues like climate change, COVID, and vaccinations, trust seems key. Even though we believe ourselves capable of "*evaluating the evidence*" and "*doing our own research*", in truth this rarely involves spending hours in laboratories running experiments or on field expeditions to gather primary data, let alone any kind of peer review process. Rather, for most of us, because of a complex interplay between psychological and sociological determinants, we tend to either trust mainstream sources on these issues or not. In Chapter 4, on the topic of trust, we will see that this boils down, not only to whether we are able to trust or not, but if we trust, who we ultimately trust on these issues. Here we delve deeper into the concept of trust and how it informs our knowledge of the world. To do so we will turn to the philosophers, sociologists, and social psychologists[8] who have made significant strides of late in providing conceptual frameworks, operational constructs, and research to better understand trust, its components, and antecedents.

In short, while the trust literature typically focuses on interpersonal trust, in this thesis we will look at the relationships between different types of trust, including general trust, social trust, or trust in groups, and institutions as well as epistemic trust, or trust in communicated knowledge, particularly scientific knowledge on significant societal risks (McCraw 2015).

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[7] Scientists have long known this to be the case, given the insistence for double-blind experimental designs to test treatments. We know that when researchers know which group is the treatment group and which is the control, they are more likely to produce findings in support of the treatment, despite sincere efforts to remain objective.

[8] Evolutionary psychology may have interesting things to say about how trust evolved, i.e. as the corner stone of social bonding.

While there are different forms of trust, we know that at its core it consists of three basic elements: (1) a person who trusts, (2) an *entity*[9] who is being trusted, and (3) a *thing* with which the trustee trusts the trusted[10]. We also know that to trust, certain preconditions must be met, including a reliance or dependence on the entity being trusted as well as confidence in it. As we will see, when we rely on others, we become vulnerable, and this creates conditions of uncertainty. This vulnerability means that the act of trusting is inherently risky and could lead to harm in cases of deception, mendacity, etc. As such, trust requires an '*attitude of optimism*' or confidence in the motives and competence of the entity being trusted (McCraw 2015).

In turn, people vary in a few ways when it comes to '*if*' and '*who*' they trust. Based on dispositional attributes and personal experiences their willingness to form a trust dependency relationship with authoritative bodies may strongly vary, and even if such a willingness may be there, their views on the motives and competence of these authoritative entities may also vary significantly.

Even if we are capable of trust, who we trust also plays an important role in what we ultimately believe to be true. We know from thinkers like Kramer (1999), Citrin and Stoker (2018), and Tyler and Degeoy (1996) that one's social circles, political orientation, religious orientation, socio-economic status, ethnicity, gender, etcetera can play a significant role in which authoritative bodies we place our trust in at a given point in time. These bodies, like churches[11] and political organisations, in turn, for various reasons ranging from the benign to the nefarious, can hold views contrary to the mainstream scientific consensus on issues of significant societal risk.

However, while the research available on trust is conceptually rich, it stops short of asking why it is that some of us trust mainstream authoritative bodies while others are more hesitant? And why is it that some of us would rather trust authoritative bodies which endorse views contrary to the mainstream scientific consensus on issues of significant societal risk when doing so increases personal risk?

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[9] Entity here meaning a person, a group of people, an organisation, a government body, the scientific community, media organisation, etc.
[10] Say that three times fast!
[11] Intelligent design in the South of the US

To answer these questions, we need to look towards the literature in psychology and sociology.

1.6. Adult Attachment Theory

It may come as no surprise that some of us are more trusting that others. Trust can be reductively thought of as a dispositional trait that exists on a continuum from '*downright paranoid*' to '*dangerously naïve and credulous*'[12]. At the one extreme you have people who almost trust nothing and no one. Extreme forms of mistrust at this end of the spectrum, we know, are associated with forms of psychopathologies like schizotypal personality disorder and are a core attribute of schizophrenia (American Psychiatric 2013). At the other end though, we have those who are far too trusting, they will believe and trust just about anyone on anything. This extreme form of unconditional trust carries with it obvious risks including everything from being swindled, too losing one's life, and is generally associated with individuals with lower perceived mental competency aka those of us who are a *bit soft in the head* (Evans and van de Calseyde 2018). Fortunately, for most of us, we fall somewhere in the middle of these two extremes. Over millennia, we have evolved to navigate our complex physical and social environments and have struck a balance when it comes to knowing *if* we should trust and, perhaps, more importantly, when not to. While our experiences continually act as a teacher that helps us dial-in where we should fall on the trust continuum, our place on it was already largely determined by what happened to us during our formative years. Thanks to the work of John Bowlby, Mary Ainsworth, and their collaborators, we now finally have a better understanding of why (Bowlby 1988, Ainsworth and Bowlby 1991, Ein-Dor, Mikulincer et al. 2011, Mikulincer and Shaver 2012, Vrticka and Vuilleumier 2012).

You may recall learning about Attachment Theory in Psychology 101 or may have come across it in one of those pop psychology TikTok videos about understanding why your romantic partner behaves oddly. In truth though, Attachment Theory has half a century of serious research behind it that has reliably demonstrated that humans tend to develop a

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[12] As we'll see in Chapter 4, the story is a bit more complicated than a simple continuum, however, it serves as a useful metaphor for this argument.

dispositional attachment style towards their primary caregivers during infancy (Mikulincer and Shaver 2003).

This all seems rather unsurprising when one starts to think of Bowlby and Ainsworth's work less through the lens of developmental psychology, as it traditionally has been viewed, and more through the lens of evolutionary psychology. At its heart, Attachment Theory is about how we have evolved to cope with the environments we get thrusted into when we arrive on this mortal coil. For most of our two hundred-thousand-year human history, infants have been entirely dependent on their primary caregivers for survival (Bowlby 1969, Bowlby 1982, Bowlby 1988, Ainsworth and Bowlby 1991). Through infancy into early childhood, humans have evolved to seek security through proximity to our caregivers. Stray too far from your mother on the savannah and you become a quick meal for a roaming predator. We've evolved to use our primary caregiver as a secure base from which to explore the world. When there is a threat, an infant can signal a caregiver through crying, or once mobile they can crawl/run into the arms of safety. However, caregivers do not all respond to these attachment demands in the same way. Rather, as we will see, depending on the way in which and how consistently, the primary caregiver reacts to these demands, infants develop either what is known as secure or insecure attachment styles and these insecure styles can develop into distinct subtypes including avoidant, anxious, and disorganised (Bowlby 1969, Bowlby 1982, Bowlby 1988, Ainsworth and Bowlby 1991, Mikulincer and Shaver 2003, Mikulincer and Shaver 2012, Shaver and Mikulincer 2014).

A key insight by Ainsworth and Bowlby (1991) was that our attachment styles follow us into adulthood and influence everything from our romantic relationships, to how we process information about others, and, as we will see, to some degree, whether we are capable of trusting ourselves and others. For example, Mikulincer and Shaver (2003), Mikulincer and Shaver (2012), Shaver and Mikulincer (2014) through an insightful body of research, showed that our attachment styles influence how we process information about the world around us. Those with secure attachment styles are more likely to be open to new information, comfortable with uncertainty, and flexible with changing their views considering new data. However, those with particular insecure styles can be closed off, unreceptive to relevant

information, distort social cues, exaggerate threats, become overly sensitive to personal risk, or at times, act with credulity.

While much of the research in this area has focused on the impact of our attachment style on our close interpersonal relationships (e.g., adult parental relationships, romantic relationships, friendship relationships), of late researchers have locked onto the fact that our attachment styles influence more than just why a partner can seem needy or distant. For example, Gaziano (2017) provided some interesting insights with her findings that secure attachment styles predict trust in media reporting and government.

However, to the best of my knowledge no research has been published which directly investigates the relationship between one's attachment styles and one's views across a spectrum of issues like climate change, COVID-19, and vaccines when mediated through different forms of trust.

A more thorough investigation of these potential relationships is unpacked in Chapter 5.

1.7. Personal Values & Core Beliefs

While Bowlby's attachment theory helps us understand why some people may be more trusting than others, it does not have much to say about *who* we ultimately trust, if we are capable of doing so, when it comes to issues of significant societal risk. However, this factor can be just as, if not more important, when forming views on these issues. Despite our desire to think of ourselves as *homo economicus* - the rational human, we are more akin to *homo socius* – a social human capable of occasional rational thought, but who's reasoning, for the most part, is motivated toward the reduction of uncertainty through social allegiances that reinforce our values and beliefs. This is an idea we will explore further in Chapter 6, largely through the theoretical frameworks provided by social psychologist Shalom Schwartz and anthropologist Mary Douglas.

As we saw from Kahan, Peters et al. (2017) experiments with numeracy and data on various political '*hot*' topics, our political orientation can motivate and misdirect our ability to reason on certain issues. For Kahan (2016) our political or *cultural* commitments function as a kind of heuristic when it comes to the rational processing of information on issues of significant societal risk. Because of the complexity of these issues, most people simply take the word of

those they trust on them. They look to *their* trusted sources on what sort of empirical claims, and what sort of data supporting such claims, are deemed credible. However, much like John and myself, this form of trust operates outside our awareness, and so, when we debate these issues, we use '*facts*' and '*data*' we deem credible and tend to dismiss those we don't without acknowledging the deeper truth that we may not be qualified to evaluate either the evidence nor the credibility of it. So how is it that we come to trust some sources over others? Are some of us just more discerning and able to pick sources that are more '*truthful*'?

Not necessarily says Kahan and Braman (2005) for whom this choice boiled down to our individual values and core beliefs. Simply put, people are more likely to trust when they see a person or institutions reflect their values and beliefs back at them. But what are values and core beliefs exactly? For the most part values and beliefs in this context refer to abstract ideals about how the world ought to be, relative to how it actually is. Kahan and Braman (2005), however, added a novel dimension of how our values and beliefs operate. For these researchers, values and beliefs can be understood as the inverse of that which we find objectionable or abject, akin to the emotion of disgust. If a dirty house or an unkept appearance offends you, then, by implication, you value cleanliness and hygiene. But what about more abstract values and beliefs? To illustrate how our emotions may operate here, let's consider a few cherished values and beliefs of modern democratic societies: freedom. Freedom is listed almost universally as a value of nations that have adopted liberal democracies. But, by valuing *freedom* these nations are really signalling their distaste for forced conformity, oppression, authoritarianism, illogical restrictions, and arbitrary limitations on choice. Because they typically experience the world as '*free*' that is how they expect it to be. Similarly, *equality* is registering a disgust for injustice, undeserved privilege, and unequal/unfair treatment. For us then, disgust is not limited to the physically abject but extends to abstract values and beliefs which run contrary to our cherished classification of what is good, righteous, and virtuous as opposed to what is evil, vile, and repulsive (Douglas 1966, Douglas and Wildavsky 1983).

However, it will probably come as no surprise that people differ in what invokes a sense of disgust. As we know, even prized ideals like *freedom* and *equality* can take on vastly different meanings, not only across nations, but also within them.

One way to understand how we differ in our values and beliefs is to turn to two well-known and well researched frameworks, the first a values framework by Schwartz (2012) and the second a beliefs framework by Douglas and Wildavsky (1983). Both theories, taken together creates a useful typology to help unpack why exactly it is we come to differ in our interpretation on seemingly '*universal*' values and beliefs.
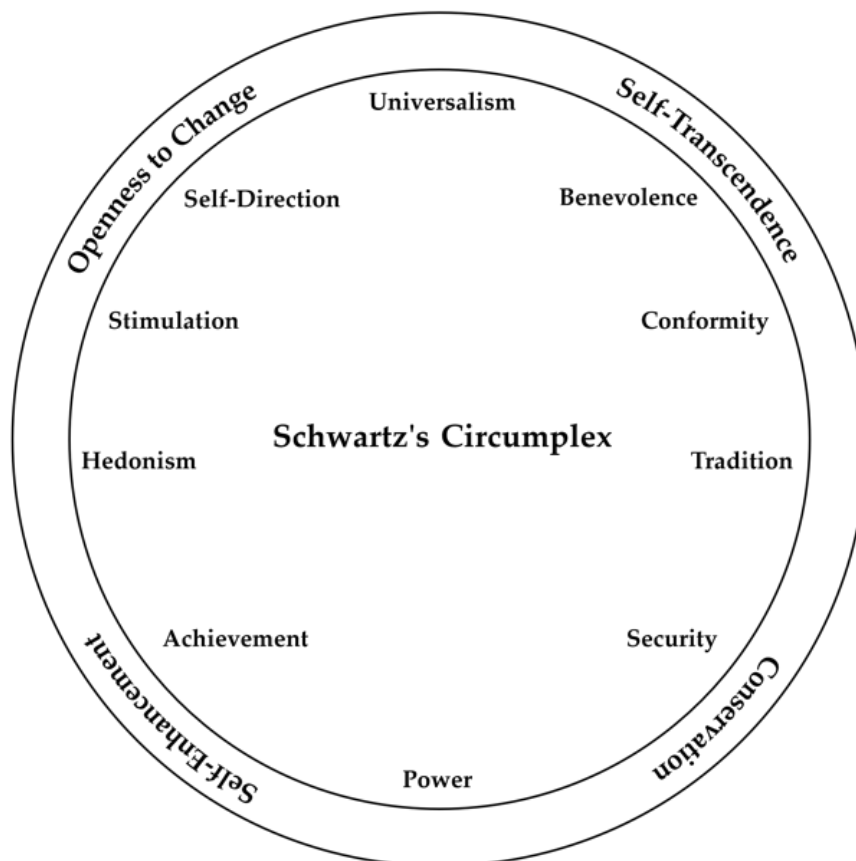
Figure 1.1: Schwartz's Values Circumplex

Schwartz (2021) proposed ten broad values that are universal, these are (1) self-direction, (2) stimulation, (3) hedonism, (4) achievement, (5) power, (6) security, (7), conformity, (8) tradition, (9) benevolence, and (10) universalism. He organised these values into a circular structure, known as Schwartz's Circumplex, based on their conflict or compatibility levels. Values adjacent on the framework share similarities, while those further apart are progressively dissimilar. Directly opposing values on the circle are in conflict, as illustrated in figure 1.1. In light of this this, it should be more apparent why a concept like '*freedom*' might not take on the same meaning for everyone. For those that value self-direction, '*freedom*' may mean the autonomy to live the life of your choice without concerns for

conformity or tradition. For others though, '*freedom*' may mean being free to require your family to adhere to one's traditions and to conform to group beliefs. Through the prism of values, these cherished concepts can then take on different meanings.

Douglas and co.'s work helps us further understand how differences arise in our beliefs about the world through a simple typology.
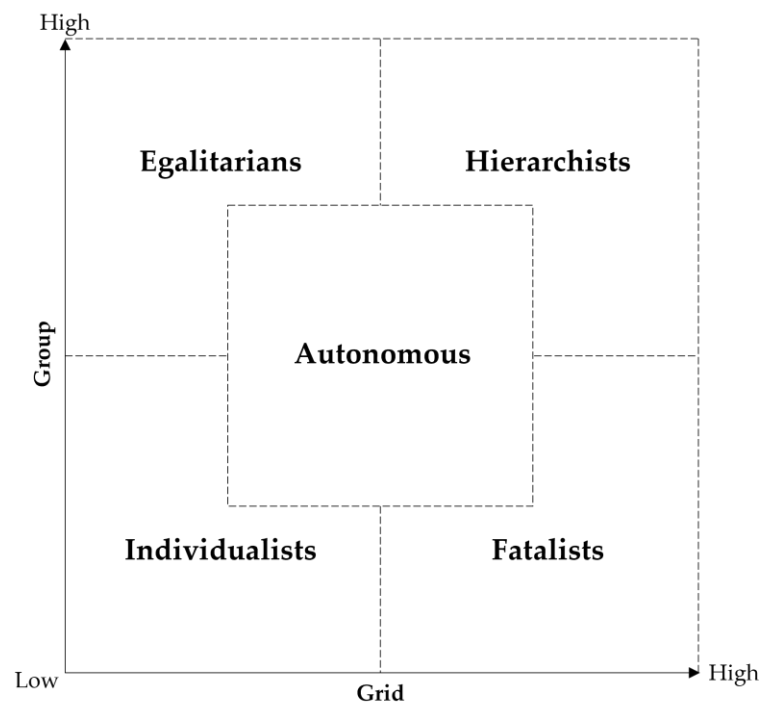
Figure 1.2: Douglas & Wildavsky's Collective Risk Management Belief Typology

Their Cultural Theory of Risk has its foundation in what is known as the grid-group axes. It offers a comprehensive lens to understand how people perceive and respond to collective risks. The axes serve as frameworks that help categorise individuals based on their beliefs about societal structures (grid) and the importance of collective ties (group).

The grid axis evaluates the degree to which individuals believe their lives are shaped by external prescriptions, or how much external forces dictate their positions in the world. At one end, there are those who feel that societal roles and regulations strongly influence them, leading them to place significant emphasis on these structures when considering risks. On the opposite end, some feel relatively free from such constraints, seeing themselves as more autonomous and less bound by external roles or expectations.

The group axis, on the other hand, measures the extent to which individuals believe they are bound by collective obligations. It gauges how strongly someone feels that collective efforts, potentially even at the expense of individual liberties, are the most effective ways to address shared risks. Some people, at one extreme, place immense value on community and collective endeavours, often advocating for group solutions to societal risks. Conversely, at the other end of the spectrum, there are those who prioritise individual autonomy over collective action.

Combining these axes, we derive four distinct typologies termed the Hierachist, Individualist, Egalitarian, and Fatalist each with distinct implications for how people perceive and respond to collective risks (Douglas and Wildavsky 1983).

Now let's tie this grid back to our democratic ideal of *freedom*. Depending on the lens through which you view freedom, via Douglas and Wildavsky (1983)'s typology, you may come to wildly different interpretations. For example, for the Individualist, '*freedom*' is more likely to mean freedom to live your life anyway you please, even if it runs antithetical to collective interests. For instance, let's consider gun rights. Even though international data has demonstrated a direct, proportional relationship between the number of guns owned per capita in a country and the subsequence rate of gun violence (Siegel, Ross et al. 2013), the individualist is likely to insist that their personal right to defend themselves trumps all collective responsibility to limit the harm caused by these weapons[13]. For the Egalitarian though, the disproportionate suffering inflicted by guns on racial minorities, the poor, and children would constitute an instance where the introduction of strict gun control would increase societal freedom, not decrease it, as it reduces injustice and oppression collectively. In this instance, the sacrifice of an individual's right to gun ownership is justified as it increases the '*freedom*' enjoyed by the majority of society. For the Egalitarian, a truly free society is one where anyone can be anything regardless of their social and biological station at birth. Taken to its extreme conclusion, the Egalitarian views a truly free society as one where men can be women, humans are equal to animals, etc.

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[13] They may also cherry pick data about high proportions of gun ownership in one country, like Switzerland, which is an outlier from the overall trend and then use it to try and discredit the conclusion.

Perhaps more pertinent to our discussion here is the role that the emotion of *disgust* plays at the extreme ends of these values and beliefs typologies. It is not simply the case that the individualist disagrees with the egalitarian on gun control, it is that their position on these issues likely offends their sensibilities to such a degree that it activates their affect, in some instances triggering emotions like anger and disgust. Those on the extreme end of the Egalitarian scale may find it difficult to fathom how an Individualist could consider an issue like an epidemic or a mass shooting and refuse to act, while a person on the extreme end of the Individualist scale may have trouble understanding why someone would want to take away a person's right to defend themselves and their family. At the extreme ends, both positions may be experienced emotionally, making rational debate on these issues challenging. As mentioned, the activation of our affect tends to engage our biases when evaluating the primary evidence on the issues being debated. We tend to turn to our '*trusted*' sources, which, as we have argued, are predominately selected based on values and beliefs. They then take their cues on these issues of significant societal risk from these sources and motivated reasoning does the rest.

These theories and the reasons why some of us lean more towards different values and beliefs orientations are explored in Chapter 6. As we will see in this chapter, the old nature/nurture debate comes into play with evidence for both neurobiological and sociological influences on our values and beliefs formation.

1.8. So, what's the problem with all this? What's missing?

To recap, we know that differences in views on issues of significant societal risk aren't simply a case of ignorance, stupidity, or mendacity. Rather, because of the complex nature of subjects like climate change, vaccinations, and pandemics, and because of the extensive division of labour we rely on, which requires significant trust in experts, the average person must rely on various authoritative sources to come to conclusions on these issues. And as argued, unconscious motivated reasoning does the rest. As such, a big part of the equation that helps us understand denialist views on these topics then, is whether a person can trust authoritative sources or not, and if they can, who they trust and why.

1.8.1. Primary Research Objective 1 – Attachment

Adult Attachment Theory provides a potential framework to understand individual differences in our propensity for trust. In a recently published study by Bellis, Hughes et al. (2022) it was found that adverse childhood experiences increased the odds of someone being vaccine hesitant as well as in opposition to COVID-19 restrictions by threefold. Therefore, it seems reasonable to hypothesise that those with insecure attachment styles are more likely to lack this capacity for epistemic trust. However, the relationship between adult attachment styles, generalised trust, institutional trust, and epistemic trust remains largely unexplored. While there are studies that have looked at the relationship between adult attachment styles and epistemic trust (Campbell, Tanzer et al. 2021) as well as with institutional trust (Gaziano 2017), to the best of my knowledge no other studies have looked at all these concepts together with the aim of unpacking the relationship between individual level differences in trust, attachment style, and issues of significant societal risk. A better understanding of this relationship has the potential to provide significant explanatory power to our understanding of denialist views. This then represents the first primary empirical objective of this study.

1.8.2. Primary Research Objective 2 – Values & Beliefs

But what about the second part of this equation, i.e. differences in who we trust? As mentioned, while Adult Attachment Theory has something to add regarding our capacity for trust, it says little of its directionality. Here we saw that who we trust is just as important as whether we are capable of it when it comes to forming views either in favour or sceptical of, the mainstream consensus on these issues. Both Schwartz and Douglas provided compelling theoretical frameworks built around individual value and belief differences to enrich our understanding of this phenomenon. However, as we have seen, there is a tendency to focus on single dependent or independent variables when studying denial. To overcome this limitation, we investigate whether our attachment orientations and our values and beliefs, interact and interrelate with institutional and epistemic trust to form multiple pathways leading to the outcome of denial on issues of significant societal risk? This became the second primary empirical objective of this study.

1.8.3. Primary Research Objective 3 - Demographics

Besides measuring respondents' attachment orientations, values, and beliefs, I was also interested in measuring other dimensions that could potentially impact our dispositional trust. Here, I turn to more traditional sociological constructs like political orientations, religious orientation, generation, sex/gender, socio-economic status, education level, employment status, and nationality. There is evidence to suggest that these characteristics, at least partially influence our trust, values, and beliefs. This is because, as research in sociology has already demonstrated, the internalization of these demographic characteristics are themselves values and belief laden (Prince-Gibson and Schwartz 1998, Robinson 2013). It is thus important to account for how these characteristics influence our values and beliefs of these issues. This then represents the third primary objective of this study.

Besides the three primary research objectives, there were other dimensions I also wanted to investigate. In my conversations with peers, colleagues, and friends, many offered their own views and explanations for this denialist phenomenon worthy of investigation.

1.8.4. Secondary Research Objective 1 – Reactance

One topic that kept coming up was what I called the '*fear of disempowerment*' but what is more commonly known as *reactance* in the psychology literature (Steindl, Jonas et al. 2015). In essence, *the fear of disempowerment* or *reactance* is the unpleasant feeling that comes when something like a rule or regulation threatens to place limits on our agency. Put differently, reactance occurs when a person feels that someone or something is taking away their choices or limiting their available alternatives (Brehm 1981, Dillard and Shen 2005, Silvia 2010). The idea here is that denialist views on issues like climate change, vaccinations, and COVID-19 are motivated because support in favour of the mainstream consensus implies the endorsement of government mandated collective action which in turn undermines individual agency and autonomy. Therefore, if I support the consensus that COVID-19 is real and lethal, then I must logically submit myself to collective action which would undermine my freedom and ability to make my own choices. Ergo, COVID-19 cannot be as dangerous as they say, lockdowns aren't effective, masks don't work, etc. This also aligns with Douglas and Wildavsky (1983) Individualist values orientation. Operationalising and seeing if *reactance* or the *fear of disempowerment* helps provide additional explanatory power

when understanding differences in trust and views on issues of significant societal risk, was thus my first secondary empirical research objective.

1.8.5. Secondary Research Objective 2 – Societal Tension

A second interesting idea that emerged was the impact of perceived societal tension on one's capacity to trust. The idea here being that if you live in complex communities or post societies (Urry 1999) where you perceive high levels of social tension, for example, between the rich and poor, locals and immigrants, different racial and/or ethnic groups, etc. that you would automatically be generally more distrustful and have less trust in authoritative institutions. There was some tentative support for this idea which emanated from a European Union study which showed that perceived societal tension was a predictor of institutional mistrust (Eurofound 2017). Given the sociological significance of societal tension, I thought it was worth investigating this further. As such, this then became my second secondary empirical research objective.

1.8.6. Secondary Research Objective 3 – The Neurobiology of Denial

Another intriguing avenue for exploration when it comes to trust and denial is our brain's neurobiological mechanics. Research in neuroscience has illuminated how certain regions of the brain, such as the amygdala and anterior insula, play roles in determining trustworthiness and processing risks, respectively (Lamm and Singer 2010, Koscik and Tranel 2011). It's conceivable that individual variations in the functioning or structure of these areas could influence one's propensity to trust authoritative sources or lean towards denialist beliefs. Moreover, understanding the neurochemical pathways, especially the role of oxytocin – a hormone often dubbed the "trust molecule" (Kosfeld, Heinrichs et al. 2005) – can provide profound insights into the neural underpinnings of our trust behaviours and how they interplay with other psychosocial factors already discussed. Therefore, examining how neurobiology complements and interacts with attachment styles, values, beliefs, and other sociological constructs in shaping our views on issues of significant societal risk encapsulates the third, and final, secondary research objective of this study.

Table 1.1: Summary of Empirical Objectives

#	Primary Empirical Objectives
1	Investigates Adult Attachment Styles relationship to Trust and Denial
2	Investigates Personal Values and Core Belief orientations relationship to Trust and Denial
3	Investigates Sociological Variables relationship to Trust and Denial (e.g., nationality, gender, etc.)
#	Secondary Empirical Objective
1	Investigates the relationship between Reactance and Trust and Denial
2	Investigates perceived Social Tension's relationship to Trust and Denial
3	Investigate the Neurobiological Basis of Denialist views on issues of Significant Societal Risk?

1.9. Complexity – or the lack thereof…

One thing that seems to be constant when reading the literature on this topic is that most researchers concerned with denialism still approach this problem from within a largely Positivistic methodological framework. Put in simpler terms, researchers are looking for linear causal relationships between single variables and are treating their populations of interest as motivationally homogenous, i.e. denialist views on *insert view here* can be explained by *insert construct variable name here*. Another limitation of the current research paradigm is the tendency for researchers to use a siloed approach when investigating this problem. They tend to approach it exclusively from within their academic discipline, be it psychology, sociology, etc. This in turn limits opportunities for the cross pollination of insights or as Abraham Maslow once observed when it comes to problem solving, "*If the only tool in your toolbox is a hammer, then all problems start to resemble a nail.*"

However, advances in our understanding of humans as complex systems suggests that this traditional approach has significant limitations as we inevitably come to reductive conclusions with extremely narrow explanatory power and even less real-world application.

As best I can, I have tried not to fall prey to these same limitations and to do so I have relied on a Complex Critical Realism methodology. This approach recognises that reality exists

independently of our thoughts (Critical Realism), but it also acknowledges that this reality is made up of complex systems with emergent properties that can't be reduced to their individual parts (Complex Systems Theory). While this sounds complicated and convoluted, it simply means that I acknowledge that we, humans, are complex, and that we have a multitude of motivational forces both internal and external to us which play a role in ultimately determining our behaviour. For some, this acknowledgement would imply a state of epistemic paralysis as it is impossible to account for all the factors and their interrelations. For these extremists, this implies having to account for every possible biological and environmental factor, within and across, each individual over their entire life span. And key complexity thinkers like Cilliers (1998), Castellani and Hafferty (2009), and Byrne (1998), Byrne and Callaghan (2014) would agree with this assessment. Cilliers (1998) perhaps put it best when he wrote: "*the best description of a complex is the system itself, but this is also its least useful description.*"

In line with these thinkers, what I am aiming for is something in the middle. That is, an acknowledgment that what I am investigating is complex, and there are more variables at play than one could reasonably account for. But at the same time, affirming that there isn't an infinity of variables, rather is likely there are a handful that account for a decent enough amount of variance to say something meaningful about this phenomenon. Perhaps Box and Draper (1987) insight here is most applicable when they noted "*that all models are wrong, the practical question is how wrong they have to be not to be useful*". By implication, by adopting a complexity approach, I acknowledge that what I propose will always remain partial, and never fully complete, but it is my hope that what I propose, while a *compressed* version of the truth, will nonetheless be useful Byrne (1998).

As such, what I have lost in precision through adopting this methodology is gained by avoiding reductionism. This is because, as we have seen in other studies, the latter invariably leads to a variables-oriented view of a phenomenon focused on division and isolation. Complexity, on the other hand, favours a case-based perspective where a phenomenon, like denialism, is viewed as the result of the nexus between objects, processes, and conventions which are found, not constructed (Ragin and Becker 2003, Castellani and Hafferty 2009, Castells 2015).

Furthermore, in line with our complexity methodology, I acknowledge that no one discipline has all the answers. As such, I let the research question drive the disciplines I drew on, and not the other way around. This study then, is by its very nature, interdisciplinarity, drawing on thinkers, sources, and insights from across the social and natural sciences.

Therefore, while a complexity approach certainly has its drawbacks, for a study of wicked social global problems, this approach appears most suited. For those readers that remain unconvinced, I will elaborate on this justification in Chapter 7 where I have argued not only that denialism needs to be seen as a complex phenomenon, but also that to further our understanding of it, we need to study it as such.

1.10.   How was the empirical study carried out?

Because of the scope of my research questions which, as we have seen, encompass quite a few sociological and psychological variables, I decided to go with a quantitative approach. This allowed me to sample thousands of respondents globally on multiple constructs which gave me enough data to use COMPLEX-IT, a relatively new case-based data modelling tool[14].

The empirical study consisted of four phases. The first was solving the participant sourcing problem. Fortunately, my generous benefactors at the Leverhulme Foundation provided me with a £7,500 no-strings attached grant to purchase research participants time, which I did through Prolific. The second phase involved developing and obtaining validated instruments on the various constructs I was assessing. I had to create instruments to assess denialism on subjects of significant societal risk, institutional trust, and fear of disempowerment while I adapted a measure of adult attachment to better reflect contemporary times. The remainder of the instruments were selected based on their reputation, ubiquity in publications, and psychometric qualities. Once a battery of instruments had been assembled, there was a need to pilot my newly developed instruments as well as verify the properties of existing ones. To do so, I ran six (6) pilot studies with an overall sample size of 1,581 respondents. The data obtained over these iterations helped me refine my instruments to a point where I was satisfied with their psychometric characteristics, all while allowing me to test various constructs of interest. This piloting phase constituted phase 3. Phase 4 was the big show, where I collected my final sample using my refined instruments. In total, I collected 1,199 responses with a 50:50 gender split from four geographical zones, the UK, the US, the Global North (less the UK and US), and the Global South. A more thorough account of all this is provided in Chapter 8, where I detail my research methods. Here, I also elaborate on the ethics concerns and the risk mitigating factors that were taken to ensure this study was done on the up-and-up.

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[14] As I come from an Industrial and Organisational Psychology background, having worked in quantitative research and psychometric instrument design for the United Nations over the last decade, quantitative research falls well within my wheelhouse.

1.11.   What I found...

While the findings of this empirical investigation will be explored in depth in Chapter 9, there are some key findings that are worth highlighting. Firstly, as expected, denialist views across climate change, COVID-19, and vaccinations were found to be significantly correlated, meaning, that if you hold denialist views on one, you are highly likely to hold denialist views on another. This is consistent with the findings of other studies and points to a general underlying denialist construct (Kahan and Braman 2005, Kahan, Peters et al. 2017, Bardon 2020). Secondly, consistent with prior research (Tyler and Degeoy 1996, Kramer 1999, Lang and Hallman 2005, Hetherington 2018, Furman 2020), institutional mistrust was a significant predictor of denialist views. Therefore, the more you distrust the media, the government, international organisations, etc. the more likely you are to endorse denialist views.

Perhaps the most important insight demonstrated through this study was that, as hypothesised, when it comes to denialist views, populations are not homogenous in their underlying motives. A case-based modelling analysis on my global sample of 1,199 respondents provided a three-group solution. The first cluster (*n=519*) were folks who didn't hold denialist views, or who I called the "*Accepters*", while the other two clusters both held denialist views. However, these two clusters seemed to come the same conclusion on these issues for different reasons. Of these two clusters, the first (*n=426*), or what I have labelled "*Hesitants*", appeared to have their denialist views predicted more through psychological dimensions, while for the second group, that I have labelled the "*Denialists*" (*n=247*) appeared to have their views predicted more by sociological dimensions. With this little teaser out of the way, more detail is reported in Chapter 9, but suffice to say our finding supports the idea that research samples on denial should be treated as motivationally heterogenous.

1.12.   Summary of what's to come.

As already alluded to, this thesis is broken down into a series of chapters each with its own unique focus but related to my research questions at large. The next chapter focuses squarely on the literature of denial. Chapter 3 through 6 serve a specific purpose. Over the course of these chapters, I have built a theorical model is that is presented in Chapter 7. The remaining chapters explain how the model was tested and whether support for it was found or not:

Table 1.2: Complete Chapter Outline

Chapter #	Chapter Title	Description
1	Introduction	If you are reading this, you hopefully already know what this chapter is about!
2	The Trouble with Denial	I make a case for why we should care about denialism, especially in this contemporary age. I also go over the research in the denialist space and point out limitations.
3	Motivated Reasoning	We start to build our model by first looking at the cognitive mechanisms at play in denialism.
4	Trust	Trust is investigated as a possible trigger of motivated reasoning. Here we dive into the literature on trust to help us understand this concept better.
5	Adult Attachment Theory	To understand why some of us have a harder time trusting others, we turn to the work on adult attachment.
6	Personal Values & Core Beliefs	We add to our model by investigating how, despite having a propensity for trust, some of us still don't trust mainstream institutions.
7	Towards a Complexity Model of Denial	We assemble our model and explain why Case-Based Configurational Complexity is the best way to test it.
8	Methods	I provide an in depth rundown of how exactly I went about testing our model and answering our empirical questions.
9	Findings	Like it says on the tin, in this chapter, I present the results of my empirical research.
10	Discussion, Limitations, Future Research, Conclusion	Here you are first treated to my musing of what I make of the study's findings and what I think the implications of it all might be. Finally, I wrap things up with a conclusion, I consider some of the limitations of my study, and I ponder where this should all go next.

On to Chapter 2 we go.

Chapter 2 - The Trouble with Denial

"The easiest way to solve a problem is to deny it exists."

– Isaac Asimov

The purpose of this chapter, besides defining denial in the context of this study, is to convince you of a few things concerning it. Firstly, not all denial is innocent, some forms of it have serious societal consequences. Simply put, there is a lot more than a fight with your uncle at the Christmas dinner table at stake. While some forms of denial have a microscopic ripple effect, as in the case of a family argument; others, when aggregated up, follow a complex systems pathway where the emergent whole is more than the sum of its parts. The result is large-scale social problems, as in the case of entire segments of a country or massive complex global networks denying climate change. Secondly, our contemporary, internet-dominated, social media age has made denialism, and its impact, worse, and it will only continue to do so. And lastly, I aim to show you that the research out there concerned with denial has certain limitations which require our attention.

2.1. What Exactly is Denial? Hint: It is Not a Long River in Africa.

We have all heard the term denial thrown around in pop psychology. Jane is in denial about her partner's infidelity, even though its common knowledge to her peers. Mary is in denial about her diagnoses, instead believing the doctors are wrong. Peter is in denial about his drug addiction, rather choosing to believe he can stop whenever he wants. I could go on, but I think you know what I am talking about here. Denial[15] in this context, simply put, is an unwillingness to acknowledge a painful or threatening reality (Morrison and Maisto 2002). Psychoanalysts have offered many different accounts of the true psychic purpose of denial. However, these seem to mostly boil down to the idea that denial exists to soften the emotional blow of some shock or unwanted truth, thereby allowing the individual to come to terms with it gradually. However, denial may also become pathological when the person under its spell fails to do so and instead persists in their embrace of an untruth.

There are of course many different paths away from the reality of a situation, and according to Bardon (2020) our understanding of denial is further refined by eliminating what it is not.

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[15] When I refer to denial is more in the psychological sense of the word than the just the normative word sense which allows one to deny lies as well as facts.

He makes a compelling case for why denial is not simply a case of ignorance, delusion, wishful-thinking, spin, mendacity, and/or faith. Figure 2.1 provides a usefully heuristic to help us think through whether something is a case of denial or something else.
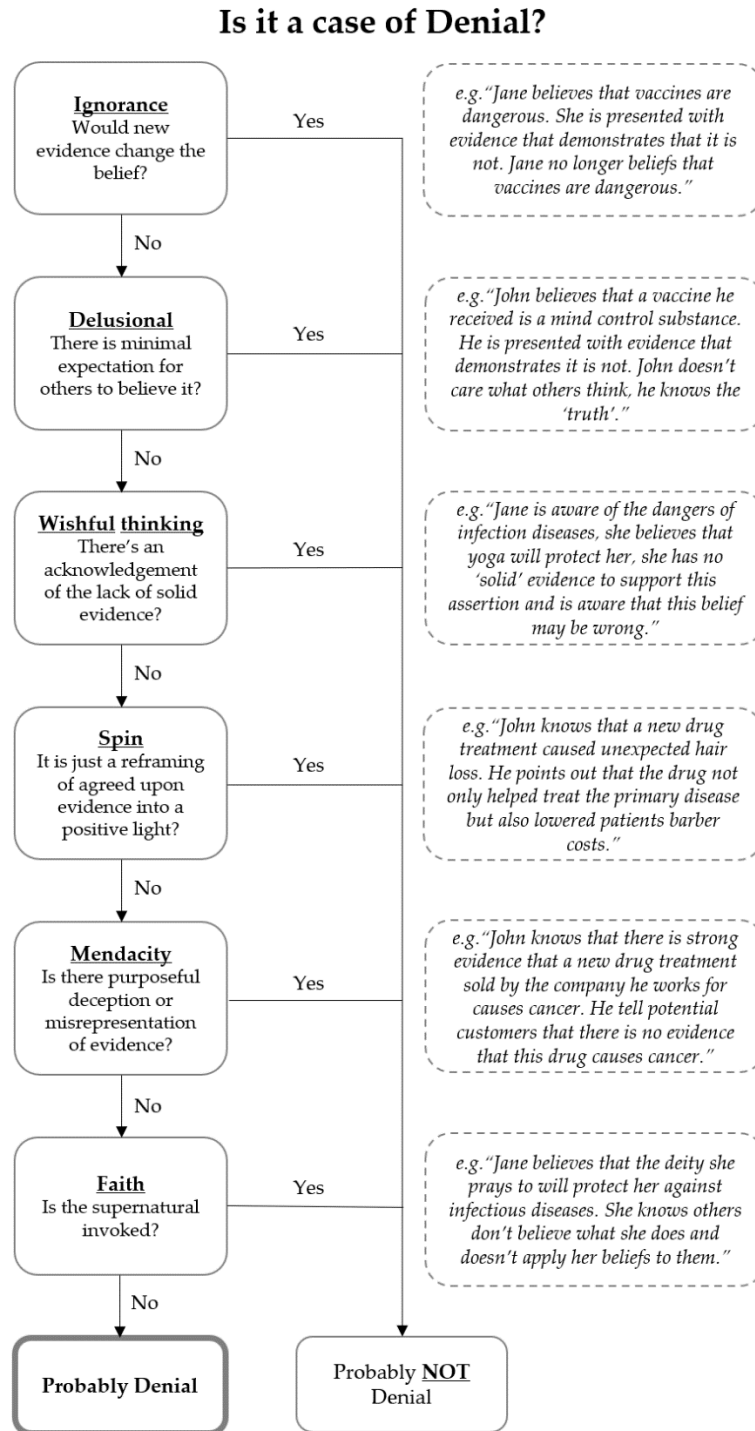
Figure 2.1: Is it a case of denial? Inspired by Bardon (2020)

2.1.1. Collective Denial

So far, we have mostly alluded to forms of denial that are more or less personal. The truth is we have all probably, at some point in our lives, engaged in one form of personal denial or another[16]. However, in the context of this thesis, when I refer to denial, I am talking about instances where it moves outside the domain of the personal and places itself into our broader societal context or what is sometimes called "*collective denial*". Collective denial occurs when a group of people endorse the same denialist view, which, through social feedback loops has the effect of reinforcing it (Hendy and Tucker 2021).

One rather humorous form of collective denial is that of the modern Flat Earth Society[17]. This is a global[18] community of people who believe the earth is not spherical, but in fact, a dome-covered disk. Using our decision tree from Figure 2., we can assess whether this group's claim, is in fact, denial or something else.

Having considered the profile of a typical flat earther, and applying this understanding to our decision tree, we can respond as follows:

1. ***Can we dismiss their conclusion as merely a case of ignorance?*** I believe the answer is no. The shape of the earth has been known for centuries and is widely taught in schools everywhere. Flat-earthers likely knew about the spherical account of the Earth, and the evidence that supports it, before coming across the flat-earth hypothesis. Yet, they now actively dismiss the former.

2. ***Is it a case of delusion?*** Some might argue 'yes' given the preposterous nature of this claim, however, a quick look at social media platforms like Facebook shows numerous groups dedicated to this topic with hundreds of thousands of members. Therefore, this is not just the delusion of a lone mad person, but rather one that Flat-earthers share and want others to believe as well. They even go so far as running

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[16] My personal favourite being: "*I am never drinking again!*"

[17] You might reasonably question the use of this specific case. Given the seemingly outlandish nature of this group's supposition it is easy to dismiss them as at best having inhibited cognitive functioning or at worst a mental disability. Yet, over recent decades those who have proclaimed their belief in this assertion have counted among their rank's university lecturers and notable public figures with no noticeable impairment in other domains of life (Dyer, 2018). I watched an entire Flat Earth Convention for my research – here's what I learnt. The Conversation.

[18] The irony of the use of that word is not lost on me!

sophisticated experiments and constructing complicated models to help others understand why their account is the correct one.

3. ***Is it a case of wishful thinking then?*** Again, the answer is no, there is a clear understanding that they are '*right*', and in this case, it is the rest of us that are misinformed. This belief is backed by a sincere conviction that what they believe is factually accurate and is something beyond mere self-belief.

4. ***Is it a case of spin perhaps?*** No, there is no agreed upon fact that is simply reframed into something more positive. A fact about reality is in dispute.

5. ***Is it a case of mendacity then?*** Those who hold this conviction have nothing material to gain from it. To the contrary, they open themselves to ridicule and mockery. Therefore, it is hard to imagine someone taking on this belief knowing it is false and expecting some sort of gain in return (other than perhaps for purposes of humour).

6. ***Is it a question of faith?*** Again, the answer is no. Most modern flat-earthers do not invoke the supernatural as supporting evidence for this claim, rather they use sophisticated instrumentation like laser gyroscopes and complicated gravitational models requiring an advanced working knowledge of calculus, geometry, and physics as evidence, among hundreds of pieces, of "*evidence*" for their assertion.

One is then left to conclude that the dogged adherence to this belief in the face of mountains of contrary evidence, known even to small children, is then probably a case of denial. While a useful exercise to hone our understanding of denial, our decision tree is by no means the definitive definitional tool. Denial is more than just the inverse of the concepts contained in our heuristic.

While amusing to consider, the flat-earthers are unlikely to have a dramatic impact on, for example, public education policy. However, in some cases, collective denial can have serious public policy ramifications. Let's consider the example of iodised salt in Pakistan.

It has long been known that iodine is an essential micronutrient to the human diet. Because of variations in the availability of iodine in soil -it is more prevalent near the coast than inland- not all diets have contain enough of it (Opazo, Coronado-Arrazola et al. 2022). This deficiency leads to birth defects, thyroid gland problems, including endemic goitre, as well as intellectual and developmental disabilities (Opazo, Coronado-Arrazola et al. 2022). This

has led many governments to mandate the addition of small amounts of iodine to table salt or bread as a cheap and effective way to deal with this dietary deficiency (Zimmermann and Boelaert 2015). However, when Pakistan tried to introduce this in 1995, it was presented to the public on television mixed in with a presentation on family planning and was subsequently erroneously linked to reduced fertility and impotence, rather than prenatal health, as intended. Conspiracy theories started to proliferate around iodine, which in turn, resulted in a major public health crisis which this nation is still feeling the effects of to this day (Leiby 2013). Here, collective denial around the clear health benefits of iodised table salt resulted because, while the scientific and medical evidence is clear, the underlying biological explanation is complicated and not well understood by the public. This in turn means that the public is reliant on authoritative sources of information on these subjects which are, as we now know, predicated on trust in those sources.

For our purposes then, collective denial occurs when the issues at hand are scientifically complicated, but the evidence on a subject is consider conclusive. However, without an advanced understanding of it, the evidence may be misconstrued.

2.1.2. Complex Denial

Besides the two examples provided above, the opportunity for denial is even more prevalent in cases where the social issue is more complicated or complex and the evidence for a policy does not enjoy a clear one-to-one relationship to a particular outcome. In complex cases a scientific consensus may have emerged on a subject, but rarely can a direct one-to-one link be demonstrated. Rather, there are many different factors that impact many different outcomes. Here outcomes are described in probabilities rather than certainties. For example, Andy[19], a close friend of mine is a habitual[20] marijuana smoker. He grows his own cannabis plants and is discerning in his selection of which strains he cultivates. However, Andy and many of the members of his marijuana smoking community, have convinced themselves that not only does their habit not pose any health risks, but actually has many health benefits. Andy will quickly quote studies at you which have shown that marijuana has anti-cancer properties, reduces the chances of developing type-2 diabetes, and promotes stronger

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[19] Again, names have been changed to ensure anonymity.
[20] By habitual, I mean virtually daily. This example does not pertain to the occasional recreational marijuana users.

bones, as well as work as an effective pain management technique, without the massive side effects of opioids and other pain management medications. What makes this form of denial so complex is that there is some truth in Andy's claims. Studies have found therapeutical applications for cannabidiols (CBD) which is one of the active ingredients in marijuana (Kis, Ifrim et al. 2019), as well as support for many of the beneficial points raised above. However, the habitual act of smoking marijuana carries with it similar risks to smoking tobacco as it contains many of the same toxins, irritants, and carcinogens (Moir, Rickert et al. 2008)[21]. Furthermore, the psychoactive element of cannabis, THC has been found to affect cognition and is linked to reduced capacity in memory, learning, attention, decision-making, coordination, emotional control, and reaction time (Batalla, Bhattacharyya et al. 2013, Klimkiewicz and Jasińska 2017). When confronted with this evidence as presented in the WHO (2016) report summarising the best available evidence, Andy will argue that he does not trust this science, and that the risks are overblown and not in line with his experience or those of his large network of fellow marijuana smokers. For Andy and his community, the health risks associated with this practice simply pale in comparison to the health benefits exactly because those who highlight the risks, like the WHO or the US CDC, are among the mainstream institutions who villainised marijuana historically (Drug Policy Alliance 2022). In their view, these institutions cannot therefore be trusted[22].

This form of denial at least limits its impact to Andy and perhaps his immediate family. In a country with no public health services, his decision, and its accompanying risks, are Andy's to make and deal with should these outcomes occur[23]. The point I am trying to make here is that while this form of denial is far from ideal in my opinion, the risks associated with it are proximate to Andy. Andy's decision to habitually smoke marijuana does not actively impact

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[21] Here it is important to note that is more to do with the act of smoking than the substance being imbibed, e.g., the same may not be true for the active ingredients if imbibed orally as an edible.

[22] Truth be told, I could have made the same argument for habitual drinking which health bodies have long warned carries significant health risk. Yet, you could easily swap out marijuana for alcohol, my name for Andy's and the same outcome would hold. I simply enjoy wine too much!

[23] This risk calculation to society of course changes in countries with publicly funded health services. Here the risk introduced by Andy's smoking may well become a burden on the public purse.

society at large. As such, denial at this level does not carry with it the wider implication of generalised societal risk[24].

2.1.3. Complex Collective Denial

However, in instances of complex collective denial, like climate change or pandemic denial, the need for us to trust experts and authoritative sources to form our views is heightened. This is because the evidence around these topics is highly technical, probabilistic, and there are also likely to be dissenting scientific voices which further complicate the epistemic landscape. While dissent is an important part of the scientific process[25], in the wrong hands, thanks to motivated reasoning[26], the '*evidence*' provided by even a single dissenting '*expert*' view can be latched onto, over weighted by the layman, and in their minds used to discredit a conclusion favoured by the scientific majority.

2.1.4. Complex Collective Denial and Significant Societal Risk

Besides our distinction between complicated and complex denial, there is another distinction worth noting for the purposes of this thesis. When I refer to denial going forward, I mean the types of denial which carry with them *significant societal risk*. It is one thing to hold denialist views on iodised salt[27] or marijuana smoking, after all these are individual choices which have, for the most part, proximate impacts and, perhaps best be left to individual agency. However, as we will see in this chapter, there are forms of complex collective denial which sanction individual, and subsequent collective behaviour, which do pose a direct risk to others, and at times, society at large. As we will see in the next section, when it comes to denial on issues like climate change, pandemics, and vaccinations, our individual choices, and subsequent behaviours, can have a direct, widespread, and potentially lethal impact on the lives of others.

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[24] I know one could argue there are residual indirect risks to society because Andy may not be operating as an optimal member of society, or should Andy become ill, there may still be consequences for the public purse.

[25] Sometimes the dissenting voice is correct, but this is the exception rather than the rule in complex fields.

[26] See Chapter 3.

[27] The reason I say the fall out of the denial of the benefits of iodised salt is localised is because that result health impacts are not commutable like viral infections.

In sum then, when I refer to **denialism** in this thesis, **I am referring to a form of collective denial on complex issues in contradiction to the scientific consensus on subjects which lead to attitudes and behaviours which introduce a high degree of societal risk that generally related to global social problems.**

2.2. Complex Collective Denial is not Innocent.

When your aunt floats a denialist view that iodised table salt makes you sterile versus, say, the MMR vaccine, we are moving from the localised *passive* realm of denial into an *active* one with potentially serious widespread societal-level consequences.

In our current circumstances there seem to be at least three specific areas where active, complex collective denialist views meet the criteria set by our definition of having a global impact that extends beyond national borders. These are climate change denial, pandemic denial, and vaccination denial.

2.2.1. Climate Change Denial

The evidence for the negative, serious, and long-term effects of anthropomorphic climate change is overwhelming. The vast majority of scientists from across numerous related disciplines as well as a global intergovernmental panel on climate change have confirmed and re-confirmed this view (Pedersen, van Vuuren et al. 2022). Despite an overall decrease in the proportion of people who hold denialist views on this subject, there is still a significant number of people who believe that climate change is either (1) not real, (2) real, but not caused by greenhouse gasses or humans, or (3) real, but not as bad as they say[28] (Coan, Boussalis et al. 2021). It must be conceded that at least a proportion of these individuals continue to hold these views for insincere reasons. They may hold these views in defence of vested economic interests or because they are political agents pandering to a particular audience or master. Others still may hold these views because they are direct beneficiaries of the fossil fuel or other pollutant industries, or as Upton Sinclair, as noted by Bardon (2020) once quipped, "*It is difficult to get a man to understand something, when his salary depends on his not understanding it.*" For these reasons, one can debate whether continuing to consciously and deliberately advocate for denialist views on climate change qualifies as

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[28] About 1 in 8 US citizens hold at least one of these views.

denialism or just selfish mendacity. However, we can safely conclude that many people who still maintain a denialist stance on climate change do not have much to directly gain from it. As my introductory reflective statement about John in Chapter 1 hopefully demonstrated, there are people out there who hold these views based on their sincere evaluation of their '*trusted*' evidence. I do not for a minute believe that John has malicious intent in his denial on this subject. In fact, quite the contrary.

However, John and nearly 1 in 8 Americans' denial of climate change (Milman and Harvey 2019) has real world consequences. On an individual level, a study by Berger and Wyss (2021) showed that those who engage in climate change denial, exercise more self-interested choices and will reap the benefits of greenhouse gas emissions no matter how great the climate cost or how small the personal benefit. Even though this group are more likely to engage in individual behaviours which accelerate climate change, their actions in and of themselves are not nearly as bad as the secondary consequences of their denialism.

This is because the world's largest contributors to climate change are large multinational corporations and industrialised nations, and denialism, even by a minority, provides these entities with sufficient political cover to continue their present trajectories. For example, at the time of writing this, nearly one third of the US House of Representatives, in the country ranked the world's second largest greenhouse gas emitter, is made up of climate change denialists (Center for American Progress 2021). This minority of denialists has been surprisingly effective at delaying climate action, either by blocking attempts to commit to joint climate action or by delaying legislation aimed at curbing greenhouse emissions. This has left McGuire (2022), a Professor Emeritus of geophysics and climate change, to conclude in his latest book, Hothouse Earth, that: "

> "*a conspiracy of ignorance, inertia, poor governance, and obfuscation and lies by*
> *climate change deniers that have enabled us to sleepwalk to within a half a degree*
> *of the dangerous 1.5C climate change guardrail.*"

Furthermore, the prevailing consensus among climate researchers is that urgent and immediate action is needed to prevent a serious climate catastrophe. However, because of the "*balanced view*" approach taken by many media organisations, denialist views enjoy a significant amount of airtime even though they represent the minority, thereby creating a

sense among the public that there is far more doubt about the science than truly exists (Wilson 2000). This only serves to muddy the epistemic landscape on this issue. In addition, instead of working on technical solutions, serious scientists are left having to defend established science against claims misguided or false claims made by denialists. This is a dangerous diversion from more critical pursuits.

As such, the effects of John's climate change denial are not the same as the denial practiced by Andy. John's views and those of his fellow denialists, aggregate into real world political power which places the ecology of the entire planet at risk. And while John and those who hold these views are not solely responsible for our ecological crisis, their attitudes and behaviours continue to help enable much of the lethargic movement on this issue. This is turn, carries with it significant societal risks.

2.2.2. Pandemic Denial

When I started my research in 2019, little could we have known, what a big role active complex collective denialism would soon play in all our lives. As the novel SARS-CoV-2 virus spread worldwide causing the COVID-19 pandemic, so did a myriad of pandemic related denialist views. Despite us now knowing that this was one of the deadliest pandemics in living memory,[29] there were a wide range of issues that large groups seemed unwilling to accept prevailing public health guidance on. And while the authorities responsible for this guidance could have done a better job in their communication, their errors hardly warranted the reactionary response that followed. Denialist views abounded around the true lethality of the virus, its origins, its commutability, the effectiveness of social distancing measures, the effectiveness/safety of wearing face masks, the side effects of hand sanitization, the effectiveness of prophylactic therapies, the effectiveness of COVID-19 treatments, etc.

One of the most surprising forms of denial, given its ease, has been the denial of the effectiveness and/or safety of wearing face masks to help reduce the spread of the pandemic

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[29] At the time of writing this pandemic, though seemingly at its tail end, had an official total global death toll of ±6 million while models produced by the Economist, which factors in global excess death rates, estimate that the true death toll is somewhere between 12 million to 22 million (see Adam, D. (2022). "The pandemic's true death toll: millions more than official counts." <u>Nature</u>.).

causing virus. It is estimated that between 10 to 15% of North Americans believe face masks to be either ineffective at helping prevent the spread of the SARS-CoV-2 virus or believe that wearing face masks poses a direct risk to their health through oxygen depletion or carbon dioxide poisoning (Taylor and Asmundson 2021). These authors note that similar attitudes have been recorded in Australia and across several European countries. Despite repeated evidence to the contrary, this did not stop this small but vocal minority from refusing to wear masks in public. In some instances, this refusal resulted in physical altercations with those who have been tasked with enforcing mask rules, including assaults on shop assistants, flight attendants, and security personnel (Porterfield 2020). There were even large street protests that rallied against face mask mandates[30] (Martin and Vanderslott 2021).

While wearing a face mask does not offer 100% protection against either contracting or spreading the SARS-CoV-2 virus, it does reduce the risk of doing so dramatically, by some estimates, as much as 65% (Eikenberry, Mancuso et al. 2020). When, at the height of the pandemic, individuals refused to wear masks in public, they were not only increasing the risk of infection to themselves but also increased the risk of spreading the virus to others. As we know, even a single infected person has the potential to pass on the virus to many others[31] which, in turn, results in an exponential growth in cases. As such, this form of denial poses a real risk to society at large as such behaviours place the lives of a large globally interconnected community at risk.

Similarly, several prophylactic treatments which would reportedly prevent you from contracting SARS-CoV-2 made their way into the public realm. Perhaps the most famous of these were Hydroxychloroquine and Ivermectin[32] (Ferner and Aronson 2020, Mahévas, Tran et al. 2020, Garegnani, Madrid et al. 2022). Even a lack of clear, clinical evidence regarding their effectiveness did not stop those engaging in denial from taking these drugs in large doses in the hope that they would prevent infection (US Federal Drug and Food Administration 2020, Goldberg 2021). Many of those who took these drugs did so without a

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[30] As if to prove the point that human behaviour is remarkably consistent, these protests aren't the first time such a rebellion against requirements to wear face masks has occurred. During the 1918 Spanish Flu epidemic a group of anti-mask protestors took to the streets in San Francisco with a very similar set of gripes and fought against any type of public mask mandate.

[31] See R number.

[32] For some reason, these medications doubled as both preventative and treatment therapies.

doctor's prescription, with little to no knowledge of the side effects or correct dosage. While the decision to engage in denialism with regards to the effectiveness of these prophylactics, and their associated side effects, is theirs to make, this is not where this story ends. When people believe they have immunity from infection, they change their behaviour and take more risks including ignoring public health guidance on social distancing and other preventative measures like mask wearing (Hills and Eraso 2021). This places their own safety and the safety of others at risk, as they are just as likely to spread the virus as those who do not take these drugs.

The behaviour change described above is not limited to denialism around prophylactic treatments. The same goes for other types of COVID denial. If, for example, a person believed that COVID is no more lethal than the common flu, and therefore, that the authorities were misleading us, they would also have been less likely to follow public health guidance such as physical distancing protocols, placing the public at large at risk (Hills and Eraso 2021).

The consequence of pandemic denial was nicely summed up Roozenbeek, Schneider et al. (2020) in their study which links the embrace of COVID misinformation with a significant reduction in the likelihood of compliance with health guidance measures. Therefore, we are left of conclude that denial in this domain, like climate change, also carries with it significant societal risk.

2.2.3. Vaccine Safety/Efficacy Denial

While the COVID pandemic has brought the issue of vaccine hesitancy and anti-vaccination attitudes to the fore, these views pre-date the COVID pestilence. In fact, it should come as no surprise that anti-vaccination views have been around for as long as vaccinations have (Hussain, Ali et al. 2018). In fact, the first anti-vaccination movements coincide with the development of Edward Jenner's cowpox vaccine (McHugh 2021). Durbach (2000) recounted how the UK Parliament passed laws in the mid-18th century mandating Jenner's smallpox vaccine for children up to the age of 14, which included penalties for noncompliance. Almost instantly the Anti-Vaccination League and the Anti-Compulsory Vaccination League were formed in response. In addition, numerous anti-vaccination journals came into being and this period saw several public demonstrations against vaccinations including the now

infamous 1885 Leicester march against vaccines which drew a crowd of between 80,000 and 100,000 people. Ongoing protests prompted the UK government to establish a special commission later that year to investigate the safety and efficacy of Jenner's vaccine. The independent commission found that the evidence supported both that the vaccine was safe if properly administered, and that it was effective at preventing smallpox. However, the commission did argue in favour of a "*conscientious objector*" clause to allow those who remained unconvinced to opt out of the vaccine for their children (Porter and Porter 1988).

The anti-vaccination movement also arrived in the United States around this period. In 1879, the Anti Vaccination Society of America was established, soon followed by the New England Anti Compulsory Vaccination League, (1882) and the Anti-vaccination League of New York City (1885) all in response to the introduction of Jenner's smallpox vaccine. These leagues went on to challenge any attempts at vaccine mandates in the courts and succeeded in several US states (College of Physicians of Philadelphia 2021).

Despite these challenges, the smallpox vaccines prevailed and in 1980 the World Health Organisation declared the disease eradicated globally (WHO 1980). The eradication of smallpox took well over a century to achieve, and one is left to wonder how much faster this goal could have been reached if not for these anti-vaccination movements. Indeed, how many lives could have been saved?

Before our current COVID vaccination denial, there were two more major global anti-vaccination waves (Pandolfi, Franza et al. 2018). The first of these, according to Ault (2021) was the controversy surrounding the Diphtheria, Tetanus, and Pertussis (DTP) vaccine during the 1970s. Hysteria regarding the safety of the DTP vaccine spread across the globe as anecdotal reports emerged linking it with neurological conditions in children (Kulenkampff, Schwartzman et al. 1974). A subsequent media frenzy in the UK and US resulted in several high-profile newspaper reports and a television documentary. These anecdotal accounts only furthered eroded trust in the DTP vaccine (College of Physicians of Philadelphia 2021). Consequently, parents asked physicians to not vaccinate their children, and physicians were far more likely to support exemptions. The decreased vaccination rate in the general population led to several outbreaks of whooping cough (pertussis) and resulted in the deaths of several infants (College of Physicians of Philadelphia 2021). This

once again led the UK government to call on a Joint Commission on Vaccination and Immunization to investigate the safety and efficacy of the DTP vaccine. The commission ordered a comprehensive independent study which involved every child in the UK aged between 2 and 36 months reported to have suffered from some form of neurological disorder. The study concluded that there was no evidence for a link between the DTP vaccine and the emergence of neurological disorders in children (Robinson 1981). This prompted the launch of a national pro-immunization campaign to reaffirm the necessity and safety of the vaccine. Similar controversies emerged in the US in the 1980's off the back of sensational documentaries like "*DPT: Vaccination Roulette*" which described alleged adverse reactions to the immunization and painted a picture of minimal benefits (Hilts 1982). Although the media storm instigated several lawsuits against vaccine manufacturers, the overwhelming and affirmative data in support of the safety and efficacy of the vaccine meant that none of these cases were successful (Sugarman 2007).

With the stage set linking vaccines with neurological disorders, the second major antivaccination wave took place in the early 2000s, when the MMR vaccine was linked with the emergence of autism in children (College of Physicians of Philadelphia 2021). While the evidence for this link was dubious at best (Nature Medicine 2010)[33], the arrival of the internet meant that traditional media outlets, which at least had some checks and balances, were no longer necessary to spread such claims. Soon, there was a global anti-vaccination community who fed off each other, creating and spreading misinformation. This was made worse when celebrity culture started intermixing with anti-vaccination sentiments. Jenny McCarthy, former Playboy model and partner to Jim Carey at the time, was one of the lead advocates of this false link. Other celebrities including Robert De Niro, Alicia Silverstone, Lisa Bonet, Jessica Biel, Rob Schneider, and Robert F. Kennedy Jr. have all made public statements questioning the safety of the MMR vaccinations (Sloss 2021). Fortunately, at the peak of this anti-vax wave social media was not yet fully developed so Twitter, Facebook, or Instagram could not be deployed to further spread this misinformation. While online anti-vax forums existed at this time, these could only be located through deliberate internet

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[33] As mentioned in chapter 1, the study published by Andrew Wakefield was found to contain falsified data and was later retracted by the Lancet.

searches. This would all change with the advent and nearly universal adoption of social media.

During the SARS-COV-2 pandemic of the 2020's the same anti-vaccination sentiments which repeated themselves previously re-emerged and the same arguments about the safety and efficacy of the newly developed COVID-19 vaccines began to circulate (Al-Gharbi 2022, Pierri, Perry et al. 2022). However, this time, it was not the town newsletter, the mainstream media, or internet forums leading the charge. During our contemporary pandemic, social media was chiefly responsible for the spread of vaccine misinformation (Wilson and Wiysonge 2020, Ennab, Babar et al. 2022). And unlike previous iterations of the internet, where you had to search for information, our personal social media pages were filled with algorithmically tailored content geared to holding our attention. Dispassionate machines picked up on the fact that some of us are more likely to engage with content which supports certain views. In many ways, these machines know our values and beliefs better than we do. For the first time ever, large portions of the global population were exposed to extreme anti-vaccination sentiments without having gone looking for it (Germani and Biller-Andorno 2021).

Even as the COVID-19 pandemic has subsided in most countries largely thanks to the ability of vaccines to stem the severity of the disease, many remain hesitant. In a global study by Robinson, Jones et al. (2021) involving 58,656 respondents from 13 countries, 1 in 5 or ±20% stated that they were either unwilling or unsure if they would get vaccinated. While this proportion varies slightly from country to country, it seems to be a fair global estimate. A study in the Canadian province of Saskatchewan involving 9,252 adults placed hesitancy rates at around 20% (Muhajarine, Adeyinka et al. 2021). In the US, a systematic review of 65 studies by Yasmin, Najeeb et al. (2021) on vaccine denial/hesitancy reported an overall hesitancy rate of 23%. This was consistent with the overall findings of Elflein (2022). A similar study in Chili, South America, also placed the hesitancy rate at 23% (Cerda and Garcia 2021). In my home country of South Africa, a similar systematic review to the one carried out in the US by Cooper, Van Rooyen et al. (2021), revealed a hesitancy rate of between 20% and 30%. Some countries recorded much more extreme hesitancy rates, like

Russia at 43% and others, much lower rates, such as China at 2% and India at 5% (Woodward 2021, Sallam, Al-Sanafi et al. 2022).

While it is a positive development that most of the world's population trusts in the safety and efficacy of these vaccines, it remains possible that the remaining 20% will act as vector for the continued spread of the SARS-CoV-2 virus along with the development of mutations. This not to mention the possibility of another pandemic.

2.2.4. Denial as an Outcome

As we have seen from the definition and examples provided above, denial is a set of attitudes and behaviours which can best be described as an **outcome** (*i.e. I refuse to take the vaccine; I will not follow public heath guidance; I will not fly less; etc*). However, nothing mentioned in our definitions above relates to the **processes** which lead an individual to this denialist outcome. As the argument presented in this section hopefully demonstrates, the impact of denial on issues of significant societal risk remains a major concern for governments, global institutions, policy makers, civil society, and scientists who are all eager to understand the underlying processes which lead groups of people these outcomes. As a result, there has been no shortage of research aimed at uncovering the drivers or underlying mechanisms of denial. However, as I have made my way through this literature, I came across a few limitations worthy of our attention.

2.3. Limitations of Denial Research

Based upon my review and analyses of a sample of the available literature, there appears to be at least five noteworthy shortcomings in the denial research. This is not to imply that this research has no value. Indeed, each study referenced below has added greater depth to our understanding of this issue in one way or another. However, for us to advance our understanding beyond its current levels, we must also consider how each of these approaches may have the unintended consequence of blinkering research in this field.

2.3.1. The Study of Denial in Single Domains

There are hundreds of studies investigating climate change denial, COVID denial, <u>or</u> vaccine denial (and indeed many other forms of denial)[34] . However, in line with a generally positivistic methodological paradigm, which is still the dominant research methodology of the social sciences (Houghton 2011), researchers tend to get fixated on a single dependent variable like COVID denial <u>OR</u> Climate Change denial. The focus is then purely on this form of denial rather than considering the potential interrelations between different forms of it. There is of course no *denying*[35] that this approach offers certain advantages, including a more manageable scope, easier measurement of constructs, and focused domain specific conclusions. However, I would argue that an issue specific focus in the study of denial has certain drawbacks as well. The most obvious being the inability to generalise the findings from one form of denial to another.

The other, perhaps less obvious, but no less major disadvantage of this approach, is the resulting conclusions. For example, in climate change denial research, the focus has been on why people hold the views they do. Logically one is led to investigate whether climate denial is related to levels of subjective knowledge of the climate science (Kellstedt, Zahran et al. 2008, Malka, Krosnick et al. 2009), experiences of extreme weather events (Spence, Poortinga et al. 2011), levels of science education (Ranney and Velautham 2021), attitudes of 'nature dominance' (Jylhä, Tam et al. 2020), or the failure of climate science communication (Brunhuber 2015, Hira 2021), media reporting bias on climate change (Chinn, Hart et al. 2020), etc. It should come as no surprise that this approach and these areas of investigation have either no, or small, explanatory effect sizes (Hornsey, Harris et al. 2016). The same argument applies when you consider vaccine denial in isolation. Here denial is investigated, for example, as a function of reporting accuracy of infection and fatality rates (Abdulmoneim, Aboelsaad et al. 2021). I could go on, but I believe the point here is made, i.e. the type of denial one chooses to investigate leads to a somewhat blinkered approach with an overemphasis and narrow focus on obvious proximate thematic causes.

However, should you establish that different forms of denial are in fact interrelated, the nature of the subsequent lines of inquiry change. For example, if we know that those who

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[34] A quick Google Scholar search returns 361,000 when looking for studies related to "climate change denial".

[35] Irony of using this word here not lost on me ☺

hold climate change denialist views are also likely to hold vaccination denialist views, then the question becomes, why do we observe denial in two seemingly unrelated domains[36]? This elevates denial to a sort of '*meta-construct*' which transcends single topic areas and potentially points us to different conclusions when attempting to answer questions about its underlying causes.

2.3.2. 'Silver Bullet' Explanations of Denial (Single Independent Variables)

Much like the fixation on a single dependent variable, researchers are equally keen to find '*the*' single independent variable which causally explains denial. This of course has great intuitive appeal, for surely there must be a sociological or psychological variable which can explain denial? And perhaps predictably, researchers have indeed investigated a plethora of constructs, dimensions, and attributes in their search for the root cause of denial.

2.3.2.1. Sociological 'Silver Bullets'

In the sociological domain, gender, education, race/ethnicity, nationality, socio-economic status, and political orientation have all been the focus of studies on denial.

2.3.2.1.1. Gender & Denial

For example, a meta-analysis covering 60 studies investigating gender as a predictor of vaccine denial, by Zintel, Flock et al. (2021), reported that men appeared to be less prone to denial in this domain than women. On average, men were 1.4 time more likely to indicate an intention to get vaccinated than women. However, of those 60 studies included in this meta-analysis, only 58% found a gender difference. This combined with the fact that many of the studies were focused on healthcare workers gave even the study's authors pause for reflection. I think that a better explanation for this difference can be found in the historically dismissive way the medical establishment responded to women and their specific health needs (Jackson 2019, Cleghorn 2021, Jackson 2021). This likely inculcated a sense of general mistrust towards this establishment which is more prominent in some women than men. This in turn leads to greater vaccine denial among this demography. Ironically though, Kleitman, Fullerton et al. (2021) found that men were more likely to be non-compliant with

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[36] We can also learn a lot when we know an individual holds denialist views in one area but not another, e.g., the COVID pandemic is a hoax, but climate change is real.

COVID restrictions. This study, which drew a sample from a more Westernised audience, may well have been assessing an artifact of Western Masculinity or '*macho culture*' where men are generally more willing to take risks (Fleming, Lee et al. 2014).

So, while this is certainly an interesting set of findings, the gender dimension in denial is a complex one which extends beyond simple biological differentiators and which is more likely the result of complex socio-cultural historical artifacts, like the patriarchy. Personally speaking, it seems rather easy to discount gender as the definitive causal variable in the denial equation. Even a moment worth of personal reflection would reveal plenty of examples of denial existing among both men and women along with counter examples of men and women who do not hold such views.

2.3.2.1.2. *Education & Denial*

Yet another independent variable with intuitive appeal is education. Surely, those with more education are less prone to denial. Not necessarily so, say researchers like Drummond and Fischhoff (2017) who investigated education (science literacy and high level of education) as a possible explainer for a variety of different forms of denial. They found -perhaps counterintuitively so- that the greater the level of one's education (including science education and science literacy) the more polarised beliefs on denialist issues became. Greater levels of education were therefore not a guaranteed inoculation against denial. Rather, the higher the level of education, the more entrenched certain denialists became in their views. This is a relationship that has been found many times over (King, Rubinstein et al. 2021). However, a higher level of education is in and of itself not a predictor of denialism. Plenty of highly educated people have ended up on either side of the denialist divide.

2.3.2.1.3. *Race/Ethnicity & Denial*

Much like the investigation into gender, other researchers have looked towards race/ethnicity as a possible significant independent variable at play in the denial equation. Momplaisir, Kuter et al. (2021), in a US-based study focused on a large sample (*n = 12,034*) of healthcare workers and investigated the role race played in predicting vaccine denial. They found that that vaccine hesitancy was more prevalent among Black, Hispanic, or Latino, and Asian respondents compared with those who identified as White ethnicity. One of their

more concerning findings showed that Black respondents were up to five times more likely to hold denialist views on vaccines than Whites. However, much like with gender, there are socio-historical factors at play which strongly influence the levels of trust different communities have in authoritative institutions like the medical fraternity. This hypothesis is supported by the study's authors who acknowledged that this observed difference may be down to "*mistrust of the health care system owing to historical mistreatment in research and medical care in the US*". Thus, race, again, in and of itself, may not be a predictor of denialism, but rather a proxy predictor of membership to a group who have legitimate historical reasons to mistrust authoritative institutions (Northington 1997)).

Another sociological variable that has been of interest in denial research is that of socio-economic status. For example, Lübke (2022) looked at a cross section of European countries and subpopulations and found that when it came to climate change denial, socio-economic factors can at least partly explain observed variance here. His research showed that individuals who tend to feel insecure about their economic future are significantly more likely to embrace the denial of anthropogenic climate change. However, Lubke acknowledged that self-perceived economic insecurity may have political ramifications which could reduce trust in political institutions. This is a conclusion supported by Wroe (2015), who seven years prior to Lübke, argued the same point in the US context. Contrary to this conclusion, Krishnan (2021) argued that socio-economic status played a role in vaccine denial in the US, but in the opposite direction than provided by Lübke and Wroe. She suggested that increased wealth, or greater socio-economic status, made people more readily think of themselves as separate from their communities, making them less likely to engage in behaviours such as public health measures and vaccinations for the sake of it. She cites the example of wealthy Californians in the highest SES category, who showed high rates of vaccine denial when it came to their children receiving the Covid-19 vaccine. Thus, vaccine denial, through for example, the over exaggeration of personal risk, in this instance has been driven by a lack of social concern.

So, much like our other sociological variables of interest in denial, socio-economic status is better thought of as an indirect variable at play, with the true cause being other factors which interplay with socio-economic status rather than SES itself.

2.3.2.1.4. *Nationality and Denial*

The last, and probably the most interesting and complex sociological variable I will touch on in this section is nationality. As the global COVID pandemic raged on, it created a quasi-natural experiment where differences across national borders could be assessed in terms of readiness to take up vaccinations, which stands in here as a proxy for vaccine hesitancy and vaccine denial[37]. Perhaps unsurprisingly, there were stark contrasts in reported levels of denial and hesitancy across countries. In a study by Sallam, Al-Sanafi et al. (2022), the highest COVID-19 vaccine acceptance rates were found in Ecuador (97.0%), Malaysia (94.3%), Indonesia (93.3%) and China (91.3%) while the lowest acceptance rates were found in Kuwait (23.6%), Jordan (28.4%), Italy (53.7%), Russia (54.9%), Poland (56.3%), the US (56.9%), and France (58.9%). Another study by Solis Arce, Warren et al. (2021) covering 10 low- and middle-income countries in Asia, Africa and South America, Russia (an upper-middle-income country) and the United States, which included a total of 44,260 individuals, found a considerably higher willingness to take a COVID-19 vaccine in the low- and middle-income countries samples (80.3%) than in the US (64.6%) and Russia (30.4%)[38]. However, while these findings are interesting, because of the complexities inherent in nationality i.e. cultures, historical contingencies, variation in levels of trust in local and international government and institutions, demography of people that make up a nation, the political landscape of a country, to mention a few, there just aren't firm, universal conclusions that can be drawn across nations about why some countries have lower acceptance rates than others. And even in countries with lower vaccine acceptance rates, apart from a few nations, the majority of the population are not engaged in vaccination denial. One is thus left to conclude that while there are some interesting secondary relationships to be found in the sociological variables mentioned above, there appears to be no silver bullet to be found here. The reported findings are either contradicted by other studies, the report relationships are rather weak, or, when a practically significant relationship is reported it is likely down to the influence of some socio-historical contingency which impacted this particular group's ability

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[37] One can reasonably assume that at least a proportion of those who are hesitant are in denial about vaccine safety and efficacy, and that this proportion remains consistent across countries.
[38] https://www.nature.com/articles/s41591-021-01454-y

to trust, e.g., women and racial minorities' trust in the medical establishment. One is thus left to wonder, did psychological constructs do any better in finding the holy grail of denial?

2.3.2.2. Psychological 'Silver Bullets'

Just as researchers have fixated over the possible sociological causes of denial, researchers in social psychology have been focused on investigating individual differences in cognition, personality, and mental disorders in their attempt to explain this phenomenon.

2.3.2.2.1. Cognitive Ability & Denial

Perhaps the simplest, most often used, intuitive '*street*' explanation of denial is that it is caused by good old-fashioned stupidity[39]. Put in more technical terms, individuals with lower general mental/cognitive ability (IQ) are more likely to hold denialist views. This is because '*smart*' people are supposedly both better informed and better equipped to process information, evaluate evidence, and make sound judgements about issues linked to denial like climate change, vaccinations, and COVID. Well, much like with levels of education, this common-sense explanation turns out to be mostly wrong. In their book '*Denying to the Grave, Why We Ignore the Facts That Will Save Us*', Gorman and Gorman (2016) showed that intelligence is no defence against denial. They provide ample historic and contemporary examples to support this assertion. Similarly, Robson (2019) in his book '*The Intelligence Trap: Why Smart People Make Dumb Mistakes*' reasserts that higher-than-average levels of general mental ability, or IQ, do not reduce the likelihood of the endorsement of denialist views. As Bond (2009) explains, while IQ indicates a greater capacity for cognition when faced with new problems; whether individuals apply this capacity is another question entirely. Bond uses the metaphor of a searchlight to illustrate how best to consider our mental faculties. Cognitive ability measures the brightness of our searchlights, but where we point this searchlight also matters. Some people do not point their searchlights at the other side of the problem, instead they over illuminate just one side, which, in turn, tends to hide its shadows. Thus, like education, more intelligence just gives us more tools to rationalise away contradictory evidence and often only serves to further intrench denialist beliefs.

2.3.2.2.2. Cognitive Styles & Denial

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[39] A friend of mine, a physicist, as a hobby, would infiltrate Flat Earth Societies, and once in, would start asking questions. His conclusion was always the same, these people are '*idiots*'.

While cognitive ability alone has not been terribly successful at explaining denial, cognitive styles as assessed through cognitive reflection tests have enjoyed somewhat more success. It is generally postulated that humans have two forms of cognition at their disposal. Martinelli and Veltri (2021) refer to these two styles as System 1 and System 2. System 1 processes cognition automatically and System 2 processes cognition more analytically. Kahneman (2013) famously called these two systems Fast and Slow cognition. Brekhus (2015) describes System 1 thinking as "*effortless, immediate, universalized and subconscious thought*" which we process efficiently without much review. This automatic cognition allows us to rely on a sort of "*autopilot*", which quickly responds to stimulus without much conscious effort. System 2, or analytic cognition, on the other hand, "*involves slow, deliberate, conscious, verbalized thought processes*" (Brekhus 2015), which suggest that when it comes to these two styles, different neural structures may be at play. When we engage in analytic thinking, we may reject or override our previous, automatic, cognitive assumptions, and actively put effort into our cognitive activities (Cerulo 2002).

What we do know is that individuals tend to have dominance in one of these two thinking styles. There are those that engage in more System 1 thinking, where they process sensory information more quickly, however, make more mistakes in their evaluation of this information. System 2 thinkers take longer to make evaluations, however, enjoy a greater degree of accuracy consequently[40]. Evolutionarily speaking, having a diversity of cognitive styles in your tribes made sense from a fitness perspective. Different circumstances favour different styles. If you came under attack, for example, by a wild animal or a neighbouring tribe, and instant decisions needed to be made, System 1 thinkers should/would probably have taken the lead. However, when deciding on whether to launch an attack or plan a hunt, System 2 thinkers would have been better at assessing the risks involved and would have been able to remove at least some the passion from this decision making. While these

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[40] I am reminded here of a time I took a foreign girlfriend to a lion park in South Africa. When we approached a specific enclosure, a male lion was having a tiff with a female lion and appeared to be quite annoyed. As we approached the fence, the male lion spotted us and instantly decided he was in no mood for visitors. Mere meters away from us, he gave an all-mighty roar and stormed the fence. I stood there wondering about the tensile strength of diamond mesh fencing and approximate weight of this lion, my girlfriend, on the other hand, took off like Usain Bolt and was about 100 meters away by the time my slow brain had decided that her course of action was probably the wiser one. Had we been on the African savanna even a few hundred years ago, I would have been cat food.

different styles played an important role in creating evolutionary fitness at the hunter gatherer level, each style has a distinct downside. When it comes to using cognitive shortcuts to draw snap conclusions, System 1 thinking has the clear advantage. However, researchers like Martinelli and Veltri (2021) have consistently found that those who primarily rely on System 1 thinking tend to be more prone to endorse conspiracy theories, are more likely to fall prey to misinformation, are more likely to be religious, and are more likely to endorse denialist views. However, while these are certainly statistically significant relationships, their effective sizes are minimal. For example, cognitive reflection style only accounts for between three and 10 percent of variance in the endorsement of conspiracy theories (Sadeghiyeh, Farhadbeigi et al. 2020, Alper, Bayrak et al. 2021). In addition, just because one style tends to be dominant, this does not mean individuals are not capable of using the other. So, while System 1 thinkers may initially jump to a conclusion, on say, the true lethality of a pandemic, with time, as these individuals process additional information using system 2 thinking, they may well override their initial assessment.

In sum then, while it seems one's cognitive style may have something to do with the way we process information related to subjects of denial, overall cognitive ability does not. In fact, we can safely conclude that intelligence alone is a poor defence against it.

2.3.2.2.3. *Personality & Denial*

Other researchers have looked toward individual differences in personality to explain denial. For example, Patty, Van Dijk et al. (2017) investigated HPV vaccine hesitancy among a sample of Dutch parents and children. They found that participants who score higher on the Big Five Personality dimension of conscientiousness, were somewhat less likely to be vaccine hesitant. This is explained through the fact that individuals higher on conscientiousness are more likely to follow public health guidance because they prioritise future rewards more than immediate ones, i.e. your child's long-term health versus the short-term side effects of a vaccine. Kleitman, Fullerton et al. (2021) found a similar result when investigating COVID denial. They found that individuals who scored higher on conscientiousness were more likely to comply with public health ordinates, like stay-at-home orders during a pandemic for the sake of flattening the curve, say versus, the short-

term benefit of seeing friends and family in-person. However, while statistically significant, this relationship was rather weak.

Other personality traits, such as extroversion, neuroticism, and openness have at best been found to be inconsistent predictors of denial. Because extroverts tend to seek out social interaction more, they were also more likely to deny the effectiveness of lockdown measures but were found to engage in hygiene practices like handwashing, sanitising, and physical distancing more readily (Kleitman, Fullerton et al. 2021). Aschwanden, Strickhouser et al. (2020), found that neuroticism was associated with fewer COVID precautionary behaviours, whilst Blagov (2020) found that neuroticism played a small positive role in current social distancing behaviour, as well as intention to adopt hygiene behaviours in future. However, if you consider that your typical neurotics were likely to engage in these behaviours, pandemic, or no pandemic, the likelihood of neuroticism being the driving force behind a resistance to denial is diminished in my view. Aschwanden, Strickhouser et al. (2020) findings around openness were also inconclusive. While openness predicts a greater willingness to take risks, it also speaks to a greater propensity to be able to adapt to your environment. Evidence for a link between this trait and COVID denialist views appears to be scant.

2.3.2.2.4. *Tolerance for Ambiguity & Denial*

Other researchers, like Jessani and Harris (2018) looked at more specific individual personality driven attributes related to the Big Five, such as a low tolerance for ambiguity. Jessani and Harris (2018) found that those who were less able to tolerate ambiguity were more likely, for example, to deny the existence of anthropomorphic climate change. This was largely attributed to the probabilistic nature of climate science and the inconsistent and complicated messaging often received from the media, and social media in particular. Because of the complex nature of issues of significant societal risk, those with a low tolerance for ambiguity favour simple, clear cut, and definitive explanations. Highly complex, contingent, and probabilistic conclusions thus '*turn-off*' this audience. They are

therefore more likely to support denialist views as these often represent the more 'straight forward[41]' explanation.

Besides tolerance for ambiguity, others like Amit Aharon, Nehama et al. (2018), looked into locus of control and found a link between lower levels of locus of control and vaccine hesitancy and denial among a sample of Israeli research participants. Those with an external locus of control, i.e. those who tend to attribute the things that happen to them to external forces, were more likely to engage in denial, at least as far as vaccinations go. The most likely explanation here, in my opinion, isn't so much that an external locus of control leads to denial, it is just that those with an internal locus of control are more likely to be proactive. Put another way, if you are the type of person that takes responsibility for what happens to you, you are more likely to seek out things, like vaccinations, which help increase your sense of subjective control over your environment.

2.3.2.2.5. *Disgust Sensitivity & Denial*

Psychological variables like disgust sensitivity have been investigated by Luz, Brown et al. (2019). They found that a heightened disgust sensitivity may correlate with negative attitudes towards vaccines. However, their article Luz, Brown et al. (2019) state that this was a minimal effect. Reuben, Aitken et al. (2020) replicated and extended Luz's findings and also found a link between disgust sensitivity and parental vaccine hesitancy. This is generally attributed to the idea that people with higher levels of disgust sensitivity were more likely to find the idea of '*chemicals*' entering the body repulsive. This emotional aversion then leads to post-hoc rationalizations as to why vaccines are not safe or effective.

2.3.2.2.6. *Intrapersonal Emotional Competence & Denial*

Gavaruzzi, Caserotti et al. (2021) looked at an individual's overall intrapersonal emotional competence. They found that one's intrapersonal emotional competences affected respondents' attitudes towards vaccines. They found that lower levels of emotional competence increased the odds of a person holding denialist views on vaccinations and concluded that being able to manage, identify, and recognise one's own emotions is central to vaccine acceptance. This raises some interesting questions? Why are some people better at

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[41] Even though these explanations, ironically, upon interrogation reveal themselves often to be even more complex is nature.

regulating their emotions than others? And why does poor emotional regulation increase the chances of denialist attitudes? Perhaps these questions can best be addressed through the concept of executive functioning which is tied to System 1 and System 2 thinking as covered earlier. One's executive functioning regulates attention, cognition, and emotions (Lawson, Hook et al. 2018). Poorer executive functioning will likely lead to an increased reliance on System 1 thinking, which as we have seen, leads to less rigorous processing and an increased likelihood of denial endorsement.

2.3.2.2.7. *Mood Disorders & Denial*

Tied to this idea of emotional regulation, Perlis, Ognyanova et al. (2022) found that people who are depressed are more prone to embrace COVID-19 misinformation. Perlis, Ognyanova et al. (2022) speculates that this might be due to a bias towards negativity in those suffering from depression because misinformation usually carries with it pessimistic views of everything including scientists, the establishment, the media, etc. It is not difficult to see how such pessimistic views, rather than directly leading to denialist views, are more likely to impact one's sense of generalised trust, which in turn leads to denial.

Despite this wealth of psychological dimensions investigated (we have only covered the most promising dimensions) no clear definitive cause between such a variable and denialist views has emerged. While each of these studies is useful in furthering our understanding of the subject, this is clearly not the end of this story.

2.3.3. Denial as Conspiracy

Another shortcoming, as far as I am concerned in the denial research, is that researchers like Lewandowsky, Cook et al. (2015), Islam, Kamal et al. (2021) and Miller (2020) tend to confound, or even equate denialist views with a conspiratorial mindset (aka those who hold conspiracy theories to be true). While it is true that conspiracy theorists tend to hold denialist views on subjects like climate change, COVID, and vaccinations, not all denialists are conspiracy theorists. Once you start viewing people who believe the earth is flat, and that aeroplane contrails contain mind control chemicals, in the same group as a parent who is in denial about the safety of vaccines for their child, it becomes problematic. This tends to lead to a rather pessimistic view of these individuals as being either delusional or otherwise

mentally unstable. And while this is perhaps the case for a small minority of denialists, this is not the case for the majority, who are, healthy, functioning members of society. Approaching denial through the lens of conspiracy may be counterproductive as it allows one to dismiss views contrary to the scientific consensus as, well, '*crazy*'. This dismissive attitude brings us no closer to understanding what the root causes of the denial in the general population might be. While there is room for the study of conspiracy theorists in the context of denial, one must be careful not to overgeneralise.

2.3.4. Denial Geographically Ringfenced

Another shortcoming in some of the denial research I have encountered has been either a narrow regional or national focus. For example, Agius, Rosamond et al. (2021) explained climate change and COVID denial as a function of US nationalism. Similar studies by Clarke, Klas et al. (2021) on COVID denial in Australia and Wonodi, Obi-Jeff et al. (2022) in Nigeria on vaccine denial, also focused on the local conditions contributing to this phenomenon. While there are clear advantages to the study of denial within a geographical/cultural context, it limits the ability to generalise these results these results more broadly. This is because, studies focused on single countries, for example, tend to inadvertently confound the impact of socio-historical contingencies with the subject under investigation. As such, while the independent variables identified in these studies may well be a contributing factor, they do not necessarily account for denial of these issues in other nations. For example, vaccine denial, if investigated in Russia (high levels of denial), would lead to a different set of conclusions than if it were studied only in China (high levels of acceptance). However, as we have seen from our review of the sociological variable of nationality, this *ringfencing* of the research does not provide satisfactory answers to understand denial as a phenomenon more generally. To get a handle on what is generalizable and what is due to local socio-historical context, we must ideally undertake denial research across multiple national contexts, but ideally globally.

2.3.5. The Assumption of Homogeneity in Denial

The fifth, and final, issue that I have with the current research on denial, is that most of it assumes homogeneity in denialist populations. Put another way, what is thought to cause denial is assumed to be the same for those being investigated. Few if any studies consider

that the same denialist view on a subject, like vaccines, may in fact have one cause for one person and another for someone else. While the denial outcome is the same, the path to get there may be different. However, when one assumes that denial is driven by the same forces in everyone, it leads to a jumble of the data which softens the effects of, for example, those who were driven to denial by sociological reasons versus those who were for psychological ones. This is a concern shared by Rothmund, Farkhari et al. (2022), echoed by Ranney and Velautham (2021), and Murphy, Vallières et al. (2021) who concluded that when it came to denial, it could not be explained by a single or distinct pattern of variables, but more likely, involved different subgroups within the general population who held these views for different causal reasons.

2.4. Denial: Where to next?

To kick off this chapter we decided on a definition of denial for this thesis, that is complex, collective, and carries with it societal risk. We then investigated the three different forms of complex collective denial which involve global societal risk, climate change denial, pandemic denial, and vaccine denial. Here we looked at how these different forms of denial pose a threat to us and why they require our attention. Then we delved into the shortcomings of the current body of research in this area. We identified five characteristics of the current approach to research in this field which may be holding it back, including: a narrow focus on single dependent variables, a desire to find '*silver bullet*' explanations, denial as conspiracy, the study of denial too narrowly bound geographically, and assumptions of homogeneity in denial populations. These are all shortcomings I have attempted to address, with varying degrees of success, in this research as you will see in my research design.

In sum then, complex collective denial is real, ubiquitous, and has serious consequences. However, as we mentioned earlier, it is the outcome of other processes which in turn are driven largely by unconscious forces. In the next set of chapters 3 through 6, we set off on a journey to try and build a complex theory of denial. This starts with a focus on the cognitive processes which facilitate its manifestation followed by investigating what the likely affect triggers might be that set these processes in motion. Here we turn to the literature on trust, attachment, as well as personal values and core beliefs. To further drive home the point that

these dimensions are influenced by forces outside of our conscious awareness we turn to the literature and research in neurobiology to help us better understand what is afoot in each of these domains as well as explore how they are interrelated.

But as we will see next, when it comes to evaluation the evidence on existentially threating issues of significant societal risk our rational faculties may not be operating in the way one would assume because of a little something called 'motivated reasonings'.

Chapter 3 – Motivated Reasoning

The confidence people have in their beliefs is not a measure of the quality of evidence but of the coherence of the story the mind has managed to construct.

~ Daniel Kahneman

In Chapter 2 we looked at denial, or put another way, a destination our cognitive processes can lead us to under certain circumstance. We also looked at some of the current research in this field which tried to identify what these circumstances may be. However, belonging to a certain demographic group or having a particular psychological attribute does not in and of itself explain how these characteristics result in a person adopting and defending a denialist view in the first place. To understand this, we need better insights into the cognitive processes involved when constructing an argument in support of such a view. In short, we need to understand the road the mind travels to get to this destination.

To do so, we will explore the concept of motivated reasoning. We will look at its definition, the history of this concept, the mechanisms which enable it, investigate some of its neurobiological underpinnings as well as consider why it exists from an evolutionary fitness perspective.

3.1. What is Motivated Reasoning? Well, it is Complicated!

The first step that in coming to grips with motivated reasoning is to rid oneself of the disillusion that human beings are perfectly rational.

3.1.1. The Rationalising Animal

This is of course far from an original idea. However, the '*rational animal*' hypothesis, often attributed to Aristotle, despite its prevalence over the centuries, and continued presence in certain disciplines like economics, game theory, political science, etc. is merely a utopian ideal. Even as far back as the 18th century, thinkers like Alexander Pope (1734) and Johnathan Swift (1792) suggested, that we were merely *animals capable of occasional proper rational thought*, or as Pope so eloquently put it: "*on life's vast ocean diversely we sail, reason the*

card, but passion the gale"[42]. Heinlein (1953) later coined the term, the '*rationalising animals*' which I feel better captures this idea. The rationalising animal is not an irrational being, in fact, far from it. After all, we put humans on the moon and have split the atom. However, the evidence seems to suggest that our rational faculties are often only selectively employed. And furthermore, when they are employed, it is often the case that these cognitive tools are put to work assembling conclusions about oneself, others, or the world which do not have accuracy or *truth* as the end goal, even though we might *feel* this to be the case. In fact, something else entirely might be afoot[43].

This is perhaps not entirely surprising when we consider that reason may not have evolved primarily with *truth* as its end goal. Mercier and Sperber (2011) have convincingly argued that reasoning likely appeared to facilitate human communication and primarily serves as a tool for persuading others and ourselves. Reasoning, it would seem, came about to convince others who would not accept what is being said to them based on trust alone. Through the power of argument, reasoning allows the person making the case an opportunity to explain their point without the need for demonstration. Equally, the person receiving the information has an opportunity to evaluate the soundness of the information by evaluating it against prior knowledge for its coherence and congruence. Reasoning thus allows us to accept information that would otherwise have been dismissed as suspicious through an argument driven process audited by an epistemic vigilant receiver. The latter works to reduce the odds that the person receiving the information is manipulated or deceived by misinformation. Consequently, this dynamic interplay between argument and epistemic vigilance has rendered human communication far more effective and efficient. And it is not hard to see why. A dispute settled through reasoned argument is less costly than one settled through violence.

However, we know that, as the popular author Michael Dobbs once put it, we are for the most part but *squirming bags of appetites.* As such, this dynamic interplay between argument

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[42] See Pope's poem, An Essay on Man, 1734.

[43] This, of course, is not a revolutionary insight for the numerous social psychologists and sociologists who have understood this for some time. For example, Herbert Mead and the symbolic interactionist tradition, conflict theory and the Frankfurt School, Feminism, and the work of Donna Haraway in addition to the work of Lyotard, Lacan, and Derrida and the post structural tradition, as well as Foucault and the sociology and philosophy of science and knowledge.

and vigilance is subject to all the foibles one would expect to encounter in us. Those who attempt to persuade us may be acting out of self-interest alone, they might have mendacious intent, or they could just be incompetent. Equally, those on the receiving of this information, may find themselves desperate to believe it *true*, may be engaging in some form of cognitive bias, or may themselves be credulously incompetent. So, while we can employ reason to solve logical problems, for the most part, reason serves its primary social master, communication with the intent to persuade self and other.

3.1.2. The Passionate Reasoner

Make no mistake, reason is a powerful tool at our disposal and like any tool, it can be wielded according to the will of its owner. Sometimes we wield this tool in an honest attempt to seek the *truth*. However, when it comes to topics that invoke our passions, in certain instances the act of reasoning can have the unintended consequence of leading us further away from, rather than closer to, the *truth* (Kunda 1990).

In fact, Kunda (1990) and her collaborators, showed that even with the same set of facts at our disposal, and equal access to sophisticated reasoning tools like mathematics, statistics, and logic, we may come to wildly different conclusions about ourselves, others, and the world. This is not necessarily because of methodological or epistemological differences, but rather because of the activation of different cognitive biases related to perception, attention, and decision-making (Mercier and Sperber 2011). Furthermore, it may be the case that the activation of these biases varies from individual-to-individual according to a complex interplay between one's genetics primarily due to neurobiological differences (Jost 2006) and one's environment particularly through one's social influences (Kahan 2016). In addition, our reasoning not only has the capacity to be motivated, but this directional influence in our thinking is also largely unconscious. As Kunda (1990) noted:

> *"…it is now clear that [unconscious] directional goals do affect reasoning. People are more likely to arrive at those conclusions that they want to arrive at. Whatever the mechanisms, the implications are serious and important."*

Two decades later this idea was reaffirmed and extended by Dan Kahan (2017) from Yale University when he stated that expertise and learning does not necessarily provide immunity against it:

"Our unconscious tendency to fit the processing of information to conclusions that suit some end or goal is more prevalent than we would like to admit, and not even expert scientists are necessarily immune to it."

And again, more recently, philosopher Adrian Bardon (2020) in his book entitled '*The Truth about Denial*' once again reiterated our capacity for this predilection:

"Our capacity for motivated reasoning in the face of contradictory evidence is impressive, and the desire to affirm comforting factual claims – and to deny inconvenient truths – is deeply rooted in our nature."

Given its importance, complexity, and the implications of motivated reasoning, it may come as no surprise, that it has enjoyed significant scientific scrutiny over the last century. Nevertheless, as we will see throughout this section, it, like many other domains in the social sciences, may have suffered from methodologically reductive paradigms which hampered its development. Consequently, important unanswered questions remain. However, before we look at the history of motivated reasoning and its shortcomings, we first need to grapple with the definition of this concept.

3.1.3. Motivated Reasoning – Concepts & Definitions

Given the importance of motivated reasoning it is unsurprising to find that there is a diverse and rich body of research which is impressive both in terms of its depth and breadth. A review of a sample of the literature associated with this phenomenon quickly makes it apparent that, besides being an area of interest in multiple disciplines within the social and behavioural sciences, there is also a significant proliferation in concepts and definitions related to motivated reasoning. These include but are not limited to:

- Motivated thinking (Molden and Higgins 2012)
- Motivated inference (Kunda 1987)
- Motivated cognition (Taylor and Hardin 1999)
- Motivated political reasoning (Bacon 2000)

- Motivated scepticism (Taber and Lodge 2006)

- Motivated social cognition (Fiske and Taylor 1991)

- Socially engaged cognition (Greenwood 2019)

- Directional reasoning (Bolsen and Palm 2019)

- Hot cognition (Newman 1999)

- Rationalisation (Westen, Blagov et al. 2006)

- Wilful ignorance (Anderson, Lepper et al. 1980)

- Heuristic driven reasoning (Kahan 2013)

In addition, the literature on cognitive psychology as well as its related subject-domain of judgement and decision-making, along with the study of cognitive biases, also presents numerous concepts related to motivated reasoning including, but again not limited to:

- Confirmation bias (Nickerson 1998)

- Congruence bias (Frotvedt, Bondevik et al. 2020)

- Selective perception (Bunderson and Sutcliffe 1995)

- Choice-supportive bias (Benney and Henkel 2006)

- Observer-expectancy effect (Kantowitz, Roediger et al. 2008)

- Subjective-validation bias (Forer 1949)

Given the somewhat dense and messy conceptual landscape which surrounds motivated reasoning, it is tempting to invoke sociologist Randolph Benson (1971) when he bemoaned the proliferation of '*conceptual neologisms*' in sociology. Or similarly, and more recently, to echo the psychologist Henriques (2011) when he criticised the social sciences for conceptual proliferation so pervasive that it serves to '*create a fog*' which may prevent our deeper understanding of phenomena.

However, when one considers the intricacies of this subject, the proliferation of concepts and accompanying definitions should come as no surprise to those working in the complexity sciences. It is exactly because of its complex nature that our propensity for motivated reasoning has eluded conceptual clarity and precise definition. That is not to say that numerous definitions have not been offered, but as we will see from the below sample provided by various researchers working in this domain, no single version seems to adequately capture the concept in its totality.

For example, Kunda (1990) noted that motivated reasoning is "*strategies for accessing, constructing, and evaluating belief.*" Taber and Lodge (2006) added the unconscious and the emotive to their definition: "*partisan goals and subsequent information processing driven by automatic affective processes that establish the direction and strength of biases*". They added a principle to their definition which aids our understanding: "*that the stronger the belief and attitude the greater the likelihood to disparage or deny incongruent evidence*". Later Nir (2011) simply defined it as "*goal directed strategies for cognitive processing*" while Kahan (2016) rather vaguely defined it as "*the tendency of people to conform their assessments of information to some goal or end extrinsic to accuracy*". In the same year, Taber and Lodge (2013) added to their original definition by stating that motivated reasoning is "*reasoning processes aimed at maintaining or bolstering attitudes in the face of attitude challenging information*". And finally, we have Hughes and Zaki (2015) who saw motivated reasoning as "*the goals and needs of individuals which unconsciously steer their cognition towards a desired conclusion.*" There are many more definitions, however, these examples suffice in demonstrating the diversity of views on the subject. Towards the latter part of this section, we will review their commonalities, but first we must deal with a few quirks in this concept.

As pointed out earlier, and as both Kunda (1990) and later Taylor and Hardin (1999), reiterate, what makes motivated reasoning so peculiar and complicated is that '*all*' reasoning is by definition, motivated. That is to say that the act of reasoning is never spontaneous, but rather originates because of intention, be it, for example, to solve a specific problem or understand a situation.

Where motivated reasoning seems to become *quirky* and differ from other forms of reasoning is that it favours a directional conclusion which may be something other than a concern for accuracy (Kahan 2013). However, because motivated reasoning has its roots in the unconscious the reasoner may not be aware of the directional nature of their thinking and may genuinely believe that their conclusions are sincere and accuracy. As Kunda (1990) points out:

> "*People motivated to arrive at a particular conclusion attempt to be rational and to construct a justification of their desired conclusion that would persuade a dispassionate observer.*"

Individuals engaging in motivated reasoning are therefore being '*rational*' in so far as they are drawing on sources of knowledge, arriving at conclusions, making predictions, and constructing explanations using deductive, inductive, and abductive approaches. As Petty and Cacioppo (1986) observed *"people belief what they want to believe only to the extent that _reason_ permits"*. However, because of the affective initiation of this form of reasoning it is more prone to cognitive bias through, for example, selective memory, by selectively influencing what knowledge is considered legitimate, or even influencing the conclusions drawn from otherwise objective tools such as statistics and mathematics (Kunda 1990).

To further complicate things, it is true that '*normal*' reasoning genuinely concerned with an accuracy conclusion is also suspectable to bias. However, the accuracy directed reasoner is also more open to feedback, contradictory evidence, and revision, thus making an eventual accurate conclusion more likely (Bardon 2020). The accuracy directed reasoner is also open to changing their conclusions in light of compelling evidence whereas those engaged in affectively initiated directional reasoning are more prone to what is commonly called the '*backfire effect*' where the individual, when faced with contradictory evidence, becomes even more resolute in their original conclusion (Bardon 2020).

Perhaps a fruitful way of looking at what motivated reasoning is, much like we did with denial, is to dispel what it is not.

Firstly, Newman (1999) contended, motivated reasoning is not simply a case of '*hot headedness*' or '*hot cognition*' or "*I feel therefore I think*". Echoing Kunda (1990) he asserted that, regardless of the intensity of the affect, we are not at liberty to believe just anything. Motivated reasoning is for the most part '*cold*' and '*calculating*' and there are still demands for evidence. However, what is considered evidence and how it is evaluated is another matter entirely. Here motivated reasoning does play a pivotal role in shaping the selection and processing of evidence and the subsequent conclusions drawn from it.

It is also important not to confuse motivated reasoning with Simon (1957)'s theory of '*bounded rationality*' where less than rational outcomes are reinterpreted as '*quasi-rational*'. For Simon, our rationality is bound by real world limitations, like time constraints or our cognitive capacity where we settle for outcomes that are satisfactory rather than optimal. However, motivated reasoning is not simply a case of bounded rationality. This is because

under the conditions Simon stipulated for his theory, individuals would revise their views once presented with information which would lead to a more satisfactory outcome. However, there are numerous examples of motivated reasoning at play where the holder of such beliefs has been presented with evidence that demonstrates how those views are damaging to themselves or their kin, yet maintain their original damaging belief (e.g., anti-vaccination advocates tend to be young mothers). In addition, motivated reasoners may spend more, not less cognitive resources maintaining a directionally motivated belief.

It is also not the case that motivated reasoning can simply be written off as what, following Kahneman (2013) in Simon's footsteps, called '*Type 1*' thinking, or reasoning which is rapid, intuitive, and unconscious in a juxtaposition to T*ype 2*' thinking which is slow, calculating, and conscious. Motivated reasoning has all the hallmarks of Kahneman's Type 2 thinking, in that the reasoner is taking her time to process the information, employing sophisticated tools while making calculations, and is doing so consciously. Yet underneath the surface of consciousness, a host of cognitive biases are steering Type 2 processing to a predetermined destination which does not necessarily share a desire for an accurate representation of reality.

It is equally tempting to simply write off motivated reasoning as a form of cognitive deficiency, i.e. '*good old stupidity*' due to low IQ, lack of education and cognitive development, etc. While probably applicable in some cases, as Haidt (2012) discusses, much like denial, higher cognitive ability does not necessary provide immunity to motivated reasoning. To the contrary, those with a greater capacity for reason, or put another way, those with more '*cognitive horsepower*' at their disposal are often better at formulating directional justifications for beliefs and maintaining those beliefs through ever more sophisticated rationalizations. Put another way, the smarter you are, the better you are at explaining away contradictions.

In conclusion then, I think we can agree that motivated reasoning is a *complex animal* with many conceptual associations. However, as we have seen, these are not necessarily infinite. Instead, we may need to think of motivated reasoning as a complex '*nebula*' of theoretical concepts with some common concerns, but different in their operationalization and domains of interest. In recognition of this complexity, and in order to avoid reverting to a reductive

definition, it may be useful to consider Wittgenstein (1953) epistemic device of '*family resemblances*' in which he argued that things which could be thought to be connected by one essential common feature may in fact be connected by a series of overlapping similarities, where no one feature is common to all of the things.

Therefore, it is important to acknowledge that each discipline, along with their respective theoretical conceptions of motivated reasoning, has enriched our understanding of this phenomena by contributing a diversity of ideas and nuance to this area of scientific concern. However, no single discipline can claim motivated reasoning solely, as no single theoretical conceptualisation of it holds a complete grasp of the larger phenomena in question.

Despite its conceptual complexity, and given the methodological need for at least a working definition of the theoretical concept under investigation, here is a list of some of the common features of motivated reasoning as they will pertain to this study:

1. It originates in the unconscious (Hughes and Zaki 2015);
2. It has an affective component (Taber and Lodge 2006);
3. The reasoning is directed toward some goal other than accuracy, however, from the reasoner's perspective, they are being steered by accuracy goals (Kahan 2013);
4. This form of reasoning is more prone to cognitive biases (Taber and Lodge 2006);
5. Justifications employed must be persuasive to others (Kunda 1990); and
6. Conclusions come to because of this form of reasoning are harder to challenge because of its affective origins (i.e. because they *feel right)* (Bardon 2020).

And as we shall see in the next section, the interest in motivated reasoning dates back as far as the start of the 20th century.

3.2. Motivated Reasoning is Everywhere.

Now that we have a better grip on the concept, it is hardly surprising that we employ motivated reasoning often in our lives. The evidence for the pervasiveness of this cognitive process when it comes to evaluating ourselves, others, and the world is substantial and overwhelming. This is a conclusion drawn from decades of research in the fields of social psychology, judgement and decision making, as well as more recently, neurobiology.

For example, when it comes to ourselves, Sherman and Gorkin (1989) showed that subjects, when failing to solve a deliberately impossible '*trick*' test were more likely to argue for affirmative action policies which viewed testing overall as discriminatory despite being showed evidence to the contrary. Sherman and Kunda (1989) showed when subjects were told that either caffeine consumption or toothbrushing was "*bad for one's long-term health*" they reported having engaged in these activities less frequently than subjects who were told the opposite. Here we see some of the mechanism of motivated reasoning at work, where we either discount evidence to support our views or we engage in selective memory searches to back up our self-assessments.

Furthermore, when it comes to our evaluation of others, Klein and Kunda (1989) showed that the processes of motivated reasoning may be just as much at play here. In their study, they devised a trivia game in which participants were first given an opportunity to evaluate the performance of players and then were assigned one as a teammate. One of the players was a plant that always obtained a perfect score in the demonstration round. If a subject was assigned the plant as a teammate, they remembered them as having higher skill while the opposite was true if they were assigned to the opposite team. This suggests that a biased memory search was being employed because of a self-serving bias. There are of course many more studies that support the prevalence of motivated reasoning in our evaluation of others - see Kunda and Sinclair (1999).

While the ubiquity of motivated reasoning in the evaluation of 'self' and 'other' may seem unsurprising, the prevalence of this phenomenon in the evaluation of objective reality is perhaps more unexpected. While it seems almost natural for cognitive artifacts like self-serving bias and attribution bias to add directionality to our reasoning when the subject is ourselves or others, is seems less so in the evaluation of empirical evidence and fact.

Yet, as we saw in Chapter 2, even previously well-established scientific facts, as fundamental as the shape of our planet are called into question by some on '*rational*' grounds. And while this specific fringe group hardly matters, as we now know there are times when it does like in the case of climate change, pandemics, and vaccinations. Here motivated reasoning has far-reaching consequences.

Given the prevalence of motivated reasoning as a fundamental cognitive process and its potential far-reaching negative consequences, it stands to reason that there has historically been a great deal of interest in this subject which requires our attention.

3.3. Motivated Reasoning: What We Know so Far & What's Missing?

The realisation that motivated reasoning is an important area of research is not new. In fact, under one banner or another, scientific interest in this topic has been a hotbed of activity for at least a century[44].

3.3.1. Motivated Reasoning: The Swinging 20's, 50's, and 70's

As early as the 1920's, researchers like Bogardus (1924), Dunlap (1925), Ellwood (1925), and Faris (1925) came to the conclusion that our beliefs and attitudes, as well as the cognition which gave rise to them, were under the influence of something other than a faithfulness to accuracy. A subsequent generation of social psychologists like Lewin (1947), Newcomb (1951), Asch (1952), and Kelley (1955) echoed and extended this idea by showing that our perception of reality is largely the result of our attempt to represent the beliefs and attitudes of the members of a target social reference group. During this period, Festinger (1957) also showed that attitudes impact reasoning while Heider (1958) demonstrated the role of attribution on it. Later, in the 1970's Erdelyi (1974) showed that motivation affects perception which in turn, impacts how we evaluate reality.

3.3.2. Motivated Reasoning: The 80's and a Decade of Turmoil

However, around this time the view that motivated reasoning is under the influence of unconscious forces came under considerable criticism by Miller and Ross (1975) and later by Nisbett and Ross (1980) when they asserted that the research up-and-to that point could be reinterpreted entirely in conscious cognitive terms which did not require motivative reasoning as an explanation. Drawing on Simon (1957)'s substantial work and what was later expanded on by Kahneman (2013), they contended that what was being identified as '*directional reasoning*' was in fact merely a case of '*bounded rationality*'. And what was previously attributed to motivated reasoning, was in fact merely a case of conclusions

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[44] Readers familiar with the historical context of motivated reasoning, or more interested in the contemporary research, can skip to section 3.3.4. This historical overview is given to provide additional conceptual richness while addressing some of the controversy associated with it.

drawn about the world which seemed more plausible because of prior beliefs, expectations, and heuristics. Thus, there was no need for *motivation* to be considered in reasoning.

3.3.3. Motivated Reasoning: The 90's, Turmoil Laid to Rest.

This non-motivated versus motivated reasoning debate raged all through the 1980's until a researcher from Princeton University, Ziva Kunda published her seminal paper in the Psychological Bulletin in 1990 entitled '*The Case for Motivated Reasoning*' in which she systematically re-reviewed the evidence from research conducted over the prior four decades and came to the conclusion that while Miller, Ross, and Nisbett had a valid point, there were nonetheless numerous instances of research findings which could not be adequately explained by their '*cognitive nonmotivational hypothesis*' alone (Miller and Ross 1975, Nisbett and Ross 1980). Kunda (1990) both addressed the controversy and added to our understanding of motivated reasoning by modifying our view of it as '*bounded*', in the sense that our propensity for motivated cognition is **both** directional and constrained. Drawing on the work of Darley and Gross (1983) as well as Pyszcynski and Greenberg (1987) she showed that motivated reasoning was not merely a case of "*I feel therefore I think*", but rather that desired conclusions can only be maintained if one can muster the necessary supporting evidence to maintain such a view.

However, as Kunda (1990) and her colleagues so convincingly illustrated, motivation plays a crucial role in what knowledge structures we access and which strategies we employ when we search for and process evidence which forms the bedrock of our evaluations of reality. In her own words: "*directional goals…affect reasoning by affecting which information will be considered in the reasoning process*" (p.483). This conclusion would later be reaffirmed by Hughes and Zaki (2015) in that "*motivation not only shapes what people think, but how people think*". Hughes and Zaki (2015) continued by demonstrating how motivated reasoning influences our perceptions in a directional manner through our attention and decision-making.

Therefore, in the search for evidence we unconsciously adopt biased searches through memory for relevant beliefs and inferential rules. In addition, how we treat evidence also varies when evaluated under a motivated condition. As Lord, Ross et al. (1979) showed, people tend to be more critical of the research methods and findings of scientific studies

which disconfirmed their initial beliefs. Their research subjects would quickly call into question these findings based on insufficient sample size, non-random sample selection, or the absence of control groups, etc. but would not hold studies which supported their initial views to the same methodological standards. Instead, they would be more forgiving of the methods employed by supportive studies despite being open to the same criticism. Furthermore, Lord, Ross et al. (1979) found that even when we find no obvious methodological shortcomings in a study, we will still tend to downplay findings if they are threatening to our initial beliefs while also discounting this evidence in our future evaluations.

This all suggests that while we '*attempt*' to be rational in our evaluations of the world under motivated conditions, as Kunda (1990) maintains: "*we will only believe undesirable evidence if we cannot refute it, but we will refute it if we can*" (p.490). This left Kunda (1990) to conclude that "*people rely on cognitive processes and representations to arrive at their desired conclusions, but motivation plays a role in determining which of these will be used on a given occasion*" and ultimately that "*motivation affects reasoning through a reliance on a biased set of cognitive processes."*

In addition, Kunda (1990) points out that this interplay between motivation, biased memory searches and selective evaluation of evidence, over time, becomes subject to a compounding effect where "*biased memory searches will result in the formation of additional beliefs and theories that are constructed so as to justify desired conclusions.*" This in turn, in some cases, will eventually result in a set of beliefs which Sam Harris humorously described as a set of propositions "*we cannot believe someone else could reasonably believe*".

Throughout the subsequent decade, there was renewed interest in motivated reasoning culminating in a 1999 special issue of Psychological Inquiry dedicated entirely to this subject. Researchers here reaffirmed and refined Kunda's ideas about the processes which underpin it.

3.3.4. Motivated Reasoning at the Turn of the New Millennium

As the end of the last century approached, researchers had done a decent job at cataloguing and describing the mechanisms that enable motivated reasoning. Newman (1999) showed

that self-posed directional questions and a degree of self-deception were at work. He also suggested that selective exposure to evidence was likely at play. Other insights into the mechanisms enabling motivated reasoning listed by Kunda and Sinclair (1999) included:

- Employing biased memory searches
- A tendency to require less evidence when the hypothesis being tested is desirable
- The search for inferential rules that could yield desired conclusions
- The creative combination of assessed knowledge to construct new beliefs

However, by the end of the millennium, while there was wide acknowledgement of the progress made in the field especially in terms of describing the mechanisms at work in this phenomenon, a consensus remained that there was a glaring gap in our understanding of motivated reasoning. The question, "*what exactly motivated our reasoning?*" remained mostly unanswered. In their summation of the articles published in the special issue, Taylor and Hardin (1999) concluded that motivated reasoning was a "*phenomena in search of a theory*". These authors continued by pointing out that while research up to that point had done a satisfactory job at "*demonstrating the importance of motivation in cognition, having done so with operational capability and with local conceptual coherence…we have not provided a clear picture of what is meant by motivation.*" Taylor and Hardin (1999) continued by suggesting that for this domain of research to advance, the important and fundamental question, "*what is motivation?*" would need to be tackled, as ambitious as it may seem. They further called for a "*theoretical framework that enables us to define motivation, explain existing knowledge in this area, and generate currently unanticipated predictions*. Here they provided four recommendations for future theory building in this domain by (1) taking advantage of where motivated reasoning is most observed, (2) looking at motivated cognition from a pragmatic standpoint, (3), clarifying how motivated cognition is framed by the dynamics of relationships; and (4), looking towards advances in cognitive neuroscience to construct an architecture of motivated cognition.

While not explicitly mentioned, Taylor and Hardin (1999) also alluded to the need to re-evaluate motivated cognition in complexity terms as they looked towards *pragmatism*. Here they pointed out that it is unlikely that a single motive will be identified as having a causal connection to motivated cognition, but rather that our cognition is governed by multiple

competing motives. In their words: "*understanding what motives govern processing and how multiple motives influence processing in ways that complement or contradict each other must figure prominently into future theoretical efforts.*".

In addition to the above, Taylor and Hardin (1999) strongly suggest that for this field to advance an "*integrative bio-behavioural social science*" interdisciplinary approach must be taken, drawing on biology, sociology, and psychology. They asserted that: "*at the very least, we must not build theoretical models that fly in the face of what we know about human biology.*" As such they cautioned against the use of psychoanalytic models to understand '*motivation*' in this context and advocated for neurobiology as the basis for our understanding.

Taylor and Hardin (1999) in their article, which became the marching orders for motivated cognition researchers for the next two decades, concluded that this phenomenon seems to be "*socially embedded*" with our "*fundamental human need to be connected to others*" playing a key role in activating it.

3.3.5. Motivated Reasoning, a New Generation of Research

The next two decades saw a new generation of researchers take up the challenge put down by Taylor and Hardin (1999). Scientists postulated that motivated reasoning was being impelled by:

- The desire to maintain a positive self-conception (Dunning, Johnson et al. 2016)
- The rationalization of self-serving behaviour (Hsee, Zhang et al. 2003)
- The desire to avoid the anticipated stress and anxiety of unwelcome news (Dawson, Gilovich et al. 2016)
- The desire to perceive coherence rather than complexity in pieces of evidence relevant to important decisions (Russo, Carlson et al. 2008)
- Identity protection (Nyhan and Reifler 2015, Westfall, Van Boven et al. 2015).

However, while useful, these listed motives could not explain motivated reasoning in the context of evidence denial as there were too many instances that the '*fact*' being denied ran contrary to the general self-interest of the person holding it (i.e. vaccinations).

3.3.6. Motivated Reasoning and Advances in Neuroscience

More recently though, researchers have heeded Taylor and Hardin (1999)'s call to look towards neurobiology for answers in our quest to better understand motivated reasoning.

One of the more interesting insights to be gained from neuroscience when it comes to our understanding of motivated reasoning is that in affectively-laden situations, the brain attempts to equilibrate to a solution that satisfies both cognitive constraints (goodness-of-fit of the available data) **and** emotional constraints (maximising positive affect, whilst minimising negative affect). It would appear then that when the topic under consideration is emotionally charged, constraints are introduced to limit our 'cold' cognition so that our emotional demands can still be met. What is interesting is that in the absence of a strong affective or emotional response, the mind is left relatively free to employ reason in a less constrained way.

This principle is nicely illustrated by a classic study undertaken by Hastorf and Cantril (1954). These two researchers asked college students from two prestigious US universities, Princeton and Dartmouth, to review a film of a highly contentious American football game played between these two institutions in 1951 during which players from both teams ended up seriously injured. Participants in the study were asked to evaluate the number of infractions for each team, and as it turns out, depending on which institution the respondent belong too, the resulting infraction count was significantly different between the two groups by some margin. What is perhaps most curious here is that the participants did register at least some infractions for their own team, but their ability to spot infractions in the opposition team was far more accurate. The authors concluded, based on the data collected, that it was as if these two groups saw an entirely different game. However, today we know that a more likely explanation is that these participants' perception, attention, and ultimate evaluation was influenced by their affective attachment to their in-group, i.e. their institutional membership and their desire to maintain a positive self-image.

To understand this, you need to appreciate that first and foremost both groups of students felt a strong sense of belonging to their institutions with what they identify as having upstanding and honourable student bodies. When confronted with evidence that this might not be the case through the actions of their fellow students on the football field, they

unconsciously discounted the seriousness of an infraction or entirely failed to perceive it. However, they were quick to spot these same infractions in the opposition team. Here their minds were hard at work trying to re-establish an equilibrium between the evidence they were confronted with and their desire to maintain a positive view of their institution and how it reflected on them. Afterall, who wants to be identified with thuggish behaviour? Their minds where thus engaged in a *goodness-of-fit* exercise where they were unconsciously, selectively registering evidence to maintain the view that their team were the lessor of the two aggressors.

Evidence for how this operates in the brain only emerged more than half a century later when fMRI technology finally arrived. One study by Mulder, Wagenmakers et al. (2012) demonstrated that our perception appears to be strongly affected by the desirability of a contingent outcome. They asked participants to view an array of moving dots where the direction of motion was difficult to discern. However, participants were asked to make a call on which direction most of the dots were moving. In some instances, the participants were informed that they would receive a reward if the dots moved predominately in one direction. Perhaps unsurprisingly, people tended to see the bulk of the dots moving in the direction that would result in a reward. Through imaging of participants' brain activity, Mulder, Wagenmakers et al. (2012) could see that that their occipital regions, which are involved in the coding on sensory information, were being modulated by their prefrontal cortexes under the motivational conditions. It wasn't just that participants were faking seeing the dots heading in their desired direction, they truly were *seeing* what they were motivated to see. The authors' conclusion was that even a fundamental tool of perception, like vision, can be biased towards a desired outcome if the motivational conditions are right. Under certain conditions, our eyes or ears, it would seem, should not always be trusted.

Besides our perceptions being highjacked by our emotions, what we pay attention to, and eventually commit to memory, is equally impacted by our affect. For example, Sharot, Korn et al. (2011) while exploring unrealistic optimistic individuals, found that they tended to selectively update their beliefs provided the update shifted the belief in a positive direction. For example, if you believed that there was a one in 100 chance of being robbed, and you were told that this was closer to one in 10,000, these participants were more likely to commit

this fact to memory. However, if they believed that their odds of winning the lottery were one in a million and they were then told that it was more like one in 300 million, participants tended to not update their beliefs and tended to not commit this new information to memory. Again, using fMRI, it was clear that when participants were presented with potentially negative information for belief updating, there was diminished activity in the lateral prefrontal cortex. Put another way, optimistic people are motivated to remain optimistic[45], and they will selectively pay attention to data that confirms or improves this view of the world. However, evidence to the contrary receives little attention and is less likely to be committed to memory. This is because there is a selective update error being committed through diminished neural coding of undesirable information regarding the future. Therefore, our emotions and motives influence the neural systems involved in attention control to divert our attention towards or away from information, depending on the desirability of the conclusions they may lead to.

Another study undertaken by Westen, Blagov et al. (2006) highlighted that we appear to engage different neural circuits depending on whether we are engaging in neutral reasoning or affectively-laden motivated reasoning. Westen and his colleagues peered into the brains of 30 committed partisan research subjects using fMRI during the 2004 US Presidential Elections. Subjects were given reasoning tasks that involved three judgment conditions: (1) information threatening to their own candidate, (2) information threatening to the opposition's candidate, and (3) threatening to neutral apolitical control targets. In instances where participants were confronted with information which undermined the credibility of their own candidate, activation was detected in the ventromedial prefrontal cortex (vmPFC), posterior cingulate cortex, insular cortex, the lateral and medial orbital cortex as well as the amygdala. These are all important brain regions associated with emotion. However, in the presence of neutral information perceived as non-threatening, processing was primarily associated with the dorsolateral prefrontal cortex (dlPFC) which is associated more with cold dispassionate reasoning and plays an important role in emotional regulation. However, when participants were evaluating information perceived as threatening to their candidate, activation of dlPFC was minimal.

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[45] Presumably the same is true for pessimistic people.

There are more studies in the cognitive neurosciences that provide incredible detail of the various neuro-structures involved in the different facets of motivated reasoning. However, the details of the neuro anatomy involved here are complicated and beyond what can be fully explained in a thesis in the social sciences. However, and while this is most certainly a reductive account, at its most basic, Sapolsky (2017) shows the prefrontal cortex is key to our ability to reason and has a list of functions including working memory, executive functioning, gratification postponement, long-term planning, regulation of emotions, and reining in impulsivity.

In short, our frontal cortex can override the more primitive automatic parts of our brains like the limbic system and the amygdala. This enables us to do the harder thing when our neo cortex has concluded that this is the right thing to do and has the capacity to do so. If you could point to Abraham Lincoln's "*better angles of our nature*", this is where you would point on a brain map.

However, the prefrontal cortex does not operate in isolation. The ventromedial PFC, a subregion of the PFC, is plugged right into the limbic system, meaning that like it or not, emotions play an important part in our ability to reason. The vmPFC is the part of the brain that asks whether something "*feels*" right. This in turn is also influenced by the amygdala, in our primal brain, which is the seat of fear, anxiety, disgust, and aggression. The vmPFC can therefore function as a way for us to rationalise our primal feelings, for example, one might have a fearful response to a stranger that looks different to you, immigrants might look different to you, as such, immigrants are dangerous, and must be expelled from your country. One then starts to look for evidence to back up this assertion in a post-hoc fashion, i.e. immigrants are responsible for most of the crime. This is all an attempt to re-establish an equilibrium between our cognition and emotion.

The dorsolateral PFC, yet another subregion of the PFC, acts as the counterbalance to the above. This is where our rational Star Trek Spocks live. This part of the brain is mostly utilitarian in how it processes and most capable of nuance and complex thinking. This is the part of the brain that can suspend our primal drivers and view things a little more dispassionately.

However, the dlPFC is expensive, it takes a huge amount of energy to make and sustain its neurons, and when they are used, they get tired quickly. This is also the first part of the brain to suffer neurodegenerative effects, be it through aging or diseases. And when this part of the cortex gets exhausted or damaged our behaviour changes. We become less prosocial, we are more willing to cheat, have difficulty regulating our emotions, and act more impulsively. In short, we tend to rely more on our default primal programming to reason and understand our world (Sapolsky 2017).

It would appear then that under circumstances in which dlPFC activation is minimal and the vmPFC is left in charge of reasoning, emotion has a way of interfering in our ability to perceive information, pay attention to it, as well as evaluate it. In short, when the dlPFC is missing in action, we are far more likely to engage in motivated reasoning where our emotions drive us to a predetermined destination of its choosing.

Again, what I have explained above would probably be considered an oversimplification by those in the know. However, an important take away here is that there is a growing body of evidence in the neurosciences which strongly suggests that there is a network of functionally integrated brain regions involved in motivated reasoning. Furthermore, these brain regions are involved in more emotion laden reasoning, which to the reasoner, may feel no different from a dispassionate evaluation of the evidence, but in truth, they're being steered to conclusions other than a concern for *truth*.

3.4. Motivated Reasoning: An Evolutionary Perspective

The question we are now left with is: why are we primed to engage for motivated reasoning especially, if motivated reasoning has a habit of directing us further away from, rather than closer to, the *truth*?

As we learnt from Mercier and Sperber (2018), to understand why motivated reasoning is an artifact of our cognitive processes, we need to appreciate that the function of reason is not necessarily first-and-foremost the pursuit of *truth*, but a social tool to persuade ourselves and others to help increase our chances of survival and reproduction. In line with Ehrlich (2000)'s general thesis in Human Kind, it likely offered important evolutionary fitness benefits that allowed us to thrive in an essentially unknowable complex world.

From a survival perspective, motivated reasoning likely played a pivotal role in the establishment of elaborate founding myths that helped tie communities together (Harari 2015). This likely occurred through group-serving motivation, which is related to in-group bias, where a cluster is formed based on superficial genetic similarities (usually appearance) within populations. Here motivated reasoning is used to rationalise this attraction post-factum through ethnic-level, in-group creation myths which serve to maintain a worldview that favours the in-group thus increasing the likelihood of collaboration and survival. This, along with several other complex factors, like geographical location, helps to foster overall group cohesion (Zeigler-Hill, Welling et al. 2015). Motivated reasoning also serves to enable the creation and continued justification of our governing ideologies, and their accompanying power structures (Jost 2018). Most recently in our species history, our in-group biases have given rise to the sovereign mono-ethnically-dominated nation-state[46] overwhelmingly concerned with self-determination based on elaborate, but well-reasoned, founding myths. Historically, motivated reasoning has contributed towards populations of individuals becoming cohesive flourishing communities rooted in a shared invention of '*reality*'.

From a reproductive perspective, we see motivated reasoning in action every day. At its most basic level it is a couple that reasons to themselves that they would make great parents and that their offspring would be special in some way. At the societal level, motivated reasoning is essential in the founding and continued justification of institutions like the patriarchy and marriage. And while both these institutions have been detrimental to the equality and liberty of women, they have historically been beneficial to reproduction (Folbre 1994).

Therefore, motivated reasoning has resulted in certain evolutionary benefits as it enhances our ability to collaborate and reproduce. Without it, it would be difficult to convince yourself and others that your tribe is more deserving of resources than a neighbouring one. Equally, as we have seen, motivated reasoning is key to the establishment and continued rationalization of institutions which facilitate reproduction.

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[46] While most modern countries now consider themselves diverse, in most cases a single ethnic group still holds the majority of political and/or economic power.

3.5. Motivated Reasoning: What can we conclude?

We now know that the evidence for the existence of motivated reasoning is overwhelming and that it has been a subject of inquiry for a long time. We also know that it works by selectively impacting our perception, attention, and processing of information in ways that are outside our conscious awareness. Furthermore, we know, thanks to advances in neuroscience, that affect can trigger the mind to reason through information entirely differently to the way it would in the absence of this trigger. And finally, we know that motivated reasoning isn't some cognitive error, it is a part of our cognition that has helped us survive historically.

However, motivated reasoning also enables denial, and as I argued in the previous chapter, in our contemporary age this carries with it significant societal risk. As such, we need to understand why some individuals, on issues like climate change, pandemics, and vaccinations, have affective responses which drive them to engage in motivated reasoning on these issues away from the scientific consensus. Put another way, why have these individuals become epistemically hyper vigilant, or why do they no longer trust the authoritative sources of information on these issues?

To attempt to address this question, we are going to explore the concept of trust in the next chapter. Here we will look at how, when it comes to denial and the motivated reasoning that enables us to embrace such views, trust, or a lack there of, can act as an affective trigger which sets our Rube-Goldberg-Denial machine in motion.

Chapter 4 – Trust: A Double-Edged Sword…

> *"Trust is like a mirror, you can fix it if it's broken, but you can still see the crack in that mother f*****'s reflection."*
>
> *- Lady Gaga*

Too little or too much of a good thing will kill you, my mother used to say. When it comes to trust, this same truism may apply. As we now know, most of us are not sophisticated enough to come to our own independent conclusions on issues like climate change, pandemics, and vaccinations. Most of us simply do not have the expertise or experience to evaluate the primary sources of data and draw our own scientific conclusions. And even if we did, few of us would have the available time and resources to do so. Rather, when it comes to these matters, we tend to either accept or reject the mainstream scientific consensus based on whether we <u>trust</u> the authoritative institutions tasked with being the bearers of bad news. The rest, as we saw in the previous chapter, is mostly just motivated reasoning along with post-hoc rationalizations for our beliefs one way or the other (Bardon 2020).

In turn, as Imhoff, Lamberty et al. (2018) pointed out, there seem to be two main reasons for this lack of trust in these institutions. Firstly, the individual has a general trust deficit and finds it difficult to trust full stop. In the second instance, the individual does not lack the capacity to trust, but rather trusts some other '*authority*' which holds a position contrary to the mainstream scientific consensus. Because their trust in these other institutions supersedes the trust in mainstream ones, these individuals are more likely to reject the scientific consensus put forward by them. Either way, a lack of trust in mainstream authoritative institutions likely invokes an affective response which in turn triggers our motivated reasoning. This in turn can lead us to believe that our conclusions have been *independently* derived thus leading to, or at the very least aiding and abetting, their denial[47].

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[47] The same goes for people who trust the consensus provided by these mainstream institutions. In the past I had convinced myself that I knew climate change was real because I had done an '*independent evaluation*' of the available '*research*' on this issue. But really, I just believed the IPCC, the UN, NASA, and Al Gore when they told me it was real, and I still do. However, besides anecdotal experiences of unusual weather patterns, in truth, there is nothing else that I can offer other than my trust in the mainstream consensus when I make this claim.

The concept of trust is thus central to our understanding of how denial works. Given that this is a key concept to my thesis, in this chapter I will do my best to define it, consider different forms of it, and explore what happens to our cognition when we either lack it or have too much of it.

4.1. What is Trust?

Trust as a concept is a slippery one and appears to a large degree, to be stuck in a conceptual fog with philosophers and social scientists going back and forth on what it means and how to operationalise it. Consequently, there is no one universal definition of trust which appears in the literature (Bachmann and Zaheer 2013). However, there are some common features of trust that, for the most part, appear agreed upon. Before we explore these features, it might be useful to take a step back and ask ourselves, what is the purpose of trust?

4.1.1. Why Do We Need to Trust? An Evolutionary Perspective

According to Jones and George (1998) trust enables cooperation among individuals, groups, and institutions and helps manage the uncertainty inherent to our environment and interactions. In short, trust was, and remains, a key precondition for our survival as social animals. As mammalian newborns, we depend on others for our survival because we are relatively helpless at birth. The survival of humankind depends on a social trust bond between newborns and other humans[48]. Beyond this dependence though, and key to our success as a species, has been the division of survival activities amongst our members (e.g., hunting, foraging, protection, etc.). These activities signify a complex set of cooperative behaviours that at their very foundation, have trust as a cornerstone. However, at the start of our evolution as a species, our need to trust was limited to our kin. As we evolved and underwent various paradigm shifts, from hunter-gatherer, to agriculture, to empire, to modern day, our ability to trust has had to adapt from dealing with knowable kin relations to dealing with abstract, almost ethereal concepts, like institutions founded on abstract ideals[49]. There is quite a difference in trusting your mother when she tells you which berries are safe to eat, relative to trusting a global institution when it tells you anthropomorphic

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[48] As we will see in Chapter 5 on Attachment theory, this relationship in-and-of itself is a complex one.

[49] Or as one of my philosopher friends used to call them: "*squishy ideals*".

climate change poses a threat to your way of life. This evolution in our ability to trust institutions built on abstractions is foundational to our modern world. As Jones and George (1998) put it:

> *"Trust leads to a set of behavioural expectations among people allowing them to manage the uncertainty or risk associated with their interactions so that they can jointly optimize the gains that will result from their cooperative behaviour."*

Without this '*higher-order*' capacity for trust, there would be no national governments, no international trade or travel, no global cooperation on peace and security, etc. Trust is the thus the bedrock of any society, be it local or global.

4.1.2. Trust Defined?

Now that we have a better understanding of the purpose and importance of trust, we can attempt to define it. At its core trust involves three basic elements: (1) a person or group of people who trusts, (2) an *entity*[50] who is being trusted, and (3) a *thing* with which the trustee trusts the trusted. For example, I (1) trust my friend (2) will be on time to pick me up from the airport (3), or the UK public (1) trusts the NHS (2) that the COVID-19 Moderna vaccination is safe and effective at preventing severe SARS-COV-2 infections (3).

Now that we know the players involved in the trust game, we need to understand the rules. The first of which is that the person who trusts, or the trustor, by definition, has little to no power over the person or entity being trusted. In our examples above, I have no coercive power over my friend picking me up from the airport, and if they don't, I can be angry at them, but that's about the extent of it. This is unlike examples where material exchange is involved such a taxi service, where I can withhold payment and pay someone else. In the case of the vaccine, an even greater vulnerability applies. We are trusting the NHS when they tell us that the vaccine and its associated side effects pose less of a risk than a SARS-COV-2 infection would without it. However, the fact remains, we have little to no direct immediate power over this institution, nor do we have any true insight into how they came to these conclusions beyond what they are willing to share. We simply trust their

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[50] Entity here meaning a person, a group of people, an organisation, a government body, the scientific community, media organisation, etc.

communication to us when they tell us that they have done what is necessary to ensure our safety.

Therefore, trust is fundamentally characterised by a state of vulnerability which makes *betrayal* a possible outcome of any trust relationship (Kumar, Capraro et al. 2020). For example, when my friend asks me to house sit while she travels, she opens her personal space up to the possibility that I might be negligent, or even act destructively toward her property. She might well return to a home emptied, or worse, burnt to the ground. Or I might travel to another country and trust that this host nation's authorities, sovereign as they are, will not detain me without cause and will assist me in the event I get into trouble.

And it is this idea of vulnerability that is core to any definition of trust. For example, Jones and George (1998) defined trust as:

> *"an expression of confidence between two parties in an exchange of some kind – confidence that they will not be harmed or put at risk by the actions of the other party."*

Harrison McKnight and Chervany (2001) echoed this sentiment with their notion of trust as:

> *"a willingness to depend on another party with reasonable security but without control over that party."*

Here the phrases "*will not be harmed or put at risk*" and "*depend on… without control*" stand in for vulnerability. Thielmann and Hilbig (2015) simply considered trust as a "*decision under risk*" whereas Mayer, Davis et al. (1995) explained trust to be:

> *"The willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of their ability to monitor or control that other party."*

Another way to help further our understanding of trust is to imagine its opposite. For Miller (1974) *cynicism* is the other side of the trust coin. Here cynicism refers to a general sense of alienation or an attitude of pessimism toward the trustee. However, others like Cook and Gronke (2001) have argued that the opposite of trust is something far more active. For them, *distrust* is an intentional unwillingness to depend on others which is driven by a *negative affective orientation* or dislike towards the trustee. It is therefore reasonable to assume that

trust can likewise be thought of as either passive or active, i.e. an attitude or a specially motivated behaviour.

Regardless of your views on trust as active or passive, for it to occur, the trustor must be *vulnerable* to the party who is being trusted. The trustor must also believe that the trustee will deliver the desired outcome. Afterall, you will not trust someone who is likely to fail you. As such, trust at the very least requires an '*attitude of optimism*' or confidence in the motives and competence of the entity being trusted (McCraw 2015). This belief or confidence, in turn, can be attributed to various dispositional and situational features.

According to Thielmann and Hilbig (2015) the dispositional variables at play within the trustor are (1) their propensity for risk, (2) betrayal sensitivity, and (3) expectations of trustworthiness. The situational variables that are required for a trust relationship are (1) the existing history between the trustor and trustee, (2) the nature of the '*thing*' the trustor is trusting the trustee with, and (3) the environmental backdrop within which trust is meant to occur.

4.1.3.   Dispositional Antecedents of Trust

Let's take a closer look at how individuals can vary on the basis of dispositional variables that are influenced largely through their personalities.

4.1.3.1. Risk Propensity

Some of us have a greater capacity for risk-taking than others (McNamara, Stephens et al. 2009, Baer, Sessions et al. 2021). Simply put, our risk appetites are not the same. Some individuals will happily jump off a cliff with only a thin nylon sheet strapped to their backs, while others are nervous to set foot outside their front doors. The same applies when it comes to trust, some people are naturally just more willing to take a chance on others. They will accept the risk of trusting others even if it means there is a high probability that they may be taken advantage of at some point. For others though, the opposite is true[51]. The

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[51] In the late 2000's I had a travelling buddy, Michael, and the two of us would pick regions of the world, just turn up, and we would see what would happen. Once in Ljubljana, Slovenia we were approached by a woman around our age in bar. She was curious about where we were from, and we ended up having a pleasant chat with her that evening. She subsequently invited us to dinner at her place the following evening. An invitation I accepted without hesitation or consulting Michael. To my surprise, he was not keen on going at all. When I asked him why, he told me he was convinced that this was all an Eastern European honey trap- the end goal- to harvest

question of course is, why? Our first clue comes from the musings of John Derry, the first British test pilot to break the sound barrier. He was lauded a hero, a title he resoundingly rejected. When asked what the source of his bravery was, he responded that he did not consider himself brave at all, rather, "*what others attribute to bravery simply comes down to the fact that I completely and utterly lack a sense of imagination*."

In some ways our risk propensity, when it comes to trust, works in a similar way. Some of us tend to imagine the worse possible outcomes while others do not think of these at all, or we are a little too optimistic or even over-confident in our assessment of others. This tendency to assume the worst, or the best, can be further attributed to two concepts referred to in the literature as '*risk aversion*' and '*loss aversion*' (Thielmann and Hilbig 2015). While the risk averse tend to overestimate the probably of negative outcomes and underestimate the probability of a positive outcome, the loss averse overemphasise the emotional toll a loss may cause. A classic example here being asking a potential love interest out on a date. A person high on risk aversion might believe the target of their affections will never say '*yes*' when in fact there is a reasonably good chance, they would. While, for someone high on loss aversion, the fear of rejection, no matter how slim, would be so painful that they don't do it at all even if the odds were significantly in their favour. For those low on these two attributes, the opposite would be true-they would always assume there is a good chance someone would say '*yes*' and even if they said '*no*' their concern for this response wouldn't be considered an overly important factor in their decision making.

In summary then, our propensity for risk differs and these differences can be attributed to variations in our capacity for risk aversion and loss aversion.

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our organs! I laughed it off and the next evening I dragged him along to her place, which I must admit, was in a pretty sketchy part of town. As the evening progressed, she plied us with home-made alcohol. At one point later that evening her boyfriend arrived with a couple of his friends who had rather rough appearances – they were covered in tattoos and had face piercings. I could see Michael grow very nervous. After dinner, the three men disappeared from the kitchen saying they were fetching something they "*wanted to show us*". Michael gave me a look like this was the end. They returned with musical instruments, and we got drunk on east European moonshine, and sang the night away. We thankfully retained our kidneys, but as Michael later pointed out, there was a better than 0% chance we would not have, and for him, that was more risk than he was comfortable with.

4.1.3.2. Betrayal Sensitivity

Tied to the concept of loss aversion is a specific concept referred to as betrayal sensitivity. It turns out that some of us are very sensitive to the prospect of betrayal, no matter how trivial the matter over which the betrayal occurred (Jones, Couch et al. 1997).

Here, I am reminded of two high school friends who were sisters. Briana and Sharon loved fashion and clothing. They would constantly be in each other's wardrobes borrowing an item here and there to complete some new ensemble. However, when Sharon went into Briana's wardrobe to borrow something without asking, no matter how minor, all hell would break loose. Sharon's defence would usually be to point out that it was only a lip gloss to which Briana would reply, "*it doesn't matter what you took, it is the principle of the matter, you don't take other people's stuff without asking*." Ironically, I noticed that Briana would at times nip into her sister's room and do the same. However, the same reaction was never forthcoming from Sharon who was far more relaxed about it, even when at times, Briana would not take the best of care of the items she had borrowed without permission. If the item in question was expensive, Sharon would be upset, but if it was something minor, she just wouldn't care as much.

I always wondered why this was and the concept of betrayal sensitivity help me understand this observation better. You see, Briana was simply more sensitive to what she considered a betrayal. She trusted her sister with access to her wardrobe on the condition she asked permission to borrow something. When Sharon betrayed that trust; the act of betrayal was far worse than the potential loss of a pair of stockings to a run. For Sharon, however, the same was not true, even though her sister perpetrated the same transgression against her, she just did not view it as a betrayal. Instead, she focused on the worth of the item through the lens of loss aversion.

As such, we all have different levels of sensitivity to betrayal, some of us are simply more prone to experience its effects than others.

Betrayal sensitivity, historically, has had more wide-reaching consequences than a disagreement between two sisters. In fact, being overly sensitive to betrayal has resulted in the deaths of millions (Özerim 2018). As recounted by Klein (2018), prior to the First World

War, the British promised to sell two warships to the Ottoman Turks. However, in early August 1914, Winston Churchill commandeered the Sultan Osman and the Reşadiye, the two battleships bought by the Ottomans from the Vickers and Armstrong shipbuilding company. This decision was deemed '*supreme British treachery*' as it came with no promise of compensation. This betrayal swayed the Turkish people in favour of siding with Germany in the war and the Ottoman Empire signed a treaty of alliance, formally entering the First World War on 28th October 1914. This decision to enter the war for little other reason than being slighted on the global stage, cost the Turks 325,000 men in battle and many more in civilian deaths. It would seem here that their sensitivity to betrayal superseded or overrode the significant potential for loss -both financial and in terms of lives- which was highly likely to occur by entering the war.

In conclusion then, betrayal sensitivity is more or less a case of, *it doesn't matter what you betrayed me over, it is the principle of the matter.* And what's furthermore, this sensitivity differs in intensity among the general population and from culture to culture.

4.1.3.3. Expectations of Trustworthiness

When it comes to trust, as we have seen, we are operating in a state of uncertainty. If we 100% knew the trustee's intensions and the outcomes to follow, no trust would be required. Like the sun, we could just be certain that it would be there in the morning. However, in the absence of such certainty the trustor must make inferences about the trustee's trustworthiness (Thielmann and Hilbig 2015). This in turn means that the trustor must be able to effectively '*read*' and draw inferences about the trustee's likely future behaviour related to the trust transaction at hand. To come to such a conclusion the trustee must employ their cognition, which as we have seen, could involve 'System 2' thinking including logic and reason or 'System 1' thinking with its host of mental shortcuts, including biases like stereotypes, actor-observer bias, etc. It should then come as no surprise that we differ in our approach to making this evaluation based on our past experiences, environmental conditioning, or our cognitive styles.

We all have unique lived experiences, and our past experiences play a significant role in shaping our outlook on the world. When it comes to evaluating a potential trust partner, we rely on our past experiences or '*learning*' to tell us about their potential trustworthiness. Been

cheated on by a former partner and they want you to trust them again? Well, this would depend on whether this is a pattern of behaviour the trustor has experienced in the past. Have other partners cheated and repeated the offence? Or perhaps you were raised in a home where parental infidelity was the norm. This would lead one to perhaps assume that those who are unfaithful are irredeemable. In addition, our ability to trust is also influenced by the social environments we are embedded in. For example, having been raised in South Africa towards the tail end of Apartheid meant that I was exposed to a plethora of racial stereotypes all of which strongly suggested that people of '*other*' races were not to be trusted. The point here being that our own unique pasts inform our evaluations of the trustee's trustworthiness independent of the actual experiences and knowledge of the trustee in question.

Related to past experiences is environmental conditioning. While both require some historic event or events to impact the trustors evaluation of a potential trustee's trustworthiness, the former is for the most part conscious, while the latter is not. Sometimes you just do not know why you do not find someone trustworthy. I had a work colleague, Daniel, who got a bad feeling about a new boss. When I pressed him on why he did not trust her, he couldn't tell me exactly how he came to this conclusion. The most he could offer was that he knew the '*type*' having had a much longer career than me at that point. At first, I attributed it to a potential gender bias on Daniel's part, but as time went by, Daniel's gut feeling about this boss turned out to be correct. She was a deeply insecure and capricious individual who would happily throw any of her team under the bus if it suited her. My takeaway here was that over his decades of work he was conditioned to '*sense*' what type of manager a person would be. While rather illogical, in this case, it turned out to be accurate. As such, we can be conditioned to intuitively trust or not trust on a level below conscious awareness.

However, as we all well know, our gut instincts are not 100% correct 100% of the time. Our evaluations of trustworthiness can often be wrong, and you do not have to look very far for evidence to back up this assertion. For example, Boehm, Thistle et al. (2006) explained that in US banks, loan assessors have some leeway in deciding if a loan is to be approved or not. While there are multiple '*hard*' criteria which loan applicants must meet, like offering collateral and having a heathy credit record, at least some of this decision is left to the loan

assessor's discretion based on what can only be described as '*soft*' criteria, aka an assessment of their general '*trustworthiness*'. Here, it seems, that our inherent biases when it comes to the evaluation of these loan applicants '*soft criteria*' play a significant role. Boehm, Thistle et al. (2006) found that Black Americans were about half as likely to get approved for a loan application compared with their White counterparts despite meeting the same hard criteria. Their evaluation of trustworthiness may be negatively informed by stereotypes and other cognitive biases on the part of these loan assessors.

Finally, and tied in with this idea of cognitive bias, are our cognitive styles. As we saw in the previous chapters, our cognitive styles play a role in whether we make evaluations about ourselves, others, and the world in a manner which is fast, but relies heavily on mental shortcuts and heuristics, or slow, which requires more effort, but which is ultimately more systematic and as a result tends to be more objective. Consequently, those who tend to default to System 1 thinking are more likely to come to snap judgements about someone, or some entity's, trustworthiness which is likely informed by some type of bias. Those who engage primarily in System 2 type thinking are more likely to look for objective criteria and will assign those criteria more weight when making determinations about trustworthiness (Schubert, Ferreira et al. 2021).

In sum then, on an individual level, there are several personal dispositions we vary on including propensity for risk, betrayal aversion, and the way we establish the trustworthiness of a potential trustee. Therefore, it is possible for one person to conclude that I am worthy of their trust, while a different individual, who has access to the exact same information about me, may come to a very different conclusion because of the reasons covered above.

What we have here then are at least three different personal dispositions which can impact our ability to trust no matter the circumstances (i.e. the trustee or the object of trust). However, even the person with the lowest levels of risk aversion, betrayal sensitivity, and the highest expectations of trustworthiness may end up not trusting someone, or something, because of a situational variable.

4.1.4. Situational Antecedents of Trust

We now know that there are some key individual differences that influence a person's capacity for trust. However, there are also key environmental factors at play when determining one's willingness to trust.

4.1.4.1. History Between the Trustor and Trustee

I have a friend, Elise, who I go to lunch with every now and then. However, Elise is never on time for our lunch meetings. If I say noon, she will be there 20 minutes later. If I say half past noon, she'll be there closer to 1 PM. No matter what time we agree upon, Elise will be *reliably* late. At first this used to frustrate me to no end. However, I adapted. Now I tell Elise we are meeting at noon, and I turn up at 12:15 and only wait five minutes instead of 20. While Elise is still late, at least she is consistently so. I can *trust* her to be 15 to 20 minutes late to any engagement. The point here being that the history you have with a trustee informs your willingness to trust them going forward and the concept of '*consistency*' plays a major role in our willingness to trust[52]. Consistency, even if somewhat negative, like with Elise, trumps inconsistency every time when it comes to trust. Knowing with a reasonably high degree of probably how someone or some institution is going to act, is a foundational element to the trust equation. If the trustee has acted unpredictably in the past, even if there were reassurances going forward, one would be forgiven for not wanting to lend them your trust.

There have been significant historical examples of this phenomenon in action. As touched on in Chapter 2, Black Americans have a trust deficient when it comes to the US's medical establishment because of the fraught past this demographic has had with this institution. There is perhaps no better illustration of this than the Tuskegee syphilis study, Ralph, Green et al. (2008) argued. What began in 1932 among 400 African American males as a monitoring study, later became one the world's most controversial pieces of medical research. While there was no known cure for syphilis in 1932, the development of antibiotics in the 1940's changed that. Despite penicillin becoming an effective treatment for this sexually transmitted disease, the experimenters persuaded the local medical establishment to

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[52] As George Bush once famously said, "*Fool me once, shame on... shame on you. Fool me—you can't get fooled again.*"

withhold this therapy from the experimental group so that they could continue to monitor the effects of this bacterial infection long term.

They did so for another 27 years before it was finally stopped after a leak, a media exposé, and a public outcry. However, over the course of the experiment, 28 participants had died as a direct result of their infections, 100 more died from related complications, at least 40 spouses had contracted the disease and it had been passed on to 19 infants at birth. And these are just the recorded lives that are known to have been impacted. It is speculated that many more were impacted through unreported extramarital affairs. Even two generations later, this serious breach of trust and medical ethics has not fully healed among Black American who continue to express distrust in mainstream medicine, and to be honest, who can blame them?

4.1.4.2. The Nature of the Object of Trust

It seems so obvious that it might seem redundant even to mention, but the '*object*' of trust is critical to our willingness to trust. It is one thing to trust your friend to pick you up from the airport, it is quite another to ask them to look after your newborn. Simply put, the more important or *valuable* the object of trust is to the trustor, the harder it will be for them to demonstrate a willingness to trust (Thielmann and Hilbig 2015). For example, my friend Raphel has an irrational love for classic exotic cars and owns at least five such vehicles. Raphel trusts no one, and I mean no one, to drive these automobiles. Not his best friend of 20+ years, not his spouse of 15+ years, no one is allowed behind the wheel of one of these machines. However, Raphel will happily trust me to house sit for him or even babysit his children. Raphel has painstaking restored these cars and invested a lot of time and resources to do so. Consequently, he values these objects a great deal, in fact, he values them so highly that he does not trust even people that he has had long and consistent relationships with them.

The two key take aways here are that the importance we place on the object of trust will impact our risk appetite all else being equal, and what we place importance on differs from individual to individual. As we will see in Chapter 6 which touches on values, there are both biological and environmental determinates leading to differences in our value orientations, or, put another way, what we are willing to trust others with.

4.1.4.3. The Environmental Backdrop to Trust

The environment we find ourselves in also sets or hampers the conditions for trust to emerge. As a reformed New Yorker, I know there is a big difference between how one would respond to being approached by a reprobate on the subway in the 1980s, versus, say in the 2010s. The 1980's was a time when there were pervasive crimes of opportunity in the city. Muggings were common and people were frequently harassed on the subways until things started to change for a variety of reasons throughout the 1990's resulting in a drastically reduced crime rate. Instead of wearing running shoes to the opera, people once again started wearing dress shoes when taking the subway. In a similar vein, where you find yourself, also impacts your willingness to trust. I remember finding myself in Mogadishu, Somalia around 2017 as part of my job for the United Nations. UN workers were subject to constant attack and finding yourself off base outside the security perimeter meant that your guard was up immediately[53]. Few of us would dare travel without the necessary personal protective gear including helmets and bulletproof vests. Even the most innocent, petite, frail-looking street merchant was greeted with deep suspicion. This is of course different from travelling a few hundred miles East to the Maldives, where the biggest environmental risk you face is a sunburn. There, you would happily close your eyes with your belly exposed while a stranger gave you a massage without thinking twice.

Structurally speaking, there appear to be at least two environmental factors which seem to impact our willingness to trust. Scarcity and conflict. Simply put, when resources become scarce, our willingness to trust diminishes, or rather, it takes more for us to be trusting. However, at times of abundance, our willingness to trust is more readily given. In South Africa during the 19th Century there were a series of regional conflicts in my home province of the Eastern Cape. Essentially, European Settlers who arrived in 18th Century had established themselves around what was known as the Grahamstown area (now Makhanda). This placed them right on the border of the Xhosa tribe that had lived as cattle herders in the area for centuries at that time. As Ballard (1986) showed, every time there was a drought year, a skirmish would break out between the settlers and Xhosa tribes in what is today known as the Cape Frontier Wars ,which took place intermittently over the 19th

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[53] My sister-in-law's father died in such an attack in Mogadishu.

Century (there were seven in total). However, at the time the connection between these conflicts and resource scarcity, in this case water and grazing pastures driven by the climate, had not been made. These conflicts were often triggered by things as trivial as a stolen axe or a few stolen goats. During these times of hardship, the relationships between the Settlers and Xhosa would be characterised by extreme distrust with one side being quick to accuse the other of some wrongdoing without much evidence or the benefit of the doubt. However, as soon as it rained and the grazing lands were restored, these two groups became more trusting of one another and would resume normal relations including trade.

Similarly, at times of war or when faced with pollical conflict, we become less willing to trust. Our willingness to trust others suffers a deficit because the environment is one characterised by increased risk and uncertainty. The stakes when it comes to trust, are much higher during times of conflict and scarcity, making it harder to know who to trust. As a result, trust is less forthcoming.

4.1.5.   What is Trust? Section Summary

It would seem from the elements we discussed above that trust is a complex phenomenon with multiple interdependent antecedents in the form of interpersonal dispositions and situational variables which must come together for it to occur. However, so far, we have only really considered trust on an interpersonal level, meaning trust between individuals. As we will see in the next section, in our contemporary societies characterised by complex trust relations, different forms or '*levels*' of trust are required.

4.2. What are the Different Forms of Trust[54]?

Trust has dispositional and situational antecedents inherent to the individual acting as the trustor, the entity that is being trusted, and the object of trust. As we will see in this section, there are different kinds of trustees, or '*entities*' that we are required to place our trust in, and our capacity to trust also varies depending on which of these trustees we are asked to rely on.

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[54] For a comprehensive overview, see Schilke, O., M. Reimann and K. S. Cook (2021). "Trust in Social Relations." Annual Review of Sociology **47**(1): 239-259.

4.2.1. Interpersonal Trust

As it says on the label, interpersonal trust refers the capacity of one person to trust another. This one-to-one trust relationship is subject to all the same dispositional and situational variables outlined. The major difference in trust here is between strong, weak, and unknown relations (Khodyakov 2016). Among our strong networks, like our immediate family and close friends, our willingness to trust comes much easier almost at the point of being implicit. As the saying goes, *these are the people I would trust with my life*. However, the same could not be said of one's weak networks. These are people that you know through reputation and through limited engagement. You would trust them with a recommendation, or you might even call on them for the odd favour. But you would not necessarily trust them to be there for you in a pickle[55]. Finally, there are the unknowns, these are effectively perfect strangers, the people you have encountered but who do not know you from a bar of soap and vice versa. It should not be hard to see, depending on which of these networks we are asked to place our trust in, how much easier or harder it might be. That is not to say that a family member will not readily stab you in the back and a complete stranger won't save your life. No, rather, when it comes to our trust-related risk calculations, we just weight these groups differently.

Given what we know now about our individual and situational dispositions it seems reasonable to believe that there will be differences in one's capacity to trust these different groups. Some of us trust only strong relations like family (think the Godfather), while others are more willing to trust members of their weak network. There are even folks out there who have complete faith in the kindness and generosity of strangers, sometimes at their peril[56].

4.2.2. Social Trust

Unlike unknown interpersonal trust where the trustor trusts unknown individuals or even groups of individuals they have encounters with, social trust refers to our trust in the

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[55] Interestingly enough, research by Granovetter, M. S. (1973). "The strenght of weak ties." <u>American Journal of Sociology</u> **78**(6): 1360-1380. has shown that individuals with larger weak networks enjoy better life outcomes than those with larger strong networks. It seems the ability to trust and be trusted by those outside your strongest relations increases one's available opportunities or "opens more doors" as they say.

[56] Domonoshe, C. (2018). D.C. Couple Killed In Tajikistan Attack Were Biking Around The World Together. <u>NPR</u>. USA, NPR.

"generalised other about whom little information exists" (Robinson and Jackson 2001) and whom we do not necessarily have direct interactions with. As such, social trust acts as a shorthand for the anonymous others and is an important component of large complex modern societies where it is impossible to know even a little bit about everyone (Sønderskov and Dinesen 2015). Social trust asks the question, *do we trust our fellow city dwellers, fellow nationals, or fellow humans, to act in a manner that is in our collective best interest or at the very least does not put me at risk?*

Here it is not hard to think of contemporary examples of societies characterised by low and high levels of social trust. One of my favourite places to visit in the world is Beirut, Lebanon. Few cities in the world have as much energy and there is no way you would spend more than three days there without some unhealthy weight gain. However, it does not take long before you realise that under the surface, Lebanese society is one characterised by a deep sense of distrust between different ethnic groups, different religious groups, and different political groups[57][58]. While this country settled into an uncomfortable state of tolerance after its civil war, it would hardly be characterised as a healthy society[59]. Corruption is pervasive, political leaders are often subject to assassination attempts, and terrorism remains a constant threat. This in turn has had a noticeable impact on public infrastructure and services. When I ask friends on either side of the political divide if they would trust the other to act in a way that does not just favour their '*tribe*' the answer is usually a resounding '*no*'! This lack of trust in turn makes it difficult to build healthy societies where nationals are working towards mutually desirable collective outcomes.

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[57] Admittedly there is quite a bit of overlap across these three different domains, as ethnic groups tend to belong to the same religious groups, and consequently support the same political parties.

[58] This is of course not the only such country, Northern Ireland still has the memory of the 'Troubles' and South Africa still reels from the effects of Apartheid to this day. Both these countries, along with many other post-conflict contexts still suffer from a lack of social trust.

[59] Quote from the movie Beirut (2018): "*If you want to understand Lebanon, think of a boarding-house without a landlord. The only thing the tenants have in common is their talent for betrayal. So these people have been living together, cheek by jowl, 20 centuries. 2,000 years of revenge, blood feuds, vendetta, murder. One night there's a storm. Raining like hell. There's a knock at the door. Who is it? It's the Palestinians. They want in. They've been up and down the block. They had doors slammed in their face. They're cold. They're tired. They want in and they want in now. So the house is thrown into confusion. Tenants arguing. Some of 'em violently opposed. Some think, "Let 'em in. They'll be gone tomorrow." Some think, "I let them in tonight, then I'll have an ally against my enemy." Some of 'em are terrified if they keep the door shut. So, it isn't until after the Palestinians move in that the other people in the house realize the tragedy of the situation. That the Palestinians want nothing more than to just burn down the Israeli house next door. Welcome to Beirut.*"

When it comes to social trust, it can vary along multiple dimensions, as we have seen from our example above, there can be trust deficits between ethnic, religious, and political groups. However, social distrust can also cut across generations, genders, immigration status, social economic class, sexual orientation, or any other population subgroup that may seem foreign to the observer. When it comes to generations, we know that Boomers think that Millennials are entitled and lazy whereas Millennials think Boomers[60] are insensitive and out of touch. In some cultures, there is little to no trust across genders. In parts of India, women travel in groups as a single female can quickly become a victim of sexual violence. In South Africa, there is little trust between Black South Africans and undocumented immigrants from East and West Africa while in the UK, there remains a trust deficit between the under/working classes and the upper classes. Equally, in the US, sexual/gender orientation has become a hot topic in the culture wars characterised by high levels of distrust among those in favour and those opposed to it. For example, certain cisgendered groups believe that transgendered groups are actively trying to undermine objective reality and convert unsuspecting pre-teens into surgical and hormonal gender reassignment procedures before a reasonable age of consent. Asked if either of these groups would trust the other with say responsible education policies, the answer would be '*never*'.

In fact, social trust has been found to have important societal outcomes. In a study funded by the European Union carried out in 2016 across the EU, societal trust was found to be highly correlated with institutional trust within countries (Eurofound 2017).

4.2.3. Institutional Trust

As already mentioned, our contemporary world is built on our ability to trust in institutions. According to Khodyakov (2016) these are entities that are more than the collection of individuals that constitute them. As such, should a particular individual or even a group of individuals leave an institution, through internal self-correcting mechanisms, it would simply replace those who were lost and continue[61]. Therefore, institutions are more than the

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[60] See "Okay, Boomer!"

[61] This of course does not mean that the specific individuals at the helm of these institutions can't influence the levels of trust people are willing to demonstrate towards it. However, while levels of trust in, for example, the UK government may vary somewhat, these levels don't wildly fluctuate depending on who is the current prime minister.

sum of the people that run them, they exist phenomenologically in our collective consciousness as something at once intangible yet distinct and *real*[62]. Institutions can be anything from national governments to political parties, international governments, monarchies, NGOs, NPOs, foundations, think tanks, the media (mainstream and alt/fringe), the medical establishment, global corporations, brands, universities, the sciences, sports teams, etc. The United Nations is an example of a global mainstream institution, it is a multilateral membership organisation founded around a set of principles[63]. While it has physical spaces associated with it, should someone, heaven forbid, bomb the UN headquarters in New York tomorrow, and in so doing kill thousands of UN workers and member state representatives, the institution itself will likely recover and continue. While an extreme example, this helps illustrate the intangible nature of these entities. Similarly, political parties, governments, monarchies, universities, or companies may lose figure heads (i.e. party leaders, presidents, queens, CEOs, vice chancellors, etc.) but will live on through internal mechanisms to ensure their continued existence.

Other institutions are completely decentralised and exist as nebulae of smaller institutions in the minds of the public. When, for example, we say we "*trust the science*" on a particular issue, we are really saying that we trust the constellation of institutions which enabled, generated, and communicated that knowledge to us. We are saying that we believe that those who funded the research, those who carried it out, those who endorse it, and those who communicated it to us are able/competent, consistent/predictable, benevolent, and have acted with integrity.

For example, let us consider climate change. For one to trust the claim that anthropomorphic climate change poses a clear and present danger to humanity, you need to trust a chain of institutions.

First and foremost, you must trust that those who are producing this research are not acting on behalf of some malevolent actor. For example, some might believe that climate change research is being funded by the renewable energy lobby to undermine fossil fuel markets and drive a '*green agenda*'. This type of criticism is of not without some historical precedent.

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[62] In the United States the US Supreme Court went so far as to rule that corporations are "people" insofar as they have a right to political speech.
[63] See the UN Charter.

We know that industry-funded research tends to produce findings consistent with the desires of those providing the funding[64]. If one therefore believes, like my friend John does, that the research being produced by institutions like NASA is being steered by a desire for funding, then one is not likely to trust their conclusions on issues like climate change.

Secondly, one must believe that those who undertake the research are competent to do so. If you believe that climate science researchers are *hacks* who do not know what they are doing, you might not be so easily convinced by their conclusions. Here I am reminded of a conversation I had with an Uber driver during a ride I once took in Boston. For some reason, our chat steered in the direction of climate change. He proclaimed to me that he thought climate change was all a hoax. He concluded that scientists could not even predict the weather a week from now, how was he supposed to believe that they could tell what the global climate would be like in 50 years? I did my best to explain the difference between what meteorologists and climate scientists do, but this was met with scepticism. For him the weather will always just be the *weather*.

Thirdly, on issues that pose a collective existential threat to humanity, public institutions often get involved to promote awareness and work toward policy frameworks to drive action to minimise the risk we face from it. In the case of climate change, these institutions have been working on both campaigns, agreements, and policies to curb greenhouse gas emissions. Here institutions like the UN, the EU, the AU, as well as various national, local, and city governments have thrown their weight behind the climate science and want their respective constituencies to buy into the scientific consensus on this topic. However, not everyone readily trusts their governments, or institutions like the UN, on anything, let alone when they say that climate change is real, poses a threat, and requires sometimes painful lifestyle changes to mitigate.

Finally, few people directly consume science communication from primary sources like high impact academic journals. Rather they rely on media institutions to deliver this news to them in palatable bite-sized packages. If you were to ask most people where they heard about climate change, they would probably tell you from television news, newspapers, or social media. Therefore, it stands to reason that for people to believe what they are being

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[64] See the Big Tobacco's research which concluded that nicotine was not addictive.

told, they must also trust that these media institutions are in the habit of telling the truth. And as we know, a lot of people have a hard time believing the mainstream media for sometimes legitimate and less legitimate reasons.

In sum then, we have a host of different institutions involved in getting the message across on an issue like climate change, we have those who funded the research, those who carry out the research, those who endorse/action it, and those who communicate it. If you believe that any one of these institutions lacks basic competence, has acted inconsistently or malevolently in the past and will likely do so again, or lacks basic integrity, you may not trust that the message being brought to you is true.

And if we are to be honest, many of the organisations involved in this chain of research production and communication have in the past failed us through either acting incompetently, inconsistently, malevolently, or without integrity. News media organisations have been known to sensationalise stories to get higher ratings. Scientists have been known to act malevolently as we saw with the Tuskegee syphilis experiments or even fake data (Yang 2023). Science from time to time has embraced theories which in retrospect seem irresponsible (nutritional research here being one of the major culprits) while governments are frequently caught up in corruption scandals bringing into question their integrity.

Thus, institutions are a major source of information on complex collective risks like climate change, pandemics, and vaccinations. We also now know that for us to trust the scientific consensus on these issues requires us to trust a constellation of institutions which in turn necessitates that we view these institutions as competent, reliable, benevolent, and as acting with integrity. When these basic tests are failed in the eyes of an individual or group of individuals, the messages that these organisations carry, and want us to trust them on, are likely to be received by, as Elvis famously coined, *suspicious minds*.

However, when it comes to institutional trust there is a delicate balance which must be struck. If history has taught us anything, it is that unconditional trust of institutions can be just as harmful as our inability to trust them. In some cases, blindly trusting an institution to always act in your best interest can be mortally credulous. Shockley and Shepherd (2016) concurred that institutional trust can sometimes have a dark side. While they acknowledged the importance of institutional trust for a healthy functioning society, they also highlighted

the fact that unconditional institutional trust often fulfils a psychological, or existential need as opposed to a more conventional transactional one. These authors hypothesised that during times where one's safety and security is under threat, or when there is a general lack of a sense of existential purpose, one may end up trusting institutions more than one normally would. They referred to this phenomenon as '*compensatory institutional trust*' where people sublimate trust to institutions for reasons including terror management, system-justification, compensatory control, or meaning maintenance. As they put it:

> "*To the extent that an institution appears to provide the sort of information, meaning, and sense of safety sought by epistemically or existentially threatened individuals, they may engage in motivated reasoning directed towards perceiving greater trustworthiness of said institution.*" (p. 194)

This in turn results in situations where those subject to compensatory institutional trust may continue to allow themselves to be vulnerable to these institutions even though these entities may have demonstrably acted incompetently, inconsistently, malevolently, or without integrity. It is not hard to think of historical instances where this may have been the case. For example, despite the atrocities carried out by the Soviet Union, many of its citizens maintained a deep sense of trust in the state even as the Berlin Wall was coming down (Khodyakov 2016). Today, in North Korea, much of the population remains under the spell of the state and venerate and trust the country's infallible leader implicitly (Park 2000). It seems that when those in charge of these institutions become aware that their trust no longer has to be earned, a shift in the power dynamics of society occurs often leading to gross abuses of power (Shockley and Shepherd 2016)[65]. Thus, while compensatory institutional trust can lead to significant vulnerabilities and power imbalances, it underscores the broader importance of trust in human interactions, which brings us to the concept of epistemic trust.

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[65] Unscrupulous political parties have been known to use fear mongering to shift their supporter bases from conventional trust to compensatory trust so as to lessen the reliance on, or remove entirely, the normal mechanism of accountability associated with trust.

4.2.4. Epistemic Trust

Arguably, it is our ability to communicate knowledge to others, and furthermore, the ability to trust this communicated knowledge without repeatedly falling prey to credulity, which is perhaps one of the key drivers of our success as a species (McCraw 2015).

4.2.4.1. What is Epistemic Trust?

Without epistemic trust, we would not be able to rapidly learn from others as every bit of knowledge made available to us from a third party would be subject to verification. This in turn would undermine our ability to specialise in certain domains of knowledge as we would in effect have to be experts in '*everything*' to avoid having to trust the communicated knowledge of others. Imagine, if you will, a fellow member of your tribe telling you that a certain type of mushroom is poisonous, and likely lethal if consumed. You don't trust what they have told you, so you try some of this fungus only to verify if they are telling the truth. Now you verified their claim for yourself but have been shuffled off this mortal coil. This is not exactly a recipe for success as a species.

The same goes for any communicated knowledge which has helped improve our safety and well-being. When scientists finally started to hone in on germ theory and we began instituting better hygiene practices in hospitals and at home, the rate of infections and related diseases plummeted. However, when Ignac Semmelweis first introduced the idea in the early 19th Century, it was received with scepticism. However, once the veracity of Semmelwies' claims was proven by Paster, Lister, and Koch, this knowledge spread fast throughout the world and soon virtually every professional medical establishment adopted standard hygiene practices like hand washing and disinfectants (Zoltán 2022).

Had these other entities, like doctors, hospitals, and/or medical schools not learnt from the insights of Semmelweis and others, they would have had to independently derive this theory and would have had to run their own experiments to see if his claims were in fact true. This would have at best significantly delayed the widespread adoption of these practices which would likely have cost countless lives.

It is then not hard to see why epistemic trust is so important, not only for our survival but for our success as a species. Epistemic trust fast-tracks social learning and facilitates the flow

of knowledge across time and place (McCraw 2015). We trust that the knowledge passed down from previous generations has value, and we trust the knowledge passed on to us through cultural exchange will help us more effectively navigate the world (Campbell, Tanzer et al. 2021, Fonagy, Allison et al. 2021). My grandfather taught my dad the value of hard work, keeping your word, and treating people with dignity and respect. My father in turn passed on these values to me. I, in turn, trust that these values are worthy of being upheld, not because I have sampled all the different values out there, but because I *trust* that there are good reasons to maintain these values. Equally, while I have never personally seen a germ through a microscope, I believe that practicing basic hygiene and using disinfectants to clean wounds will help reduce risk to me and those I care about, which saves me from having to experiment on myself or those close to me to test the accuracy of such claims.

However, epistemic trust is more than just social learning where one sees someone doing something and then you copy it. After all, if you've seen it work with your own eyes, not much trust is required (Tanzer, Campbell et al. 2021). Rather epistemic trust is more in the domain of when someone *tells* you something which you yourself have not seen, but you trust what they are telling you is true. For example, "*hey, there is a pack of lions on the other side of this hill, you should go the other way*". Or vaccines will help reduce the risks you and your family face from certain viral diseases and have few, if any, dangerous side effects. Here you do not have first-hand evidence yourself and you are limited to the testimony of others.

However, it is then not hard to see how epistemic trust, like other forms of trust, creates a certain vulnerability through either the incompetence of, or betrayal by, the trustee. After all, no one knows everything, and people have been known to lie. As such, unconditional epistemic trust, is not without its risks because of overt deception or simple ineptitude. It might have been the case that the stranger lied to me about the mushrooms because he wanted to harvest the supply for himself, or it could have turned out that Semmelweis[66] was crazy and the invisible bugs he kept going on about were all simply a figment of his delusions.

As such, to counterbalance the risks associated with unconditional epistemic trust, we have had to develop conditional epistemic vigilance (Fonagy, Allison et al. 2021). This form of

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[66] Semmelweis died in an insane asylum at age 47.

vigilance helps us identify untrustworthy and unreliable informants. And as mentioned, when it comes to trust, we have certain in-built predispositions and environmental cues which helps protect us from these dubious characters. This in turn allows us to distinguish between what should be encoded as 'knowledge' and what should be ignored, or at the very least, verified.

Fortunately, we seem to have an inbuilt set of mechanisms available to us from early infanthood when it comes to epistemic vigilance, with babies taking trustworthiness cues from facial expressions, the potential trustee's tone of voice, as well as other visual cues such as eye contact. In the absence of these cues, infants will not readily encode the information received as knowledge (Fonagy, Allison et al. 2021).

Epistemic trust counterbalanced with epistemic vigilance has been central to the creation of our complex contemporary world (Fonagy, Allison et al. 2021). Simply put, without being able to rely on the knowledge passed on to us by others, we would not have been able to advance at the pace we have. Our trust in the process of knowledge creation results in a collective benefit that far outweighs the sum of its parts (Fonagy, Allison et al. 2021). The benefits of this dynamic epistemic tension are thus hard to ignore. Afterall, no individual invented the smart phone. Rather this was a collective effort enabled through knowledge sharing among a large group of scientists and engineers who combined their knowledge on subjects like physics, chemistry, electrical engineering, computer science, ergonomics, design, and psychology across generations to create a device which is at once one of the most powerful creations ever, yet so simple to use a toddler can operate it.

4.2.4.2. Challenges with Epistemic Trust in Our Contemporary World

However, thinkers like Fonagy, Luyten et al. (2019), Fonagy, Allison et al. (2021) have, in my opinion, convincingly argued that this once productive tension may have been corrupted by rising economic and social inequality, the rise of the internet, and social media in particular, as well as the hacking of our psychology thanks to a present-day evolutionary mismatch between our primal wiring and the virtual spaces we now largely operate in.

Fricker (2017) pointed out that inequality can lead those at bottom end of this continuum to be filled with a sense of epistemic injustice. This is because these marginalised social groups

will likely experience a lack of psychological safety, largely driven by the effects of long term, systemic economic insecurity with little hope of real change.

This in turn may result in a backlash effect characterised by what Fonagy, Allison et al. (2021) referred to as an "*angry anti-rational distrust and cynicism directed towards elites.*" '*Elites*' here standing in for mainstream institutions and those that represent them. Those who make up these '*elites*' are seen as essentially separate from those subjected to the psychological stressors of being on the wrong end of the Gini coefficient. As they may feel a sense of alienation from the dominant epistemic regime led by the mainstream, which they see as a symbol of injustice. It is not hard then to see why these groups would find it hard to accept the knowledge generated and promoted by these elites (Fonagy, Allison et al. 2021). This is especially true of knowledge on climate change, pandemics, and vaccinations. These marginalised groups may perceive the implications of this knowledge as potentially placing even greater economic and psychological strain on them. For example, those who worked minimum wage jobs already living on the breadline, and who were most hard hit by the Covid lockdown restrictions, are also more likely to engage in denialism around the true dangers of the pandemic. We can see the effects of this in action in countries with more secure social safety nets which tended to see less of a backlash against COVID restrictions (Bardosh, De Figueiredo et al. 2022).

The second force to disrupt our ability to balance epistemic trust with epistemic vigilance was the rise of the internet and social media (Tanzer, Campbell et al. 2021). While propaganda and fake news is by no means a new phenomenon, the way it is disseminated in our contemporary age is. As Tanzer, Campbell et al. (2021) showed, the virtually instant spread of information through social media, using multimedia-rich formats and leveraging edited images and videos, has blurred the lines between '*real*' and '*fake*' information. Even the most discerning and sceptical observer has at times fallen prey to fake news stories as these are presented in packages that are superficially plausible, memorable, and emulate the look and feel of a real news story. The normal 'tools' at our disposal to distinguish news generated by those with an interest in the pursuit of truth versus those who are trying to drive a particular agenda are thus left largely defenceless against information presented this way. Institutions like the UN have argued that this new environment simply demands

greater levels of epistemic vigilance where one would be expected to verify each piece of information encountered (Wone 2020)[67]. However, this may be discounting the sheer volume of information this medium exposes one to. For example, as Andrea (2016) showed, the average person may be exposed to as much as 34 Gigabytes of information while browsing social media over the course of a day . This is more information than we were exposed over the course of a week 40 years ago, and more information than over a lifetime 500 years ago.

This volume of information simply overwhelms our ability to be epistemically vigilant and the average person is then either left in a state where we find news of all types untrustworthy, or we let our guards down, opening ourselves up to the possibility that we will accept certain pieces of fake news as *true* (Tanzer, Campbell et al. 2021).

As Newberry (2022) explained, where social media becomes more sinister is in its market driven desire to keep you engaged on their respective platforms for as long as possible in order to maximise advertising exposure. To do this, these platforms harvest everything they know about us to place us in hyper-specific profiles according to our personalities, ideological orientations, genders, interests, values, and beliefs, etc. These profiles are then used to expose us to algorithmically tailored content designed to maximise our engagement. And nothing is quite as engaging as outrage. Facebook, for example, will expose you to a news story primed to pique your interest and will then show you one or two comments out of hundreds on that story made by a fellow user. Here's the kicker though, the comments you are exposed are carefully selected from profiles who hold diametrically opposing views to yours. When people read what they perceive to be "*outrageous*" comments, they feel compelled to respond thus taking the bait and increasing their time spent of the platforms. This tactic also unfortunately has the unintended consequence of promoting the impression that the world we live in is far more polarised on these issues than we truly are.

Unfortunately, this is not where this story ends. As Fonagy, Allison et al. (2021) put it:

> "*Left without a dominant social epistemic model because of their contempt for the elites in charge of traditional knowledge production, those who feel socially and economically alienated fall back on the naturally selected social epistemic*

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[67] See shareverified.com

mechanisms available to them. The psychological processes that underpin and facilitate the establishment of epistemic trust may also help to explain our vulnerability to misinformation in a social and technological environment that differs radically from the biological environment in which these essential tools emerged."

Put another way, the very mechanisms that helped us establish a healthy balance between epistemic trust and vigilance in the past, may now undermine this very purpose.

One of the chief ways in which we established trusted knowledge in the past is if that knowledge was characterised as something '*we'* believed in. Thus, knowledge was judged as more trustworthy if the majority of your in-group community believed it to be *true*. In '*organic*' communities where a diversity of views is present due to a natural distribution of dispositions and experiences, a piece of 'knowledge' had to overcome multiple hurdles before it became a *truth[68]*. However, in our contemporary social media age, communities are no longer geographically bound, which in the past inevitability resulted in the presence of at least some epistemic diversity. Now people can without much friction seek out '*like-minded*' communities which reinforce, rather than challenge, their perception of reality[69]. Do you believe that mainstream science has been deceiving us about the true shape of the earth? No problem, go to Facebook and within seconds you'll be a member of a Flat Earth Community with thousands of members who hold the same view. Here you can revel and engage in content that serves as fuel for confirmation bias and motivated reasoning. The normal checks and balances do not apply, yet our evolved intuitive sense that if most of my community believes something to be true, it probably is, makes us believe that this naturally evolved *audit check* has taken place, when in fact, it only took place against an artificial community of like-minded social media users. The usual critical voices that may have

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[68] This is not to suggest that always served to get to the truth, it just meant it was harder for a piece of false information to become accepted knowledge. For example, if someone claimed that the moon is made of cheese, someone else would call *bullshit*.

[69] This is not to say that in the past people didn't seek out like-minded communities. People have been known to physically relocate themselves or move within subgroups of individuals who share their views. However, it is much harder to pick yourself up and move to a community that shares some kooky view than it is to accept that this view might not be true. In the world of social media though, those barriers to kooky land have been removed. You can instantly become a member of a community that shares your hyper-specific views thus, serving to reinforce the idea that they are true.

otherwise brought this piece of knowledge into question are not present in these echo-chambers, yet to the person who spends time here, it feels like it has passed these hurdles.

In addition, as Fonagy, Allison et al. (2021) pointed out, in our contemporary world where many people feel economically and socially excluded resulting in them rejecting the dominate epistemic regime, a void is left as the demand for knowledge and certainty has not lessened. Besides trying to fill this void with online communities of like-minded individuals, there is also a tendency for people to try to lessen the anxiety associated with living in a world of epistemic hypervigilance. To do so they engage in hyper-mentalisation which refers to the minds ability to conjure unnecessarily and overly complicated explanations for observed phenomena resulting in outcomes like denial and conspiracy theories. For example, a person spots a jet aircraft producing a contrail and at other times it does not. The person then assumes that this is a feature of the aircraft and not as a natural result of the interaction between the planes exhaust and atmospheric conditions. The next question that arises is why would you sometime see contrails and other times not? Well, the only other time you would witness that is when you see planes crop dusting fields with pesticide. The pilot controls when the pesticide is released and when it is not. So why would commercial jet aircraft be 'crop dusting' over cities? Well, because they want the populations of these cities to ingest something they normally won't. The answer, a drug for mind control. The government is using commercial aircraft to 'crop dust' populations of people to make them more compliant. Sounds crazy right? But this is an actual conspiracy theory with thousands of supporters. There are many more such conspiracy theories, from the 'Deep State' in the US, to 'the Illuminati' in Europe. There are conspiracy theories about a race of lizard people who run the world. What all these ideas have in common are their levels of intricacy. These are not simple explanations. The Deep State is a cabal of democratic politicians and billionaires who pull the strings of power so that they can indulge their paedophilic desires in the basements of streetside pizzaria in Washington, DC.

Fonagy, Luyten et al. (2019), Fonagy, Allison et al. (2021) argued that the rise in the adoption of conspiracy theories is due, in part, to hyper-mentalisation which is directly caused by a decline in epistemic trust. In their view, and I tend to agree, the decline in epistemic trust, especially in the knowledge generated by mainstream institutions is one of the most

significant threats faced by humanity. Without broad-based epistemic trust, and appropriate levels of epistemic vigilance, the foundations of society are undermined, and this will result in a regress in civilisation.

4.3. The Neurobiology of Trust

It should come as no surprise, given the importance of trust for our survival as a species (and indeed for many other species), that the biological basis for trust has been an area of great interest to the field of neurobiology. It then also stands reason that there is a large body of work in this field which has generated important insights to aid our understanding of the biological antecedents of trust. Here researchers have provided evidence that our dispositional trust has, at least, a partial grounding in our genetic makeup, our endocrine system, our neuroanatomy, and the interaction between these systems in response to our environment. This is because our genes not only hold the blueprints of our neuroanatomy but also directly influence the production and release of hormones which help shape our brains in response to our environments. Equally, hormones influence the activation of brain regions as different regions have different receptors that respond to the presence or absence of different hormones and neurotransmitters. But what has this got to do with trust?

Trust has an affective association. The presence of trust often results in positive affect, i.e. "*I feel good about the world because there are people, or entities, I can trust in it*". Whereas, the breach of trust, is associated with negative affect, i.e. "*my trust has been violated and I feel angry, sad, disgusted and/or despondent about it*". And as we know, we don't all experience emotions the same way. When faced with some stimuli, some of us demonstrate no affective response at all, while others may have a stronger or weaker response to it. It thus follows that because trust has this affective component, and because we differ in our affective responses to stimuli, there must be some basis for these differences. This, in turn, has prompted researchers to ask if there is a biological basis for trust and if so, why do we differ in our propensity for trust?

In a study involving both monozygotic (identical) twins and dizygotic twins (i.e. normal siblings) undertaken by Cesarini, Dawes et al. (2008) using a trust game[70], researchers found that there were differences in how players responded independently from how they were being treated by the opposite player. This suggests that there was more going on than just the force of play. Cesarini, Dawes et al. (2008) concluded that there is at least a partial basis for our propensity to trust found in our genes with between 10 and 20% of the variance in observations accounted for by similarities and differences in the behaviour exhibited by these twin sets. However, critics of this study pointed out that similarity in responses by the monozygotic twins could just as easily be explained by their shared environmental and social conditioning.

This prompted Sturgus, Read et al. (2010), to undertake a similar twins study using a survey to capture beliefs about social trust. Like in the Cesarini, Dawes et al. (2008) study, they too found that much of the variance in a multi-item trust scale could be accounted for by genetic factors. However, they were able to demonstrate that while the environment plays an important role in our propensity to trust, these influences, at least in their study, were limited to those that were unique to each sibling and not necessarily because of shared environmental influences, including all those relating to the family and home-life. This is not to say parents play no role beyond the transmission of genes in the development of trust in their offspring, rather, they found that from adolescence to early adulthood and onwards, individual differences are accounted for more by genetic and non-shared environmental factors, than by shared environment alone.

While these two studies provided some evidence for the genetic basis for trust, and the differences in the individual propensity for it, they don't help us understand what might be afoot in terms of possible bio-causes. To better our understanding here, researchers have investigated how genes can affect our hormones and how these in turn can subsequently influence the development of brain structures.

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[70] The trust game is commonly used in lab studies investigating trust behaviour. Two anonymously paired individuals are given some amount of money. The first player gets a choice of giving some amount to the other player ranging from all to none of it. The amount is then tripled before it is passed on to player 2. Player 2 then has to decide how much they want to send back to player 1.

Specifically, genetics researchers have investigated the oxytocin receptor (OXTR) and found that variations in this receptor result in observed differences in perception and behaviour, including stress, reactivity, and empathy, leading to the conclusion that it also plays an important role in observed differences in trust behaviour (Israel, Lerer et al. 2009, Tost, Kolachana et al. 2010). In particular, Tost, Kolachana et al. (2010) found that a genetic variant in OXTR, which is linked to social processing, predicts individual differences in brain structure and functions. These structural differences in turn, manifest themselves as differences in one's propensity to trust as an individual dispositional attribute. This is because these differences resulted in changes in key oxytocinergic brain regions including the amygdala and the hypothalamus which are responsible for the processing of emotionally salient social cues related to trust, and in the case of the amygdala, fear learning.

Over activation of the amygdala, it was found, results in an increased sensitivity to fear learning leading to a disposition more prone to distrust. For example, Adolphs, Tranel et al. (1998) found that individuals with acute bilateral amygdala damage when presented with a variety of pictures of faces, and asked to judge their approachability and trustworthiness, had trouble making any discernible distinction. Unlike the control group of participants who tended to rate some faces as more, or less trustworthy, those physically incapable of amygdala activation, tended to evaluate everyone as equally worthy of trust despite their appearance. This finding was later supported by a study undertaken by Winston, Strange et al. (2002) through fMRI studies which showed that amaygdala activitation was indeed present during the evaluation of faces that appeared untrustworthy.

Besides differences in one's neuroanatomy, the simple presence or absence of certain hormones and neurotransmitters can impact one's readiness to trust. For example, oxytocin is a hormone which acts as a neurotransmitter, or more specifically a neuropeptide. Neuropeptides are different from classical neurotransmitters because they act as auxiliary messengers rather than classical neurotransmitters which are limited to synaptic uptake. Oxytocin is involved in a wide array of prosocial behaviours including attachment and trust. Specially, it is known to be released during childbirth, lactation, and orgasm and is much

higher in women than men in many contexts and does seem to promote trusting behaviour (Love 2014)[71].

To test the impact oxytocin has on trust willingness, Kosfeld, Heinrichs et al. (2005) nasally administered this neuropeptide to 29 subjects whereas another 29 subjects received a placebo. These participants were then asked to participate in the trust game as explained earlier. They observed that almost half (45%) of those who received the oxytocin showed maximal trust and gave away all the money they received as player 1, while the rest tended to demonstrate increased trust more generally. However, in the placebo group, only 20% did the same. It would seem then that the increased presence of oxytocin in the brain resulted in a greater willingness to trust others. A later study by Yao, Zhao et al. (2014) showed that this effect was more prominent in women than men.

Baumgartner, Heinrichs et al. (2008) examined the neural circuitry of trusting behaviour through the intra-nasal, double-blind, administration of oxytocin with fMRI. They found that subjects in the experimental group who had their oxytocin artificially elevated showed no change in their trusting behaviour after they learned that their trust had been betrayed numerous times. On the other hand, subjects that received the placebo, decreased their willingness to trust when it was repeatedly breached. They had the same participants play a risk game under the same conditions, however, here no differences were observed. They were able to conclude that the differences observed in their experiment were not due to a change in risk aversion, but more related to a willingness to trust.

Through neural imagining, Baumgartner, Heinrichs et al. (2008) could see that these differences in trust response were associated with a reduced activation in the amygdala, certain midbrain regions, and the dorsal striatum in subjects receiving oxytocin. This suggests that our neural systems mediating fear processing, i.e. our amygdalae and midbrain regions with dorsal striatum modulate oxytocin's effect on trust. This finding is supported by Kirsch (2005) who also found that oxytocin significantly reduced activation of the amygdala compared to his placebo group under similar experimental conditions.

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[71] One can therefore hypothesise, based on the data collected in my study that women will generally be more trusting than men. Findings reported in Chapter 10 point to mixed support for this hypothesis, but the data did support the idea that women were more trusting of mainstream institutions.

Furthermore, studies by Zak, Kurzban et al. (2004) and Zak, Kurzban et al. (2005) showed that in a social context, perceptions of trust signalling also resulted in increased oxytocin levels, which in turn resulted in a greater willingness to trust. They observed that oxytocin was released in response to a social signal of trust, like the willing of player 1 to send a fair amount to player 2 in the trust game. This observation was statistically related to trustworthy behaviour. They also found that when the social signal of trust was removed, for example, by randomly awarding someone money (instead of it being awarded as part of the trust game), the oxytocin release dissipated along with increased levels of trustworthiness. These findings give some credence to the saying, "*the best way to get someone to trust you is to trust them.*"

While an environment characterised by trust behaviour can increase one's propensity for trust, so too can a stressful environment diminish it. A study by Takahashi, Ikeda et al. (2005) found that elevated cortisol levels due to induced social stress, like making the experimental group engage in public speaking or making them do mathematics while being observed, resulted in subjects being less trusting. This appears to be because this hormone is synthesised in response to amygdala activation and, as we now know, the activation of this neural structure is associated with fear learning and distrust. In a study carried out the year before, Takahashi, Ikeda et al. (2004) showed that social stress and the resulting cortisol elevation resulted in impaired social memory which is important in building trust. This is because trust is predicated on recalling consistency in behaviour over time. Simply put, it appears that when people are stressed, they become more distrusting because of hormonal changes independent of the objective of trust itself.

Our sex hormones also appear to play a role in our propensity to trust. Testosterone seems to have an antagonistic effect on oxytocin which in turn increases social vigilance and distrust. In a study done by Bos, Terburg et al. (2010) these researchers found that when women were administered testosterone, the steroid hormone associated with competition and dominance, it significantly decreased levels of interpersonal trust among research participants. Bos, Terburg et al. (2010) made an interesting evolutionary case for this effect. They pointed out that while those with elevated levels of oxytocin are more trusting, they can often trust to the point of credulity, where they can be taken advantage of despite

repeated prior experiences that would lead someone not under the elevated influence of this hormone, to start distrusting. According to these researchers, testosterone may be acting as a counterbalance to oxytocin resulting in the deployment of greater levels of vigilance. Testosterone levels are naturally elevated in women prior to ovulation, which these authors argued, promotes scepticism about a potential mate's trust worthiness[72]. The cause of this may be down to the ability of testosterone to increase amygdala activation. More specifically, testosterone appears to impact the afferent and efferent signalling of the amygdala to other brain regions including the orbitofrontal cortex which is implicated in social evaluation. While testosterone appeared to play a role in promoting vigilance, oestrogen appears to do the opposite. As Verbalis (1999) showed, oestrogen appears to facilitate the uptake of oxytocin by facilitating receptor binding and upregulating the number of available receptions. Testosterone and oestrogen appear to exist in dynamic tension, with the prior stimulating vigilance while the later promotes trust.

Another neurotransmitter worth mentioning in the context of trust is serotonin. According to Crockett, Clark et al. (2008), temporarily lowering serotonin levels in test subjects increased their sensitivity to perceived unfairness without affecting their mood, fairness judgments, basic reward processing, or response inhibition. Their results suggest that 5-HT plays a critical role in regulating emotion during social decision-making. Because of this effect, serotonin is thought to play at least a partial role in trust, as perceived sensitivity to unfairness is synonymous with betrayal sensitivity, as discussed earlier.

In conclusion, our neurobiology, which is in turn influenced by our development and environment, plays a significant role in our ability to exercise trust. Trust is more than just present circumstances. It has a strong biological component as well.

4.4. Are Interpersonal Trust, Social Trust, Institutional Trust, and Epistemic Trust Interrelated?

If you have gotten this far into the chapter, like me, you have also probably realised, that when it comes to trust, there is a lot going on. Simply put, trust is a complex subject. It has multiple facets, and it operates on multiple levels. As such, it is not simply the case that we

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[72] Or as my mother would say, *this is nature's way of protecting women against bullshitters and con men*.

can place someone, or even a group of individuals, on a single continuum from '*low trust*' to '*high trust*'. Rather individuals are better thought of as traversing a matrix of trust where, for example, one could have high levels of interpersonal trust for dispositional reasons but low levels of institutional trust because of situational determinants. There will of course be a small minority of individuals out there that don't trust, full stop. As Fonagy, Allison et al. (2021) pointed out, these are usually individuals with serious psychopathologies with their trust deficit, either caused by their paranoia or as the cause of it. On the other extreme corner of our matrix, there will of course be those that are too trusting to the point of being credulous. They will trust just about anyone or anything and generally we do not hold such individuals in high regard, at least, intellectually speaking. However, most of us move like chess pieces across this trust matrix driven by a complex interplay between our own dispositions and the environments we find ourselves in. Trust then is just as much a product of our biology as it is nurtured or extinguished by our surroundings.

Despite the complex nature of trust, with its multitude of possibilities, it is not a subject in complete chaos. Rather there are still some interesting patterns and relationships between the different forms of trust that are worthy of exploration. For example, Sønderskov and Dinesen (2015) showed that institutional trust has a causal impact on social trust but not the other way around, while Cook and Gronke (2001) showed that people with high levels of trust in institutions are also more likely to exhibit interpersonal and social trust.

4.5. Trust: What can we Conclude?

Trust, particularly our focus on institutional trust, is an important attitude and behaviour strongly related to our survival, and eventual prospering as a species. Since the work of Durkheim in the early 1900s on the role of trust in modern industrialised societies in the Global West, healthy but critical institutional trust has been key for a complex society to work, as its division of labour requires us to trust the decisions and expertise of others, from doctors and nurses, to bankers and health inspectors, to truck drivers and cabbies, to schoolteachers and researchers (Durkheim 1997). We saw that, theoretically speaking, trust is quite complex but in essence can be conceptualised as comprised of three parts: a trustor, a trustee, and an object of trust, with the relationship between the trustor and trustee characterised by a state of vulnerability. This state of vulnerability is more acceptable to

some than to others. We learnt that individuals do not only differ in disposition in their willingness to trust, but that there were a host of situational variables that also play a role here. We also learnt that trust has an affective component, we *feel* when to trust and distrust. We also saw that trust is not limited to interpersonal trust, there are various forms of trust including social, institutional, and epistemic trust which are all interrelated. However, when it comes to denial, epistemic trust, which is trust in communicated knowledge, appears to play a major role along with institutional trust. We saw that while epistemic trust is an important attribute to possess, in healthy individuals it is counterbalanced with appropriate levels of epistemic vigilance. Here, it was concluded that blind trust in institutions was not advisable nor was extreme scepticism. Our investigation into the neurobiology of trust helped us understand what was going on in the brain when it came to us being either overly trusting (credulous) or too distrusting (hyper-mentalising and conspiracy prone). However, it says little about what triggers an affective trust or mistrust response in the authoritative institutions responsible for communicating knowledge of matters of significant societal risk.

As we will see, the answers are complex as there are multiple layers at play. To get a better grip on this, in the next chapters, we will turn our attention to Bowlby and Ainsworth's Attachment Theory which will help us understand some of the underlying reasons determining why some of us are more willing to trust than others.

Chapter 5 - Attachment

"They f*** you up, your mum and dad. They may not mean to, but they do.

They fill you with the faults they had and add some extra, just for you".

– Philip Larkin, High Windows (1974)

Larkin's humorous, but unsubtle words convey a truth about how our caregivers unintentionally influence our development and eventual psychological dispositions. And, as we saw in the previous chapter, people vary in their ability to trust based on their psychological capacity for trust *independent* of circumstances. In this chapter, I argue that our attachment styles play a significant role in shaping our dispositional trust. This is because Attachment Theory is at its core a theory of *trust* that helps us understand why we all react differently when faced with existential threats like climate change, pandemics, and vaccines that make us feel vulnerable.

But before we dive into this assertion, let's first get a handle on what exactly the attachment system is and how it shapes our ability to trust others, including mainstream institutions. We'll explore, why, if trust is so important, attachment styles evolved resulting in some of us being less trusting. We also ask what is happening at a neurobiological level with our different attachment styles and explore how these overlap with the neurobiology of motivated reasoning and trust from the previous chapter. We then conclude by hypothesising how the different attachment styles may impact our interpersonal trust, epistemic trust, mainstream institutional trust, and our main area of concern, denial.

Now, let's explore why some of us just can't seem to trust mainstream institutions when it comes to issues of significant societal risk.

5.1. The Attachment System

Given the popularity of John Bowlby and Mary Ainsworth's Attachment Theory, there is no shortage of comprehensive theoretical overviews providing far more elaborate accounts

than is required here (Bolen, 2000; Bretherton, 1992)[73]. Instead, for the purpose of getting us situated, I'd like to use the following metaphor to summarise the attachment system's basic tenets.

For this purpose, imagine us akin to computers, our bodies the hardware and our minds the software. Our attachment system could be described as one of our core subprograms that came preloaded along with a host of other programmes. This piece of software was initially only meant to help the system get up and running and optimise it for its environment. But it never got uninstalled, subsequently adapted, and every now and then it gets triggered by the presence of perceived threats. Sometimes these threats can be serious and at other times they can be innocuous. However, once triggered this programme demands a great deal of system resources and takes control of threat-related information processing which interferes with the operation of other programmes like those responsible for curiosity, dispassionate evidence evaluation, interpersonal communication, etc. until it is satisfied the threat is resolved. Only then does it cease operations and release system resources back to the operator.

Now that I have laboured that metaphor harder than a 19th Century Yorkshire coalminer, let's unpack that. Attachment Theory, while sophisticated in its implications, is first and foremost a theory of evolution concerned with a psychological sub-system geared primarily for our fitness and survival as children (Bowlby, 1969). As we well know, unlike many other mammalian species which give birth to nearly fully developed young, human newborns and infants are entirely dependent on their caregivers for survival. However, even at this vulnerable stage of our development, we are not entirely without mechanism to increase our odds of it making past this early stage of life. As infants and toddlers, we emit cries at a pitch that is hard for other humans to ignore. During these early years, once a perceived threat is encountered, we howl, or if we are mobile, crawl, or waddle into the arms of our nearest trusted caregiver seeking safety and comfort.

There is a predictable pattern here. Some kind of external stimulus is perceived as an existential threat- a loud noise, the appearance of something strange, or the sudden absence

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[73] Readers familiar with the attachment literature are free to skip to section 5.6. The prior sections provide an overview of the theory along with descriptions of the various attachment orientations.

of a caregiver, and the attachment system is activated. This in turn creates a dominate drive for its deactivation by seeking out a trusted caregiver (usually a parent). Deactivation occurs once reassurance is provided, and soothing has occurred. Once deactivated, an infant's other systems, like those for learning, curiosity, play, and exploration are once again free to restart operation (Ainsworth et al., 1978).

It is not hard to see why, when considered through the lens of natural selection, our attachment system would have found a foothold in us as a species (and indeed many other species). Over the millennia which encompass our development as homo sapiens, infants faced with mortal threats from a wide variety of sources could either alert caregivers and/or evade them by seeking out an adult caregiver. Simply put, the activation of our attachment system as vulnerable young was, and remains, crucial to our survival (Ainsworth et al., 1978; Simpson & Belsky, 2008). Those who experienced little to no attachment system activation, likely met an unfortunate end as a snack for a roaming predator[74]. Or as Vrtička & Vuilleumier (2012) so eloquently put it:

> "*This framework relies on the assumption that every human being is born with an innate attachment system, whose biological function is to obtain or maintain proximity to significant others in times of need or the presence of threats, and thus to regulate support seeking behaviour*".

5.2. Attachment Styles

This is not where the attachment story ends for us, though. Our attachment systems are also adaptive (Ainsworth & Bowlby, 1991). We know that the attachment system is a powerful motivator which induces an affective state, characterised by emotional distress, and that we need this to be negated as soon as possible to feel *normal* again (Bowlby, 1969). However, not all infants receive consistent soothing or reassurance from their caregivers. Repeated '*misfires*' in attempts to have the attachment system deactivated through proximity and attention seeking behaviour, leave the infant with little choice but to find alternatives to reduce their sense of anxiety. This may include withdrawing into themselves or acting out (Ainsworth et al., 1978; Bowlby, 1969).

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[74] "*I want my baby back baby back ribs!*" – Fat Bastard, Austin Powers

This was one of the key observations made by Mary Ainsworth (Ainsworth et al., 1978) in what became known as the Strange Situation Experiments which aimed to investigate the nature of attachment between infants and their caregivers. The first[75] such study was conducted in 1969 and continued throughout the 1970s and involved a structured experimental procedure that has since become known simply as the *Strange Situation* (Ainsworth et al., 1978).

The Strange Situation was designed to assess the quality of attachment between infants and their caregivers by observing the infant's reactions to a series of brief separations and reunions with their caregiver in an unfamiliar room. The procedure usually involved eight episodes, each lasting three minutes, during which the infant's behaviour was observed and rated (Ainsworth et al., 1978).

In the first episode, the infant and their caregiver entered an unfamiliar room, and the infant was given a few minutes to explore and play with the toys provided. Three minutes later, in the second episode, a stranger entered the room and interacted with the infant for a brief period, while the caregiver remained present. In the third episode, the caregiver left the room, leaving the infant alone with the stranger. In the fourth episode, the caregiver returned to the room and the stranger left.

However, in the fifth episode, the caregiver left the room again, leaving the infant alone for three minutes. In the sixth episode, a different stranger entered the room and interacted with the infant for a brief period. The caregiver returned to the room and the second stranger left in the seventh episode and finally, in the eighth episode, the caregiver and infant were reunited, and the experiment ended.

Ainsworth noted that throughout the Strange Situation experiment, the behaviours of infants were initially classified into one of three attachment styles: secure attachment, insecure-avoidant/dismissive attachment, and insecure-anxious/preoccupied attachment. Infants with a secure attachment style displayed behaviour that indicated they were comfortable exploring the unfamiliar room in the presence of their caregiver. When the

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[75] The work of Shirley and Poyntz (1941) predates the work of Ainsworth and while not the same as the Strange Situation experiments, it explored similar phenomena of child-mother separation and interactions.

caregiver left the room, infants with a secure attachment style became visibly upset, often crying, and protesting. They also generally avoided the stranger unless they were accompanied by the caregiver. However, they were generally happy to see the caregiver upon their return and were easily comforted. These infants, having received comfort had their attachment system deactivated, and resumed exploring the room once they felt reassured of their caregiver's presence.

However, Ainsworth noted that infants with an insecure-avoidant/dismissive attachment style tended to avoid contact with their caregiver and showed little distress when separated from them (Ainsworth et al., 1978). They did not seek comfort from their caregiver when they returned, and often ignored or avoided their attempts to comfort them. These infants appeared to be indifferent to their caregiver's presence once they returned, and their behaviour suggested that they did not see their caregiver as a source of comfort or support. They were also indifferent to the presence of the stranger, instead keeping to themselves. It was almost as if the infant knew that the deactivation of the attachment system was their responsibility (Ainsworth et al., 1978; National Collaborating Centre for Mental Health (UK), 2015).

On the other hand, Ainsworth's team noted that infants with an insecure-anxious/preoccupied attachment style became anxiously distressed when their caregiver left, often crying, and protesting loudly. They also displayed significant fear towards the stranger. When their caregiver returned, these infants displayed ambivalent or resistant behaviour. They would generally approach their caregiver for comfort but then quickly pushed them away or avoided contact altogether. These infants appeared to be conflicted in their relationship with their caregiver, and their behaviour suggested that they were uncertain about the availability and reliability of their caregiver as a source of support.

Later, in 1990, Main and Solomon added the Disorganised/Fearful Attachment Style to the classification which accounted for a small fraction of cases (Main & Solomon, 1990). These infants exhibited conflicting or disorienting behaviours when confronted with the caregiver's absence or presence. For example, the child may approach the caregiver upon their return but then suddenly freeze or dissociate in the caregiver's presence. They may show a lack of emotional regulation, such as displaying intense distress, becoming

physically aggressive, or completely withdrawing. The child may also appear confused and disoriented, exhibiting contradictory behaviours and struggle to seek comfort from their caregiver. These behaviours indicate that the child's attachment to their caregiver is disrupted and reflects the inconsistency and unpredictability of their early caregiving experiences.

5.3. Attachment Style Classification

By observing and classifying infant behaviour in response to the Strange Situation, we have gained a deeper understanding of the development of different dispositional attachment styles and how they impact individuals throughout their lifespan. However, while the Strange Situation paints a rather neat picture of a linear relationship between child and primary caregiver, the reality is that the attachment system and how it develops, is a great deal more complex. Rather, our attachment styles are most likely the result of interactions with multiple attachment figures intersected with our neurobiology, prevailing social norms (culture), and socio-economic circumstances, all of which are interacting far from linearly. For example, the attachment relationship between the caregiver and infant involves a complex set of feedback mechanisms and adaptations. Some infants may have a genetic predisposition to a certain attachment style which requires little from the parents to trigger and may emerge independent of parental style. As such, while parents often do play a significant role in the formation of your attachment style, it is unlikely to be the soul determinate[76] (Gervai, 2009).

These four attachment styles were later refined into four distinct styles using a two-dimensional model based on how people regard themselves on the one axis, and how they view those around them on the other (Bartholomew & Horowitz, 1991; Cassidy, 2000; Pietromonaco & Barrett, 2000). Those with a positive view of self and others are considered '*secure*'. Those with a positive regard for self, but negative regard for others, are labelled '*dismissive*' or '*avoidant*'. Those with a negative perception of self, but positive predispositions towards others, are termed '*preoccupied*' or '*anxious*'. While those with a negative view of self and others are called '*fearful*' or '*disorganised*'.

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[76] Gervai (2009), having done a metanalytic review found that parenting behaviour accounts only for about one third of the variance in attachment security.

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                          Positive
                             ▲
                             │
                             │
             Avoidant        │         Secure
            (Dismissive)     │

                   Model of Self

                                    Model of Others
  Negative ◄──────────────────────────────────────► Positive
                             │
                             │
             Disorganized    │        Anxious
              (Fearful)      │      (Preoccupied)
                             │
                             │
                             ▼
                          Negative
```
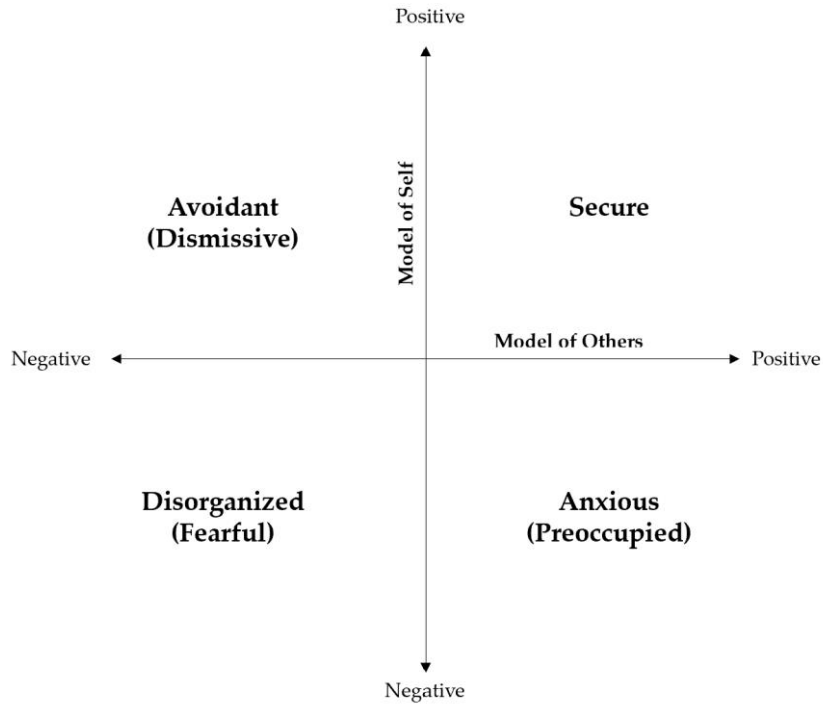
Figure 5.1: Two-dimensional Model of Attachment Styles (Bartholomew & Horowitz, 1991)

Those familiar with the literature on Attachment Theory have probably noticed that a variety of different labels are commonly used for each attachment style. This is primarily because researchers and theorists have developed their own terminology over time as they have expanded upon and refined the original theory developed by John Bowlby (Bowlby, 1969) and Mary Ainsworth (Ainsworth et al., 1978; Ainsworth & Bowlby, 1991; Bretherton, 1992).

The variations in terminology reflect differences in perspective, methodology, and emphasis among researchers. The four major adult attachment styles and their corresponding labels are:

Table 5.1: Various labels reported in the literature for the four main attachment styles.

Avoidant (Dismissive)	Secure
• Dismissing (Bartholomew & Horowitz, 1991) • Avoidant (Hazan & Shaver, 1987) • Dismissing-Avoidant (Main & Goldwyn, 1998)	• Secure (Bartholomew & Horowitz, 1991) • Autonomous (Main & Goldwyn, 1998) • Secure-Autonomous (Hesse, 1999)
Disorganised (Fearful)	**Anxious (Preoccupied)**
• Fearful (Bartholomew & Horowitz, 1991) • Disorganised/Disoriented (Main & Solomon, 1990) • Fearful-Avoidant (Hesse, 1999)	• Preoccupied (Bartholomew & Horowitz, 1991) • Enmeshed (Main & Goldwyn, 1998) • Anxious-Ambivalent (Hazan & Shaver, 1987)

For conceptual clarity in this study, going forward, I will only use the terms secure, avoidant, anxious, and disorganised. This is done merely for the sake of the reader and does not negate the relevance of the other terms listed above, nor does it dismiss the conceptual richness each label adds to our understanding of these styles.

5.4. Attachment System into Adulthood

It may come as no surprise, that although our attachment styles displayed in adulthood do not necessarily manifest in the same ways as in infancy, our attachment system, and its accompanying dominate style, nonetheless play a significant role in our subsequent mental well-being, our interpersonal relationships, and our dispositions for trust (Mikulincer & Shaver, 2003, 2007). Bowlby (1988) argued that this was because attachment is a fundamental human need, and it is essential for our survival and well-being not only as infants, but also as adults (Bowlby, 1988). For Bowlby attachment is the emotional bond that initially develops between infants and their caregivers which provides a sense of safety, security, and comfort. However, the pathways laid down by this bond then provide the framework for healthy social and emotional development as adults, helping us regulate our emotions, form relationships, and navigate the world around us.

Therefore, as Mikulincer and Shaver (2016) noted, attachment is not just important in infancy and early childhood. It continues to be important throughout our lives, as we work to form and maintain relationships with others. Our attachment style influences the way we approach relationships and the way we perceive and respond to others. More importantly it may impact our ability to regulate our emotions and trust others, which may in turn, influence our ability to trust institutions and dispassionately evaluate information provided by them. Furthermore, Fraley (2002) contended that our attachment system operates at an unconscious level, by shaping our thoughts, emotions, and behaviours below our awareness. As such, our attachment system can have a significant impact on how we function in the world. However, as we will see next, variations in our attachment styles result in differences in how this interaction occurs (Fraley, 2002; Lopez & Brennan, 2000; Simpson et al., 2007).

For example, the three major attachment styles have been found to have significant consequences for adult behaviour and social functioning. Individuals with a secure attachment style tend to have more positive and satisfying relationships, greater emotional regulation, and better mental health outcomes (Mikulincer & Shaver, 2007). Of relevance to our study is that fact that children with secure attachments develop expectations of self and others as *trustworthy and* are therefore more likely to continue this pattern of trust into adulthood (Bolen, 2000).

In contrast, individuals with insecure attachment styles, such as those with avoidant, anxious, or fearful attachment, may experience difficulties in forming and maintaining close relationships, and may be more prone to negative emotions, anxiety, and depression (Fraley et al., 2013; Gillath et al., 2016). In addition, individuals with insecure anxious and disorganised attachment styles may have more negative perceptions of themselves, while avoidant and disorganised individuals may have negative perceptions of others. These insecure attachment styles can lead to a variety of generally self-defeating patterns of behaviour characterised by distrust, credulity, or decision paralysis (Shaver & Mikulincer, 2002).

5.5. Distribution of Attachment Styles among the General Population

But just how prevalent is insecure attachment among the general population? Well, according to Holmes (2020), around 65% of infants demonstrated a secure attachment style while approximately 20% of infants demonstrated an insecure- avoidant style. Around 12% of cases demonstrated an anxious attachment style, with the remainder being disorganised (around 3 to 5%). However, Konrath et al. (2014), in a sample of American college students, reported a distribution of around 50% secure, 18% avoidant, with anxious making up the remainder (disorganised only made up a small fraction). What is perhaps of greater interest in the Konrath et al. (2014) study is that the proportion of insecure to secure attachment styles has shifted over the last 20 years in the US sample she looked at. In US college students at least, it would appear as if insecure attachment has increased by 20% with secure attachment decreasing by an equivalent proportion.

So, to surmise, while our attachment styles are largely set during our early childhood and serve their primary function here, unlike our baby teeth, they does not fall away once we mature. Instead, as Oriña et al. (2011) and Zayas et al. (2011) observed, while the levels at which our attachment system operates changes in adulthood, it remains active and influential throughout our lives.

5.6. Attachment Styles in Adulthood vis-à-vis Trust

Our attachment styles can significantly influence our ability to trust. Our attachment style informs the way we shape and maintain relationships with others based on early life experiences which largely determine our subsequent internal working model's use for interpersonal relationships (Collins & Read, 1990; Pietromonaco & Barrett, 2000). However, the three main attachment styles: secure, anxious, and avoidant as well as disorganised differ in their disposition towards trust. Going forward, I will only be referring to the three main attachment orientations. While the disorganised attachment style is interesting, it typically constitutes only a small fraction of the general population. So while the principles we discuss will likely apply to this profile as with the other insecure attachment styles, for the sake of brevity it was omitted.

With that out the way, let's look at each of Thielmann and Hilbig (2015)'s dispositional variables related to the trustor's (1) propensity for risk, (2) betrayal sensitivity, and (3) expectations of trustworthiness through the lens of the three major attachment styles (Thielmann, 2015; Thielmann & Hilbig, 2015).

5.6.1. Secure Attachment & Trust

We now understand that people with a secure attachment style generally have a positive view of self and others, they feel comfortable expressing their emotions and needs, and they are more likely to believe others to be there for them when they need support. As a result, they tend to have higher levels of trust in others and are more willing to rely on others for help when needed (Brennan & Shaver, 1995; Feeney & Noller, 1990; Mikulincer & Erev, 1991).

But what of their propensity for risk when it comes to trust? While secure individuals tend to have a lower risk propensity when it comes to engaging in dangerous behaviours such as drug use and unsafe sex, they tend to have a higher risk propensity when it comes to trusting others (Mikulincer & Shaver, 2016)[77]. They also tend to have lower levels of betrayal sensitivity, as they are less likely to perceive ambiguous or negative behaviours as indicative of a breach of trust (Mikulincer & Shaver, 2016). Additionally, securely attached individuals have higher expectations of trustworthiness, as they tend to innately believe that others are generally reliable and trustworthy in accordance with the internal working models set in childhood (Mikulincer & Shaver, 2016).

5.6.2. Avoidant Attachment & Trust

Of particular interest to this study are individuals with an avoidant attachment style. Those dominant in this style generally tend to find it harder to trust others because they have learned to suppress their attachment needs and emotions in response to inconsistent or rejecting caregiving experiences in childhood (Mikulincer & Shaver, 2016). As a result, as Bartholomew & Horowitz (1991) noted, they tend to have a negative view of others, viewing them as generally untrustworthy and unreliable, which leads them to avoid close relationships or maintain emotional distance (even in existing relationships).

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[77] If that confused you, like it did me, it means this group is less likely to engage in risky sex, but more likely to trust others more generally.

Avoidant individuals tend to view emotions as a source of vulnerability and a sign of weakness, and they prioritise independence and self-reliance over intimacy and interdependence in relationships (Mikulincer & Shaver, 2016). They may also use defensive strategies such as deactivation, in which they suppress their attachment needs and emotions, and/or hyperactivation, in which they will go to extreme ends to maintain control by, for example, distancing themselves from others (Mikulincer & Shaver, 2016).

These defensive strategies can interfere with the development of trust in relationships, as avoidant individuals may interpret others' actions as threatening or rejecting, even when this is not the case (Mikulincer & Shaver, 2016). For example, an avoidant individual may perceive another person's need for emotional support as a sign of weakness or dependency and respond by withdrawing or becoming critical. This can create a cycle of mistrust and emotional disconnection in relationships, further reinforcing the individual's negative view of others as untrustworthy (Bartholomew & Horowitz, 1991).

Overall, those with an avoidant attachment style may therefore find it harder to trust others because of their negative view of people as generally untrustworthy and unreliable, as well as their defensive strategies which interfere with the development of trust in relationships.

In terms of our dispositional framework of trust, individuals with an avoidant attachment style are, therefore, much more likely to have a lower risk propensity for trust (i.e. less likely to want to trust). This is because it would take a great amount of effort to overcome the sense of vulnerability that comes with trusting someone as this requires them to relinquish control to some degree (Mikulincer & Shaver, 2016). Those dominate in this style may also have a much higher betrayal sensitivity, as they are primed to perceive even minor offenses or ambiguous behaviours as indicative of a breach of trust (Mikulincer & Shaver, 2016). Additionally, those with an avoidant attachment style may have lower expectations of trustworthiness to start with, which would correspond with the internal working models established for this attachment style. As a consequence, they may have learned to rely on themselves rather than others, leading to a greater sense of self-reliance and independence, which in turn feeds into their sense that they alone must be in control of their world (Mikulincer & Shaver, 2016).

5.6.3. Anxious Attachment & Trust

People with an anxious attachment style tend to have a more negative view of themselves but tend to have a more positive view of others (Mikulincer & Shaver, 2016; Wu, 2009) They often worry about being rejected or abandoned and may have difficulty trusting others to be there for them (Mikulincer & Shaver, 2007). They may feel more insecure in their relationships and may require more reassurance and validation from their partners (Beeney et al., 2019). As a result, when they do find someone, or something, that provides a sense of security, they experience this attachment relationship ambivalently. It is at once a source of security but also represents something that can disappear at any moment. People with an anxious attachment style often have a strong need for validation and reassurance, and they may seek this validation from others or external sources (Clark et al., 2020; Mikulincer & Shaver, 2016). They may be more likely to believe in something that provides them with this validation, even if it is not rational or evidence based. As a result, they may also be more susceptible to manipulation by those who provide them with this sense of validation (Kural & Kovacs, 2022). Therefore, these kinds of relationships can then be a complex mix of a desire for closeness, distrust, and a vulnerability to credulity (Feeney and Noller 1990, Collins 1996).

As such, when it comes to risk propensity, anxiously attached individuals, while possessing a deep desire to trust, may experience this as a risky proposition. They tend to give over their trust more freely initially, particularly in the context of forming and maintaining close relationships, but may find the uncertainty of such an arrangement risky (Feeney & Noller, 1990). This is because they often have a heightened sensitivity to social cues and are generally desperate to be accepted by others (Mikulincer & Shaver, 2016). As a result, anxiously attached individuals may take more interpersonal risks when it comes to trusting others (Mikulincer & Shaver, 2003). For example, they may be more likely to disclose personal information to others prematurely, or chronically reach out for emotional support from friends or family members. However, they may also be more sensitive to potential rejection or abandonment and may be more likely to perceive these behaviours as a breach of trust, even when this is not the case (Ein-Dor et al., 2010). As a result, anxiously attached individuals may have a higher betrayal sensitivity due to their fear of rejection or

abandonment (Mikulincer & Shaver, 2016). Despite their desire to be emotionally close to others, they may also have lower expectations of trustworthiness because they are primed for betrayal (Mikulincer & Shaver, 2003). As such, while they may be quick to be intimate with even a stranger in an attempt to develop an emotional connection, because they tend to have experienced inconsistent or unreliable caregiving in their early lives, they have difficulty maintaining this sense of trust because of their predisposition towards insecurity (Mikulincer & Shaver, 2016).

As such, anxiously attached individuals tend to have a higher risk propensity when it comes to trust, particularly in the context of forming and maintaining close relationships (Mikulincer & Shaver, 2016). However, while they may be willing to take more interpersonal risks when it comes to trusting others, they are also incredibly sensitive to potential threats to their relationships and may be more likely to perceive even innocent behaviours as a breach of trust (Collins, 1996). They are then far more sensitive to betrayal and may have lower overall expectations of trustworthiness.

5.7. Mainstream Institutions as Attachment Figures

To determine if it is a plausible proposition that our attachment style influences our ability to trust mainstream institutions, we first need to determine if mainstream institutions, do in fact, stand-in as attachment figures in adulthood.

As we have seen, Attachment Theory suggests that our early interactions with caregivers shape the way we form and maintain relationships throughout our lives. Specifically, our attachment style, whether it be secure or insecure, has implications for how we perceive and trust others, including mainstream institutions. This is because mainstream institutions like the government, media, and science tend to become attachment figures in adulthood because they fulfil some of the same functions as our early caregivers by providing a sense of security, stability, and predictability in an uncertain and complex world (Mikulincer & Shaver, 2016). These institutions represent external sources of support and protection that can help individuals feel more secure and competent in dealing with life's challenges (Mayseless & Popper, 2007).

Government institutions, for example, provide a sense of security through their role in maintaining law and order, protecting citizens from external threats, as well as playing a role in providing basic needs like food, shelter, and healthcare[78]. We also tend to turn to government in times of crisis, seeking leadership in times of war, pandemics, along with a host of other existential threats (Hazan & Zeifman, 1999). Media institutions, in turn, provide a sense of predictability and stability through their role in informing and educating the public about current events and social norms (Lambe & Perse, 2016; Mikulincer & Shaver, 2016, 2016). Science institutions on the other hand provide a sense of competence and control through their role in advancing knowledge and technology, and in addressing social and environmental challenges (Mikulincer & Shaver, 2016). All these institutions taken together form a kind of symbolic attachment figure that people turn to when the problems they face are complex and cannot be resolved by the individual or their immediate attachment network (Cherniak, Mikulincer et al. 2021)[79].

And as we now know, people differ in their capacity for dispositional trust according to their attachment styles. When it comes to institutional trust, there is good reason to believe this conclusion can be extended to include trust in this domain. However, people with these different styles not only differ in their capacity to trust these institutions, but also in the underlying reason they seek deactivation of their attachment system from these sources.

For securely attached individuals, authoritative institutions may become attachment figures in a time of crisis or when dealing with the unknowable. However, their attachment here is balanced with their attachment to others which helps bring perspective to this one-way relationship. However, Mikulincer & Shaver (2016) has found that individuals with insecure attachment styles are, in fact, more likely to seek attachment from external sources exactly because they tend to lack strong interpersonal social support networks.

At this point we can start to speculate about the reasons the different insecure attachment styles might view mainstream institutions as an attachment figure. For those with an

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[78] This is of course not the case in all countries, such services are provided to varying degrees, but even those governments that do not directly provide these services have mechanisms in place to regulate
them to ensure their stable operation (see market subsidies and market regulations).
[79] Another prominent symbolic attachment figure is *God* with organised religion providing the mechanism through which to attach.

avoidant attachment style, it may be a way of avoiding intimacy and emotional connection with others. They may view institutions as a more neutral and objective source of support, which allows them to maintain a greater sense of independence and control. On the other hand, we can speculate those with an anxious attachment style may seek attachment to institutions due to their concerns about rejection and abandonment in close relationships. These tendencies may be particularly pronounced among individuals who have experienced trauma or extreme adversity in their early lives, as they may have difficulty trusting and relying on others in close relationships (Mikulincer & Shaver, 2016). Instead, they may seek attachment to institutions as a way of coping with their attachment-related insecurities and maintaining a sense of stability and control in their lives. These individuals may view institutions as a more reliable and stable source of support, even if they may not provide the same level of emotional closeness as interpersonal relationships (Mikulincer & Shaver, 2016). However, for those with insecure attachment styles, these one-way attachment relationships tend to spell trouble in the long run.

In sum, mainstream institutions such as the government, media, and science likely serve as attachment figures in adulthood because they fulfil fundamental needs, including providing security, stability, and predictability. However, our attachment styles not only influence our motives for forming connections with these authoritative institutions but also determine the probable outcomes of these relationships.

5.8. Trust in Mainstream Institutions vis-à-vis Attachment Style

In this section, we will explore the relationship between the three main adult attachment styles and the nature of their trust relationships with mainstream institutions.

5.8.1. Trust in Mainstream Institutions vis-à-vis Secure Attachment

One can likely conclude from what we know about adult Attachment Theory that because individuals with a secure attachment style are more likely to trust others, they will also more readily trust mainstream institutions (Mikulincer, 1998). This is because, as mentioned before, securely attached individuals are confident in their ability to form close, healthy relationships with others, and as a result, are less likely to doubt the motives or intentions of those around them (Mikulincer & Shaver, 2016). They are also comfortable expressing their

emotions and are more likely to feel safe and supported when communicating with others which makes them more open, not only to interpersonal trust, but also epistemic and institutional trust. As such, its stands to reason that when it comes to trusting mainstream institutions, securely attached individuals are more likely to trust the information provided to them by the government, media, and science, as they have greater levels of dispositional trust overall.

However, Mikulincer & Shaver (2016) has shown that securely attached individuals are also less likely to blindly trust institutions or authority figures and are more likely to critically evaluate information and opinions before forming their own conclusions. This may be due in part to their ability to regulate their emotions and maintain a sense of self-worth and confidence in their own judgments and decisions (Mikulincer & Shaver, 2016). This could be because securely attached individuals, as we have seen, also generally have had more positive experiences with trustworthy caregivers in their early lives, which have helped them develop a more nuanced and balanced perspective when it comes to trust and dependence (Mikulincer & Shaver, 2016). As such, they may have learned that trust is not an all-or-nothing proposition, and that it is possible to trust others while also maintaining a degree of independence and autonomy in their own lives. It also means that a single failing by an institution is unlikely to irreparably damage a trust relationship.

The same proposition is less likely to be the case for individuals with an insecure attachment style, and much like in their personal lives, they are much more likely to have tumultuous trust relationships with mainstream institutions.

5.8.2. Trust in Mainstream Institutions vis-à-vis Avoidant Attachment

A lack of trust in mainstream institutions, for avoidant individuals, could be attributed to the fact that they tend to evade emotional closeness with others while also generally tending to mistrust them (Campbell & Stanton, 2019). They also commonly tend to view their attachment figures as unreliable, and by extension view mainstream institutions that stand in as attachment figures in adulthood, as less likely to be trustworthy. This even though they may initially seek out institutions as stand-in attachment figures for the reasons mentioned earlier.

Their high level of betrayal sensitivity and general sense of mistrust often leads them to question the motives and intentions of mainstream institutions, causing them to be epistemically hypervigilant. Consequently, because avoidant individuals generally want to maintain a sense of autonomy, they are more likely to want to independently come to conclusions on existentially threating issues and do their own *research* to deactivate their attachment system. To accomplish this goal, a perfect tool at their disposal is motivated reasoning (Ditto & Lopez, 1992). As we saw in Chapter 3, motivated reasoning provides the means to construct alternative interpretations/explanations which, in this context, helps the individual maintain a sense of control over what are essentially complex phenomena beyond the control of even the most capable individual. This in turn deactivates the attachment system through what is essentially an act of self-soothing[80]. Tied to this is their need to not become over reliant on what they perceive to be generally unreliable abstract attachment figures. This then primes avoidant individual attachment styles for mistrust in mainstream institutions.

5.8.3. Trust in Mainstream Institutions vis-à-vis Anxious Attachment

In contrast, individuals with an anxious attachment style may be more likely to put too much trust in mainstream institutions because of a lack of trust in themselves (Bartholomew & Horowitz, 1991). These individuals are highly dependent on their attachment figures but may feel insecure in these relationships (Mikulincer & Shaver, 2003). As a result, in the absence of strong interpersonal attachment relationships, or the inability of interpersonal attachment figures to provide comfort in the face of existential threats, they may over-rely on the government, media, and science to provide them with a sense of safety and security (Collins, 1996)[81]. This is even at the expense of their own autonomy and independence. In extreme cases, individuals with an insecure-anxious attachment style may trust these institutions, even when faced with evidence suggesting that it is not safe to do so. For example, overwhelming evidence of incompetence, abuse of power, and/or corruption may do little to deter their faith in these institutions. However, this is contingent on these

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[80] Motivated reasoning in this context is to adults what sucking your own thumb is to toddlers trying to self-sooth. As a side, I was left wondering if there was a connection here to the old expression, "*sucked that information right out of his thumb*". We may have had an intuitive understanding of true purpose of motivated reasoning for a while now.

[81]

institutions continuing to provide these individuals with a sense of acceptance, inclusion, and security. If they can do so, those with this attachment style will likely continue to trust them (Mikulincer & Shaver, 2003). However, if these institutions fail to provide these existential guarantees, these individuals may '*flip*' these institutions into the *enemy* (much like a jilted lover) and may turn to other sources of acceptance and security (Mikulincer & Shaver, 2003). For example, they may then seek to attach to alternative abstract attachment figures, like political parties antithetical to mainstream institutions, religious institutions, lifestyle movements, influencers, or other institutions that provide a sense of affirmation and belonging while providing a sense of security about the world (Greenwald et al., 2021; Koleva & Rip, 2009). As a result, we can expect inconsistencies in the anxiously attached individuals trust relationships with mainstream institutions ranging from credulity to no trust at all depending on factors independent of their attachment style.

5.8.4. Trust in Mainstream Institutions as a function of Attachment Styles

In sum, while those with insecure attachment styles then have a more complicated relationship with authoritative institutions as attachment figures, they are not entirely incapable of trusting them. However, when interrogated through Thielmann & Hilbig's (2015) dispositional variables of trust, it seems clear that insecure individuals are more sensitive to betrayal and may have less expectations of trustworthiness in mainstream institutions overall. This may be due to their all-or-nothing approach to trust, and the fact that at some point or another, these institutions would have failed to meet the high expectations set for them. Consequently, a sense of betrayal may be inevitable (Mikulincer & Shaver, 2016).

As a result, when trust in institutions is undermined by incompetence, corruption, misinformation, or other forms of misconduct, it leaves those insecurely attached to these institutions and their tendency to respond in terms of binaries, with two choices (1) wilfully ignore any information that contradicts an institution as a reliable attachment figure or (2) reject these institutions as completely and entirely unreliable. Both choices result in a form of denial. The former, which is more associated with anxious individuals, can lead to dangerous credulity while the latter, which is more associated with avoidant individuals, can lead to feelings of betrayal, anger, and disillusionment resulting in a complete rejection

of trustworthiness of the information forthcoming from these institutions (Edelman Trust Barometer, 2021).

But insecure attachment styles do more than just erode our trust in these institutions, they can, as we will see in the next section, also colour the way we receive and process information from these institutions aiding the mechanism of motivated reasoning.

5.9. Attachment Style & the Processing of Existentially Threating Information

To appreciate how our ability to process salient information from mainstream institutions varies according to our attachment style, we first need to examine how attachment style affects our ability to process interpersonal cues.

5.9.1. Secure Attachment & Existentially Threatening Information

Individuals with a secure attachment style generally process interpersonal cues in a more accurate and effective way than those with an insecure attachment style (Schneider et al., 2001). This is because securely attached individuals are less like to over-analyse social cues, are more likely to perceive them accurately, respond appropriately, and regulate their emotional responses in a socially acceptable manner (Mikulincer & Shaver, 2016). Moreover, they are more likely to accept and adapt to new information that challenges their initial assessment of a situation. Conversely, individuals with an insecure attachment style, such as those with an avoidant or anxious attachment style, tend to tend to struggle in this area.

5.9.2. Insecure Attachment & Existentially Threatening Information

Avoidant individuals are often less responsive to these social cues and have difficulties recognising and responding to them (de With et al., 2023). This may be due to their habit of suppressing emotions in social situations and dismissing the emotions of others (Schneider et al., 2001).

On the other hand, anxiously attached individuals are typically hypersensitive to social cues and tend to interpret ambiguous ones, such as body language and ambiguous verbal communication, such as innuendo, humour, etc. negatively (Sheinbaum et al., 2015). This can lead to a heightened emotional reactivity and maladaptive responses like reading too

much into a situation and attributing malicious intent where none exists (Mikulincer & Shaver, 2016).

5.9.3. Existentially Threatening Information from Mainstream Institutions

The question then arises: how do these differences in processing interpersonal communication translate into biases in interpreting existentially threatening information shared by mainstream institutions? Bowlby (1969) already suggested that threats endangering bodily integrity, or threats representing danger for our survival more broadly speaking, will lead to the activation of the attachment system (Mikulincer & Shaver, 2007). In this context, it is taken that existential threats will act in the same way as more immediate threats resulting in the activation of the attachment system. In many ways, the mechanisms are similar, with the key difference being that with mainstream institutions, the direction of communication is largely one-way. This is unlike interpersonal communication, where feedback can correct misinterpretations. Communications from mainstream institutions rarely provide this opportunity. As a result, individuals must rely on themselves to make sense of the information and decide whether to trust it or not.

5.9.3.1. *Existentially Threatening Information from Mainstream Institutions - Secure Attachment*

Securely attached individuals, with their high levels of core self-evaluation (Legh-Page, 2022), are better equipped to review information provided by mainstream institutions. Although they may still show a tendency to seek out or favour information that confirms their pre-existing beliefs, they are more likely to consider alternative viewpoints and adapt their beliefs when presented with contradictory evidence (Hart et al., 2005). Consequently, they are less likely to rely on motivated reasoning and cognitive biases to form their own explanations (Sheinbaum et al., 2015). Additionally, their stronger immediate social networks are more likely to act as effective sounding boards to provide further reassurance of trust in this type of information. Their social support systems and ability to trust others in processing information make them less prone to cognitive biases such as confirmation bias and the false consensus effect (Mikulincer & Shaver, 2016). As such their relationship with epistemic trust is likely more robust.

However, securely attached individuals maybe more susceptible to normalcy bias, where they may tend to initially underestimate the severity of an existential threat due to a tendency to believe that things will continue to function normally. Nevertheless, they are generally better at adjusting their understanding as new information becomes available.

5.9.3.2. Existentially Threatening Information from Mainstream Institutions - Avoidant Attachment

However, the same cannot be said for those with an avoidant attachment style. While these individuals tend to suppress or avoid emotional reactions to communicated information, leading to a more detached information processing style, their general sense of mistrust and weaker social networks may lead them to want to come to their own conclusions to maintain a sense of control (Mikulincer & Shaver, 2003). In some cases, this may lead them to generally want to dismiss or minimise the significance of threatening information., i.e. the ostrich effect[82] (Jostmann et al., 2009). Overall, avoidant individuals may be more prone to confirmation bias where they may seek out or interpret information in a way that confirms their pre-existing beliefs, particularly if those beliefs align with their tendency to avoid emotional vulnerability or erode the sense that they are in control of their lives[83] (Edelstein & Gillath, 2008; Liu et al., 2017). This in turn may lead them to an optimism bias where they might overestimate the likelihood of positive outcomes and underestimate the severity of the existential threat, as a means of maintaining emotional distance and a sense of control[84].

These biases cause such individuals to seek out communities that agree with their assessments or where they can persuade others of their correctness, rather than subject their views to criticism. Critics are often viewed through a lens of low trust, as having malicious intent, or being brainwashed. Historically, finding like-minded people within geographically defined communities was challenging. However, as discussed in Chapters 2 and 3, the internet and social media have made it much easier to find online communities

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[82] It is not hard to see how the desire to downplay the risks associated with the COVID pandemic by some can be tied back to this.

[83] See "Reactance".

[84] "Climate change isn't as bad as they say", "The risks associated with COVID are overblown", "Vaccines are not necessary when you have a strong natural immune system".

that share one's views (Ridings & Gefen, 2004). These alternative-thinking communities create a false consensus effect, further enabling confirmation bias.

5.9.3.3. Existentially Threatening Information from Mainstream Institutions - Anxious Attachment

On the other hand, anxiously attached individuals, known for their sensitivity to interpersonal cues and heightened reactivity to perceived threats, experience intensified emotional responses when processing interpersonal or threatening information. This leads to hypervigilance towards potential threats, amplifying their perception of existential threats and contributing to negativity bias and catastrophising (Ein-Dor & Doron, 2015). As a result, emotional dysregulation may occur, making it difficult for anxiously attached individuals to process their emotions and heightening emotional reactivity when confronted with threatening information. This emotional dysregulation can interfere with rational thinking and problem-solving (Chris Fraley et al., 2006; Mikulincer & Sheffi, 2000).

Additionally, their general fear of abandonment can intensify their need for reassurance and support when faced with an existential threat, driving them to seek validation and engage in maladaptive coping strategies (Karantzas et al., 2023). These strategies may include rumination, dwelling on worst-case scenarios, potential losses, or feelings of helplessness, which can exacerbate anxiety and make it difficult to focus and effectively process information. Counterintuitively, hyper-activated anxiously attached individuals may also engage in emotional suppression similar to their avoidant counterparts to control their intense emotional reactions and heightened anxiety. However, this can lead to increased emotional distress in the long run and hinder their ability to process threatening information effectively. Moreover, anxiously attached individuals might constantly seek reassurance and validation from others to alleviate their anxiety (Evraire et al., 2022; Mikulincer & Shaver, 2016). While seeking support during stressful times is normal, excessive reassurance-seeking often cannot be satisfied by mainstream institutions, making these individuals susceptible to false promises, or leading them to seek reassurance elsewhere.

5.10.   Evolutionary Origins of Insecure Attachment?

All the research presented so far in this chapter does raise an intriguing question. Why, if having a secure attachment style has so many fitness benefits, are insecure attachment styles, which appear to do the opposite, still so prevalent in the general population?

While Bolen (2000) and others provided support for the fact that our physical and social environments play a role in the formation and maintenance of our attachment styles, it is difficult to dismiss the idea that insecure attachment styles and their associated traits, provide some kind of evolutionary benefit. This is because the different attachment styles likely evolved because of the dynamic environments and adaptive challenges faced by early humans. This is partly because our ancestors lived in small groups, relying on others for support and protection. As a result, different attachment styles may have been shaped by environmental pressures that have influenced how individuals respond to potential threats and opportunities for social bonding (Ein-Dor et al., 2010).

In this context, the benefits of a secure attachment style seem obvious. Being able to form and maintain strong bonds with others, particularly caregivers, was and remains critical for survival. Secure attachment is thought to have evolved as the optimal attachment style in ancestral environments which fostered social cohesion and in-group trust (Kirkpatrick, 1998). These strong bonds allowed them to seek support when needed, provided a sense of security, coincided with a belief that others could be relied on for support, and allowed us to explore our environments with confidence. This likely conferred a survival advantage by providing us with the social support needed to navigate our complex social and physical environments.

But what about insecure attachment styles? Avoidant attachment styles are speculated to have evolved to increase our chances of survival in environments where resources were scarce or unreliable (Ein-Dor et al., 2010). By maintaining emotional distance and focusing on self-sufficiency, these individuals could minimise their exposure to the risks encountered by the larger group and ran less of a risk of resource depletion (less sharing). Additionally, avoidant attachment may have been advantageous in environments where forming close bonds was risky due to factors such as frequent conflict, predation, or disease (Ein-Dor et al., 2010; Schmitt et al., 2004). By remaining detached, these individuals could minimise their

exposure to threats and increase their chances of survival. Ein-Dor and colleagues (2010) also theorised that given their natural tendency to remain distant from groups, avoidant individuals may have been predisposed to quickly identifying escape routes, which while not altruistic in their intent, may have been beneficial in times when escape increased the chances of survival.

On the other hand, those with anxious attachment styles may have been better equipped to detect and respond to threats within their social group, acting as a type of sentinel warning others of danger. Their hypervigilance could have helped them maintain tight social bonds, secure resources, and navigate complex social hierarchies. Furthermore, their strong need for reassurance and support may have encouraged cooperation and collaboration among group members, increasing the chances of survival for both the individual and the group. Those with this attachment style may have also tended to remain attached to their parents beyond adolescence (Belsky, 1999; Levy et al., 1998). By effectively sticking around, they would then have acted as additional attachment figures for subsequent offspring, thereby improving the odds of their survival.

In sum, in our ancestral contexts, having a range of attachment styles within a population may therefore have conferred a fitness advantage and made the social group more adaptable to capricious environmental conditions. This may well explain why the adult attachment styles we observe today are so complex and multifaceted. They reflect the interplay between genetic and environmental factors, including the social and ecological conditions that shaped the selection pressures on attachment behaviours.

But why, do I hear you ask, even bring this up?

5.10.1. Evolutionary Mismatch Hypothesis

Well because of a phenomenon called the *evolutionary mismatch* or the *mismatch hypothesis* (Li et al., 2018). According to Lloyd et al. (2011) evolutionary mismatch occurs when traits or behaviours that were once adaptive in our ancestral environment become maladaptive or harmful in the modern environment. This mismatch arises because our environment has changed rapidly, while our genes and evolved traits haven't had enough time to adapt accordingly. The desire for sugar is a classic example of evolutionary mismatch. In our

ancestral environment, sugar was scarce and was, and remains, a valuable source of energy. As a result, our ancestors developed a strong preference for sweet foods. However, in today's modern environment, refined sugar is abundant, cheap, and easily accessible, leading to overconsumption which leads to health problems such as obesity, diabetes, and heart disease (Wiss et al., 2018).

Perhaps this *mismatch hypothesis* could be said to apply to insecure attachment styles? The mismatch hypothesis, when applied to insecure attachment styles in the context of the internet and social media, can also provide at least some explanation for the prevalence of denial on critical issues such as climate change, pandemics, and vaccines. But how are each of these styles mismatched with the contemporary world we live in, characterised by the rapid transmission of information, the internet, and social media?

5.10.2. Evolutionary Mismatch Hypothesis - Avoidant Attachment

For individuals with avoidant attachment styles, their preference for maintaining emotional distance and control could make them more prone to dismissing or minimising the significance of these global threats. The internet and social media provide ample opportunities for them to seek out information that confirms their pre-existing beliefs, while avoiding challenging or emotionally uncomfortable viewpoints made possible by more organic encounters with the general public. This selective exposure can lead to the perpetuation of misinformation and the denial of scientifically supported evidence.

5.10.3. Evolutionary Mismatch Hypothesis - Anxious Attachment

In contrast, those with anxious attachment styles might be overwhelmed by the constant stream of news and updates related to these existential threats, leading to heightened emotional reactivity and anxiety. To alleviate their distress, they may be more susceptible to embracing false promises or seeking reassurance from sources that downplay the severity of these issues. This behaviour could result in the denial of the problem or the adoption of maladaptive coping strategies. Equally, their strong need for belonging and validation is a perfect match for the internet and the virtually 'instant' communities that are accessible here. As such, when a primary attachment community is perceived as unreliable, a new replacement one is only a few clicks away. However, because there is a near infinite number

of online communities to seek out and obtain validation from, people are more likely to seek out groups that affirm existing beliefs.

5.10.4. From the Evolution of Attachment to the Neuroscience of Attachment

Building upon our exploration of the impact of attachment styles on our trust in mainstream institutions and the significance of the evolutionary mismatch hypothesis, we now transition into a more intricate realm: the neuroscience of attachment. It's not merely about understanding human behaviour at a surface level; it's about diving deep into the neural processes that underscore our trust, reasoning, and interactions. By dissecting the neural relationships between attachment, trust, and reasoning, we seek to unveil the intricate web of factors shaping our perceptions and responses. It becomes paramount to grasp this neuroscience because, in a world where denial of mainstream consensus is increasingly common, comprehending the neural roots of such stances can equip us with tools to address these challenges more effectively. By understanding the potential neurological influences of our beliefs and reactions, we can start to tailor the ways we combat misinformation and find more creative ways to make a broader audience more receptive to evidence-based narratives.

5.11. The Neurobiology of Attachment vis-à-vis Trust & Motivated Reasoning

As we saw in the chapters on motivated reasoning and trust, our neurobiology plays a significant role in our propensity for trust as well as the activation of motivated reasoning.

Specifically, in Chapter 3 we learned that motivated reasoning is the brain's attempt to equilibrate to a solution that satisfies both cognitive constraints (goodness-of-fit of the available data) and emotional constraints (maximising positive affect, whilst minimising negative affect). As such, when an issue under consideration is emotionally triggering, like when we are confronted with existentially threatening information, our affective response limits our 'cold' cognition. It does this by activating a cascade of biases so that our emotional demands can be met while still attempting to make sense of the world around us. We also saw in Chapter 4, that trust has a strong affective basis. We learned that trust is associated with positive affect, while a violation of trust, is associated with an even stronger negative affect. Furthermore, in this chapter we learnt that the activation of the attachment system

results in a negative _affective_ state which gives rise to a drive directed towards its deactivation.

At the highest level then, we know that all these concepts have an affective component in common. But what exactly is going on with the attachment system at a neurobiological level?

5.11.1. The Social Neurobiology of the Attachment System

There appears to be a consensus that there is no single site in the human brain that clearly demarks the attachment system. Rather there are two different networks at play, each influencing, and being influenced, by one another (Vrtička & Vuilleumier, 2012). The first network is more concerned with the default strategies we engage in when we are threatened or distressed, while the second network says more about the system favoured to process information and make decisions about how to respond to this perceived external threat. Furthermore, which subsystems of these networks are activated, is largely determined by individual differences in attachment orientation.

5.11.1.1. Survival Network: Primitive Survival vs. Social Survival System

When confronted with something that we perceive as a threat, we have two core basic survival systems we rely on, each of which favours a different scripted behavioural orientation. The first is geared toward fight-or-flight, while the second is focused on seeking out others.

5.11.1.1.1. Primitive Survival System

The first is our more primitive sympathetic fight-or-flight circuits which form part of our limbic system, something we share with many other species, down to reptiles. The activation of this primitive survival system is associated with responses that are quick, involuntary, and/or reflexive and don't leave a lot of room for higher order processing. Once activated, it is everyone for themselves. Unsurprisingly, this system is associated with the activation of a set of brain regions associated with non-social negative affect, like physical pain, stress, and fear but also various aversive social responses such as the psychological pain related to social exclusion/rejection, social stress, social conflict, or sadness due to a personal loss. The amygdala constitutes a crucial part of this network (Godoy et al., 2018). As we know, at a

basic level this part of the brain is involved in fear responses and certain negative emotions. In the context of a social threat, an overactive or hypersensitive amygdala could create a higher likelihood of perceiving social interactions as threatening or anxiety-inducing, contributing to social aversion. But there are other areas that also play a role here. The hippocampus aids in the encoding of negative feedback by looping it through the hypothalamic pituitary adrenal axis, the insular, and the anterior cingulate cortex (Smith & Vale, 2006). Specifically, the hippocampus plays a role in the encoding of negative memories, and if overexcited, could encode and recall negative memories related to social threats. The hippocampus could then overweight these memories when deciding which past experiences to draw on when acting in the present (Qasim et al., 2021; Williams et al., 2022). In fact, overactivation of all these brain regions may lead to misinterpretation or over-analysis of social threats, activating default fight-or-flight behavioural scripts which in turn increases social aversion. An overreliance on this system when dealing with social threats, is then associated with a desire to escape, rather than seek safety among, others.

5.11.1.1.2. *Social Survival System*

On the other hand, we also have our social survival system which takes a different approach to threats. Rather than try to go it alone, this system seeks safety through close social interactions. This social survival system presumably evolved after the sympathetic nervous system to compensate for its crudeness. It is likely that the more primitive system was poorly equipped to deal with the increased complexity of living in ever larger social groups. It is not hard to imagine how a fight-or-flight response to every perceived social threat would have been counterproductive for our evolutionary fitness as social primates. Rather, a more socially oriented approach, where safety was sought among others and threats were confronted through social interactions (safety in numbers, collaboration, etc.) likely imparted certain survival benefits to our ancestors.

On a neurobiological level, the social survival system is for the most part located in the midbrain (Matthews et al., 2016) which supports the view that this system, and its accompanying behavioural orientation, evolved after the primitive survival system. What likely occurred is that this approach encoded social interactions as innately rewarding, primarily in the dopaminergic network including the ventral tegmental area, the substantia

nigra, the ventral striatum, and the ventromedial orbitofrontal cortex (vmOFC). This means that when this system is activated it is associated with a positive sense of affect (Krach et al., 2010). In addition, there is agreement that certain neurotransmitters/neuropeptides also play a role in the activation of this system. Oxytocin and vasopressin[85] along with endogenous opioids and serotonin (dopaminergic rewards networks) influence the activation of this orientation (Skuse & Gallagher, 2009).

5.11.1.1.3. *The Survival Network: The Primitive & Social Survival Network Counterbalanced*

However, the arrival of this social survival system did not override the primitive system. Rather, according to Porges (2011) these two systems came into a dynamic balance where they are selectively called on depending on several factors. This, according to Porges (2011), is because to achieve prosocial ends, evolution had to counterbalance the asocial tendencies of more our primitive survival systems. While this primitive system was effective at helping secure our immediate survival, its overall sensitivity and crude nature motivates social aversion and does little to aid our sustained long-term survival as social animals. Our social survival system, which promotes a sense of safety through close social interactions with others, is more likely to ensure our enduring survival than the fitness advantages its offers when faced with more complex and enduring threats.[86] (Ein-Dor, 2014).

Our primitive system, and its associated sympathetic circuits, are more associated with avoidance of, a desire to withdraw from, or escape from, perceived threats, even social ones. However, our social survival system is less blunt and when activated, it seeks safety by turning towards others. We then have two systems in dynamic tension with each other, the first primed towards social aversion while the latter is geared towards a social approach. These two systems combine on a continuum to make up one of the two major networks that comprise our attachment system (Vrtička & Vuilleumier, 2012).

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[85] These should start to sound familiar to readers of Chapter 4.
[86] There is an African proverb that nicely illustrates the difference between these two systems: "*If you want to go fast, go alone. If you want to go far, go with others.*"

5.11.1.2. *Mentalisation Network: Emotional vs. Cognitive*

While the survival network has a lot to say about who we'll turn to in a time of crisis (self vs. others), it says little of how we evaluate and process information, regulate our behaviours, and make decisions when faced with social threats. As we have seen, the attachment system operates by using attachment working models based on prototypical mental representation of self and others (aka the act of mentalisation). In addition, it has been suggested that individual differences in attachment influence the degree to which incoming social information is processed either more emotionally by what is known as the 'affective evaluation system' or more rationally by the 'cognitive control system' (Vrtička & Vuilleumier, 2012). Furthermore, much like the survival network, these two systems (affective vs. cognitive) in our mentalisation network are also in dynamic balance with each other (Mayes, 2000). But what exactly are these two networks doing?

5.11.1.2.1. *The Affect Evaluation System*

Much like the name suggests, the affective evaluation system relies more on emotional representations of self and others and operates mostly automatic, implicit, and partially or fully unconsciously. While this approach allows for the rapid evaluation of threat-related information, nuance, and accuracy are sacrificed because of the speed at which processing occurs. This reduced accuracy is due to the reliance on previously established working models of self, and others, to create mental shortcuts when deciding what to do next (Loewenstein et al., 2001). This is because these working models are encoded according to the two systems in the survival network which relate to the activation patterns of social aversion (others are a source of danger that cannot be trusted) versus social approach (others are a source of safety and can be trusted). As such, the processing of threat-based information is predominately shifted toward these preexisting mental schemes. Unfortunately, these working models may not always be accurate or applicable to the threat presently faced. In turn, this may result in an increased likelihood of biased evaluations and responses. On a neurobiological level, the same neurostructural and endocrine substrates are, for the most part involved as described under the two systems in the survival network, i.e. the limbic system and the midbrain regions, though there are extensions into the

neocortex (Vrtička & Vuilleumier, 2012). As we will see, which of these two systems are activated, will depend largely on a person's attachment orientation.

5.11.1.2.2. *The Cognitive Evaluation System*

The cognitive evaluation system plays more of a regulatory role and relies on rational inferences to decide on how to respond to threat-related information. In its regulatory capacity, it can suppress the affective evaluation system's automatic appraisals. It achieves this by deploying various mechanisms, some positive, such as the reappraisal of information, the desire to find out more information, or some negative, such as suppression of emotions and/or distraction. It can then use rational inferences to make decisions about how to deal with threat-related information. While this may result in more accurate appraisals of threat- related information, it comes at a cost; it generally takes more time and requires more energy (Epstein, 1994). However, the resulting outcome tends to be more nuanced, sensitive to mediating circumstances, and thus allows for deviation from mental scripts. These more sober evaluations result in assessments and behaviours that are more likely to lead to actions tailored to the unique nature of the situation by taking the time to understand the threat and how best to respond to it. It means that responses can be varied, neither falling prey to credulity nor automatic distrust, as sometimes may be the case with affectively driven evaluations.

On a neurobiological level, the cognitive evaluation system is thought to be mediated by a cognitive control network which is mostly located in the neocortex, the last part of the brain to evolve. The cognitive evaluation system includes the lateral ventral, middle, and dorsal prefrontal and orbitofrontal cortex (PFC/OFC) (Vrtička & Vuilleumier, 2012). These regions are typically associated with the regulation of cognitive processes, such as attention, working memory, and decision-making[87], as well as the representation of the mental states of self and others, including beliefs, intentions, and desires. This network is thought to operate more deliberately, but more slowly than the affective evaluation network. It is also involved in the deliberate control of emotions and social behaviours and, if activated, can override the affective evaluation system in favour of more nuanced responses.

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[87] See Executive Function

5.11.1.2.3. *Mentalisation Network: The Affect Evaluation and Cognitive Evaluation Systems - A Dynamic Balance*

Like the survival network, the systems of the mentalisation network exist on a continuum. The nature of a threat and one's present mental state may impact the location of the '*switch point*' on this continuum where elevated urgency, novelty, and perceived level of risk shifts towards the activation of the affective evaluation system. This shift in reliance of one system towards another means a commensurate change in behaviour from more flexibility to more automaticity. That is from relatively slow executive functioning to faster habitual behaviour, driven by affective responses and pre-existing scripts based on encoded evaluations of self and others (Porges, 2003). This switch point, as we will see, is not only triggered by the nature of the threat being faced but is also influenced by one's attachment style.

5.11.2. Differential Activation of the Attachment System Networks

Now that we have the different components of the different networks and systems involved in attachment layout, we can start to see how the different attachment styles are both the cause of, and are caused by, differences in the activation and deactivation of these networks and systems in the face of perceived (social) threats. Before we delve in, it should be noted that a complete picture of the neurobiology of attachment still eludes us and the findings that are available are delightfully complicated and beyond a complete description in this thesis. Consequently, the finding that I will present to you in the next section will invariably be a reductive account of an extremely complex phenomena. However, as tentative as these findings are, they nonetheless provide useful direction, help enrich our understanding, and most importantly, point to significant overlaps in our other constructs of concern: trust and motivated reasoning.

Furthermore, it should be noted at this point that the research in this area is not so much focused on secure attachment as it is on the insecure side. As such, the findings are typically discussed in terms of the two main insecure attachment styles, avoidant and anxious. This appears to be because in most cases, when an insecure finding is reported, the opposite is true for secure attachment. As such, I will not present a separate section on the neurobiology of secure attachment as has been the pattern of this chapter, as this would represent mostly a repeat of information.

5.11.2.1. Neurobiology of Avoidant Attachment

As already alluded to, the underlying mechanisms at play in the attachment system are quite complex, with avoidant attachment being no exception. However, reductively speaking, the emergence of avoidant attachment appears to be down to two opposing processes involved in the survival network. The first process relates to the fact that avoidantly attached individuals are relative insensitivity to negative social feedback such as social rejection or exclusion (Mikulincer & Shaver, 2003). As such, when confronted with a social threat, unlike their counterparts, their social survival network resists activation. However, this lack of activation and the continued presence of the threat means that alternative strategies are required.

This then leaves the mentalisation network. While under normal circumstances avoidantly attached individuals do well at regulating their emotions, they do so by using a less desirable strategy such as a response-focused emotional regulation approach. As the name suggests, this approach involves regulating emotions after they have been fully generated and/or consciously experienced. It is about dealing with the emotional response once fully formed. For example, an individual might employ a negative mechanism such as suppression, where one consciously attempts to inhibit or reduce their outward expression of emotion (Edelstein, 2006; Mikulincer et al., 2002). However, this does not mean the emotion itself is not felt or has been reduced, it is more about how the external expression of it is managed. As a result, a response-focused strategy requires a great deal of emotional labour[88] which is difficult to sustain. And when faced with social emotional stimuli that are too disturbing, intense, or pervasive (inescapable) this strategy tends to fail (Vrtička et al., 2012). As such attempts at the reappraisal of threats may not work for these individuals, leading to impaired downregulation of amygdala reactivity. This may explain why these individuals tend to become highly emotional when they preferred regulatory status strategies fail or cannot be employed. As a result, a different pattern of information processing emerges which is characterised by increased activation of the primal survival system including the amygdala.

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[88] Hochschild, A. R. (1983). The Managed Heart: Commercialization of Human Feeling. University of California Press.

This stands in contrast to more securely attached individuals who tend to deploy antecedent-focused emotional regulation strategy which involves positive mechanisms such as reappraisal which allow for intervention in the emotion-generative process before an emotional response is fully formed (Kim et al., 2010; Vrtička & Vuilleumier, 2012). This is about trying to change the way one feels before the emotion takes hold. However, this strategy only tends to work if an individual is open to receiving new information and trusts the sources, and those around them. The presence of these facets allows for social threats and their associated negative emotions to be reframed.

Now we know that the deployment of negative mental mechanisms in the mentalisation network to deal with the affect experienced after exposure to the socially threating information, tends be an ineffective strategy. This forces avoidantly attached individuals to once more turn to their primal survival network. Because of their weaker need for social closeness and lower levels of distress elicited by social rejection; these individuals tend to prefer an asocial approach driven by the primal survival network. This is supported by evidence that these individuals have reduced anterior insula and dorsal ACC activity in response to social rejection (DeWall et al., 2012). They also tend to have decreased activation of the anterior insula, ventral ACC, and initially, the amygdala/hippocampus during social conflict. However, under chronic threat, avoidantly attached individuals show increased amygdala activation, and tend to have lower overall structural integrity of the amygdala because of chronic hyperactivation (Norman et al., 2015).

In addition, avoidantly attached individuals generally have been found to have lower levels of oxytocin in their systems (De Dreu, 2012). This is correlated with a lower reported pleasantness from even positive social encounters and is related to a diminished capacity to experience social interaction as pleasurable overall. Unsurprisingly, avoidant attachment has also been correlated to diminished extraversion scores(Noftle & Shaver, 2006).

In sum then, our neurobiological understanding supports, but somewhat modifies, our view of avoidantly attached individuals as generally having a positive evaluation of self, but a negative evaluation of others. It is not so much that these individuals just have a positive disposition towards themselves, it is that they experience their ability to control their emotional responses to external stimuli as positive, and under normal circumstances they

may be correct to hold such a self-appraisal. Generally speaking, it is desirable to suppress affect and maintain control, allowing for the increased chance of dispassionate cognitive appraisal. However, while this strategy works for the evaluation of most short-term threats, their reliance on negative mechanisms to control their affect tends to be unsustainable when faced with chronic threats. The mentalisation system begins to fail, which requires reliance on the survival network. Because they don't tend to experience a dopamine reward from social engagements, which may be linked to oxytocin's interactions with dopamine (Vrticka, Andersson et al. 2008, Baskerville and Douglas 2010), they are not drawn towards using the social survival system, rather favouring the primal survival system. The primitive survival system then becomes the default system for dealing with threating information. Because of their desire to maintain control, this system is subordinately paired with their cognitive evaluation system to process threating information. What you are left with is someone that prefers to go it alone, who is primed to be fearful and sceptical of the motives of others, with a strong desire to maintain affective control using the cognitive mechanisms they have been conditioned to rely on: suppression, distraction, and avoidance. These in turn are all key ingredients for a propensity for distrust and motivated reasoning increasing the likelihood of denial.

5.11.2.2. *Neurobiology of Anxious Attachment*

Unlike their avoidantly configured counterparts, anxiously attached individuals generally lean towards the social survival system when confronted with a threat. However, unlike securely attached individuals, who favour this part of the survival network because of a feedback loop cause by a positive response in the dopamine network, anxiously attached individuals favour this system because they fear social rejection (DeWall et al., 2012). The resulting outcome on the survival network is a complex one. This is because anxiously attached individuals do not engage the social survival system for positive reasons, but rather to avoid the pain that comes with potential social rejection or exclusion. Anxiously attached individuals are therefore primed for fear and rejection but hope for closeness and acceptance.

As a consequence, when faced with socially threatening information they experience increased activation of the primitive survival systems including activation of the amygdala, the

anterior insula, and dorsal ACC (DeWall et al., 2012). In addition, there is evidence that anxiously attached individuals have impaired regulation of the HPA stress system, which produces abnormal cortisol responses when placed under stressful conditions where they are being observed (Quirin et al., 2008). Simply put, they fear the social rejection which a threat may give rise to, more than the threat itself. The activation of the amygdala then likely reflects the tendency of anxiously attached individuals to experience heightened distress in situations of personal failure or social disapproval when social support would be desired instead (Vrticka et al., 2008).

This leads to a hyperactive mind and controlled appraisals of mental states in others to do everything possible to avoid social rejection when faced with a threat. This in turn relies on emotional co-regulation which inhibits the proper processing of the threat, i.e. "*I need to match my feeling with others, to make sure I fit in. To do so I am willing to go along with what those I am attached to, say*". In short, they are more concerned about having a response to a threat that is socially acceptable than dealing with it through a process of internalisation and self-regulation like their more secure counterparts. This tendency has been supported by experiments that show that anxiously attached individuals are better able to regulate their affective response to a threat when explicitly instructed to do so (Vrtička et al., 2012). Under these experimental conditions which included a threat, and instruction on how to process it, researchers saw an almost immediate down activation of the orbital frontal cortex. However, in the absence of such instructions, anxiously attached individuals continue to upregulate their emotions through the hyperactivation of secondary attachment strategies, such as increased mentalisation, which puts them in a chronically higher arousal state requiring ever more emotional regulation. This is supported by the finding that attachment anxiety was correlated with higher amygdala activation to social negative scenes during spontaneous viewing, without specific regulation instructions confirming the previous proposal of heightened emotional mentalising (Vrtička et al., 2012). Anxious attachment also predicted greater activation in the parahippocampal cortex, suggesting that this might ease access to memories about previous attachment experiences, i.e. mental scripts to follow (Gillath et al., 2005; Vrtička et al., 2012).

The mentalisation network, with its emotional and cognitive systems is therefore left in a state where they become tools which serve the goal of deactivating the now over-aroused primitive survival system. However, because of their attachment configuration, in the mentalisation network, they generally perceive themselves in a negative light and others in a more positive light.

However, because of the chronic nature of the arousal experienced, the trigger point between the activation of the cognitive system and the emotional system is shifted in favour of the latter (Vrtička & Vuilleumier, 2012). Meaning, that when it comes to making evaluations of a threat, they are more likely to favour explanations that feel right, and the ones that feel right are going to be the ones that harmonise with whatever the in-group from that person's perspective, believes to be true. The cognitive network then just becomes a tool for the post-facto rationalisation of the individual social status quo.

5.11.3. The Neurobiological Overlap of the Attachment System, Trust & Motivated Reasoning

Based on the evidence presented above, there appears to be enough to conclude that there is indeed some neurobiological overlap between these three constructs. For one, they all have neurostructural commonalities which overlap in the brain regions responsible for the processing of affectively-laden information, including threating information. One such area appears to be the amygdala which is commonly known for its critical role in processing emotions and survival instincts (Adolphs, 2013; Cador et al., 1989). In terms of the endocrine system, lower levels of oxytocin and vasopressin are associated with less trust and is also correlated to avoidant attachment styles which has been theorised to be the least trusting attachment style (De Dreu, 2012; Kosfeld et al., 2005). Finally, as we saw, insecure attachment styles typically experience trouble in the mentalisation network, where the primitive survival system shifts the switch point in the network in favour of the emotional system, resulting in more affect driven processing, enabling motivated reasoning (Vrtička & Vuilleumier, 2012). This coincides with our understanding of motivated reasoning as the brain's effort to balance cognitive and emotional constraints. There are no doubt, additional overlaps among these concepts at a neurobiological level worth exploring. While we are unable to do justice to all the research out there, what has been presented so far at least

provides tantalising evidence of a significant interrelation between these constructs worthy of further exploration. But just how exactly are these constructs connected?

5.11.4. The Attachment System, Trust, and Motivated Reasoning

Based on what we have learned from these three constructs so far, it is likely that the following process flow is involved when we are confronted with complex and intractable existentially threating information.

1. In adulthood, existentially threating information leads to the activation of our attachment system.

2. This, in turn leads to an affective state which is experienced as undesirable resulting in a drive to reduce this experienced state.

3. Our default close interpersonal attachment networks (if present) are incapable of providing the necessary soothing when we are faced with existential threats arising from large complex issues, such as climate change, pandemics, vaccinations, etc.

4. As a result, we are left with little alternative than to turn to symbolic attachment figures, such as mainstream authoritative institutions, i.e. the government, international institutions, the media, and science for a sense of security, stability, and predictability.

5. Mainstream institutions then become the main source of soothing to help deactivate the attachment system.

6. However, the various attachment styles have different mental schemas in how they seek deactivation.

    a. **Secure attachment:**

        i. Tend to have positive evaluations of self and others (consistent with prior mental schema)

        ii. Tends to trust that mainstream institutions are acting in good faith.

        iii. Are willing to forgive them the odd mistake, and willing to remain open to revisions and changes in policy (even if contradictory).

        iv. They tend to trust the information and reassurances provided by these institutions.

v. They are secure enough to receive information critically, without being entirely dismissive.

vi. This positive relationship with these institutions leads to the deactivation of their attachment system.

vii. This then increases changes so that subsequent information is evaluated in a state of *cold* cognition.

b. **Avoidant Attachment**:

i. Tends to have a positive evaluation of self, but poor evaluation of others.

ii. Consistent with prior mental schemas, they tend to view people and mainstream institutions as generally untrustworthy.

iii. Even small mistakes are seen as confirmation of their view that these institutions are incompetent and cannot be trusted.

iv. Little to no trust placed in the information and reassurances provided by mainstream institutions.

v. Positive evaluation of self and a desire to maintain control results in attempts to self-deactivate the attachment system.

vi. As such, avoidant individuals then tend to want to "*do their own research*" to self-sooth.

vii. Because they are operating in a state of heightened affect due to attachment activation, affectively-driven motivated reasoning is also active.

viii. And because of the complex nature of these problems and the limited capacity for even intelligent individuals to deal with the volume and sophistication of the information on these subjects, a reductive explanation is constructed that is usually built on the assumption that the information provided by mainstream institutions cannot be trusted and that some other explanation must therefore be true.

ix. This alternative explanation is usually built around the idea that these abstract authority figures/mainstream institutions exist primarily to disempower people (loss of control) and, therefore, what they are

telling us is overexaggerated, i.e. "*the risks associated with climate change are overblown*", "*COVID isn't as lethal as they say*", "*vaccines aren't necessary if you have a healthy immune system*".

   x. Once an alternative explanation has been devised using motivated reasoning that allows for the de-activation of the attachment system, it is vigorously defended.

  xi. This defence necessitates that contrary information/evidence be vehemently rejected as individually constructed solutions are usually quite fragile.

c. **Anxious Attachment**:

    i. They tend to have a poor evaluation of self, but positive evaluation of others.

   ii. They tend to place a great deal of weight on avoiding social rejection and are therefore more likely to value conformity.

  iii. Consistent with prior mental schemas, they tend to initially view mainstream institutions as trustworthy authorities if their social networks view them as such.

  iv. Mistakes by these institutions are typically overlooked provided support for the mainstream institution creates a sense conformity within their social network.

   v. This can lead to credulous trust placed in the information and reassurances provided by mainstream institutions because the emphasis is on avoiding social exclusion at the expense of truth.

  vi. Poor evaluation of self, and desire for affirmation, may also result in compulsive reassurance seeking behaviour from mainstream institutions to deactivate the attachment system (compulsively following the news, etc.).

 vii. Anxious individuals then tend to want to be repeatedly reassured that things are going to be okay, and they are likely to use motivated reasoning to accept oversimplifications or even falsehoods from these institutions to lower the activation of their attachment systems.

viii. However, repeated failures by these institutions to provide the necessary reassurances and soothing can lead anxiously attached individuals to seek out alternative attachment figures that can provide a sense of belonging and reassurance provided their social network feels the same.

ix. Should an alternative attachment figure be found that provides these reassurances, affectively motivated reasoning is once more deployed to overlook any shortcomings and is used to defend these alternative attachment figures.

x. Because they now prioritise alternative attachment figures, should these alternative attachment figures take a hostile stance to the information shared by mainstream institutions, they will too.

xi. They will use motivated reasoning to defend these alternative attachment figures.

xii. And because of the complex nature of these problems, alternative attachment figures tend to provide inflated reassurances and simple explanations which attract those with a need for acceptance and soothing.

xiii. Commonly, the alternative explanation employed by these '*mainstream adjacent*' institutions is usually built around the idea that mainstream institutions are somehow unreliable and untrustworthy, feeding into the anxiously attached person's mental schema.

xiv. The information shared by these institutions is therefore seen as unreliable and untrustworthy because of desire to conform to the views of the new attachment figure.

xv. Once the views of an alternative attachment institution have been embraced, motivated reasoning allows for the vigorous defence of these views as holding them allows for the de-activation of the attachment system.

xvi. This defence necessitates that information/evidence contrary to the views of the preferred attachment figure be vehemently rejected, so as to conform with the view of the new attachment figure.

5.11.5. Attachment Style Hypothesis Related to Denial, Trust, and Motivated Reasoning

The content covered in this chapter primarily remains exploratory, suggesting that more empirical evidence is required to substantiate many of the claims. However, not all aspects of the proposed model are speculative. Indeed, a subset of the core elements outlined can be subjected to empirical scrutiny. Therefore, we can expect the outcomes based on assessments of the relevant constructs:

- Individuals with a secure attachment style are likely to demonstrate a higher degree of trust in mainstream institutions. This contrasts with those exhibiting an avoidant attachment style, who are anticipated to show diminished trust in these institutions. Individuals with anxious attachment styles present a more complex picture; their trust levels in mainstream institutions are predicted to be varied, neither consistently high nor low.

- Beyond trust in mainstream institutions, the relationship between attachment styles and epistemic trust may also be intriguing. Securely attached individuals are expected to associate with higher levels of epistemic trust. Conversely, those with an avoidant attachment pattern might display more mistrust. Individuals with an anxious attachment style may not necessarily reflect in their epistemic trust but might show increased levels of epistemic credulity.

- Finally, when considering the construct of reactance, or control, we anticipate that avoidantly attached individuals will exhibit heightened levels of reactance. This implies that such individuals might be more resistant to external influences or control, emphasising their inclination to act counter to external pressures.

5.12.   Attachment: What Can We Conclude?

The intricate interplay of the neurobiological constructs of attachment systems, trust, and motivated reasoning suggests a profound influence on how individuals perceive and interact with mainstream institutions when it comes to the acceptance of communicated knowledge, related to topics that are existentially threating. Crucially, the chapter illuminates the role of attachment orientations - secure, avoidant, and anxious - as key, yet complex, influences in shaping our trust towards these institutions. By understanding these attachment-based nuances, we gain a more profound insight into the underlying, dispositional differences impacting institutional trust. As we delve deeper into the cognitive architecture of denial, the subsequent chapter will explore the overarching influence of personal values and core beliefs.

Chapter 6 – Values & Beliefs

"A man trusts another man when he sees enough of himself in him."

~ Gregory David Roberts

In the previous chapter, we saw that there are strong theoretical reasons to suggest that our trust in mainstream institutions is coloured by our individual attachment orientations. Yet, an individual with a secure attachment style could still embrace denialist perspectives on issues of significant societal risk. For instance, someone securely attached might trust a religious institution more than a mainstream authority. If that religious body opposes vaccines, the individual might veer towards vaccine scepticism, despite their foundational trust orientation. Consequently, our opinions on issues like climate change, pandemics, and vaccinations extend beyond just our attachment styles. Our fundamental beliefs and values, mediated by the social groups they connect us to, significantly mould our standpoints. Assuming our original theoretical position holds true, we likely form our views on these issues prior to a thorough factual analysis. Hence, while many of us believe we're making 'rational evidence-based' decisions, we're largely mirroring the positions of our trusted social institutions or groups. And yet, we passionately champion these views as though they emerged from our independent deductions thanks to motivated reasoning.

This conclusion, while a hard pill to swallow, is firmly grounded in extensive sociological research spanning over a century (Aspernäs et al., 2023; Bolsen & Palm, 2019; Kunda, 1990). In essence, most of us adopt and defend the perspectives of our closely associated social institutions, as our unique, informed conclusions. American sociologist Herbert Blumer's work epitomised this notion (Blumer 1986). Firstly, he posited that humans react based on the 'meanings' they assign to things—seeing a political party not just as a mere institution, but as an embodiment of our values and beliefs. Secondly, these 'meanings' evolve from our societal interactions and contexts, influenced by continuous feedback loops. For instance, a conservative Christian might perceive abortion as immoral, linking its support to 'liberals' and by extension, viewing other issues championed by liberals, like vaccine mandates, with suspicion. Such inclinations might direct them towards specific news sources or online

communities that both validate these views and introduce them to other ideologies, like climate change scepticisms[89].

Thus, on top of influencing our social affiliations and how we subsequently create "*meaning*", our personal values and core beliefs are also at the heart of the second part of our theory, "*who do we trust?*". But what makes us trust one social institution over another and why do the facts and policy positions put forth by certain institutions hold more sway with us?

These questions are addressed by first developing our theory in relation to what we mean by '*personal values*' and '*core beliefs*'. Then we investigate why we differ in what we deem to be truly *important* and what we consider fundamentally *true*? We also delve deeper into the cognitive mechanics that help explain why we tend to gravitate towards institutions that reflect our values and beliefs. Finally, we consider why we are so reluctant to deviate from our views on issues of significant social risk, once established.

As we will discover, our combination of personal values and core beliefs are important puzzle pieces in helping us understand why we trust or distrust mainstream institutions on issues of significant societal risk. These concepts also shed light on why some of us are more inclined to place our trust in alternative institutions rather than mainstream ones. But what do we mean by personal values and beliefs in the context of this study?[90]

6.1. Personal Values & Core Beliefs Defined

My high school maths teacher, Ms. Nel, used to drill into us "*fools rush in where angels fear to tread*". She used it in the context of calculus, but there are few topics in my life that I have felt this adage applies more to, than when considering personal values and core beliefs. So many different fields have so much to say about each of these topics individually. Both are integral concepts in many fields including sociology, philosophy, economics, anthropology,

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[89] Blumer is of course not completely deterministic in his views here, we are not automatons fated to adopt and defend the views of our social institutions. For Blumer '*meanings*' can be altered through an individual's interpretive process when they are confronted by new experiences. For instance, a person such as a farmer losing successions of crops on an intergenerational farm that has never experienced such conditions, may modify their stance on climate change. This may in turn make them question other previously assumed *facts*.

[90] Readers familiar with the literature on personal values & core beliefs are welcome to skip to section 6.6.

religious studies, political science, geography, psychology, each with a rich set of definitions of what these terms mean. For our purposes, we define these two concepts as follows:

1. **Personal Values** are broad mental abstractions of that which <u>feels</u> good, right, and worthy to us. They are what we deem to be fundamentally *important* and say something about how we think the world *ought to be* as well as *how we could be get there*, whereas;

2. **Core Beliefs** are fundamental convictions that we hold about ourselves, others, the world, and the future. They are what we foundationally deem to be *true* and say something about how we think the world *actually is* and *constrains what we think is possible*.

With these definitions established for the purposes of our research, let us get more familiar with these two concepts and how they relate to each other.

6.2. Personal Values

Building on our definition of personal values, are several characteristics that combine to help us better understand this concept. Firstly, a personal value is something abstract, broad, and trans-situational, which remains applicable across a diverse range of contexts and environments, irrespective of their specifics (Sagiv et al., 2017). Moreover, our personal values serve as a type of goal - albeit an abstract one. However, not all personal goals are values[91], some goals are just goals (*e.g. post a sub 25 min time in a 5km race, etc.*). Furthermore, values, by their very nature, drive or motivate us. These are highly desirable ideals that we pursue and they mirror what we deem significant and worthy of our efforts. In addition, values, because of their abstract nature, are also quintessentially unobtainable. They perpetually exist just beyond our reach with their full realisation always yet to come[92]. Next, and perhaps more pertinent to this study, is that fact that our values are <u>affectively</u>-laden (Brosch et al., 2012). That is, we experience our values more in the realm of feeling, than in the domain of thought. They carry emotional weight and significantly influence our

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[91] If you value independence this constitutes a broad abstract goal that cuts across many domains of life. However, if you have listed eating a meal in your city's top five restaurants as a personal goal, it might speak to a personal value of openness to new experiences (hedonism/novelty) but this specific goal is not in-and-of-itself a value.

[92] They live at the end of the rainbow.

emotional responses. As such, we *feel* our values more than we *think* our values. And finally, our values say something about the way we feel that world *ought* to be (*i.e. just, benevolent, free*) and provide us with guidance for how to get there (*i.e. support just causes, act with kindness, support free speech*).

Let's look at a few examples of what we mean by personal values in the context of this definition. A prized personal value, particularly in the West, is autonomy, the desire to be self-reliant, independent, and enjoy agency over how we conduct our affairs (Helwig, 2006). Autonomy meets the definition set out above as it is a broad-trans-situational value that we try to actualise across multiple spheres of life. In Western cultures we generally strive to be economically self-reliant and don't want to feel dependent on others for our basic survival; we want agency over how we live our lives, and we want the freedom to choose our fields of study, occupation, who we marry, who we associate with, and where/how we live. This value then colours our interactions within our own families (*there is a desire to move out of the parental house*), with our friends (*I choose my own friends*), at school (*we want to choose what, where, and how we study*), at work (*we want to make choices about who we work for and how we do our work*), and in our personal life (*we want to decide who to date and who to marry*) (Markus & Kitayama, 1992). For us, autonomy is a desirable goal we continue to work towards[93]. However, even with all the money in the world, we can never be fully autonomous. We will always, with varying degrees, be dependent on someone for something. The closest one can get to actualising this goal is to live in a self-built cabin in the wilderness where one would be completely self-sufficient. However, even this lifestyle is still predicated on tools and goods that a single human would find difficult -if not impossible- to produce on their own[94]. Therefore, we can never truly be autonomous.

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[93] The concept of autonomy in Western cultures is not only a societal norm but also appears to influence individual developmental pathways. This suggests that the value placed on autonomy is deeply ingrained in society, to the extent that it shapes the development of individuals within that society. For more details, see.

[94] One need only look at one of the many reality TV survivalist shows to see this point in action. All survivalists come equipped, at minimum with clothing, tools like axes, knifes, flint, etc. without which their '*survival*' escapades would be impossible. Even my own personal favourite of these shows, called Naked and Afraid, which requires that contestants arrive with no clothing still gives each one a survivalist tool. As far as I can see, a purely autonomous long-term survival is impossible.

Autonomy also meets our affective criteria because, as we know, those who prize this value generally have strong emotive responses, should someone try to curb their autonomy (Landmann & Hess, 2017). Just try telling a highly autonomous person they no-longer have agency over who they can or cannot associate with, or where they can or cannot work. The response is unlikely to be one of simple acceptance, one is more likely to encounter significant emotional arousal, distress, resistance, or refusal. On the other hand, for those for whom this is a prized value, experiences of autonomy result in positive affect. Finally, this value speaks to how people who hold it think the world ought to be and how to get there. For those that prize this value, a world that is constantly striving to increase personal freedom should be the goal, and the support of causes that do this is one way to achieve it. Therefore, especially in the context of the West, these individuals are more likely to support libertarian causes and policies.

Another example of a personal value is benevolence, or the desire to help, support, and advance those close to one (Schwartz, 2012). Again, this is a value that is broad and trans-situational with benevolence being expressed in every aspect of life, by, for example, looking out for the welfare of our families and friends, through support for colleagues at work, or even just lending a hand to a stranger on the street. In addition, you will find it hard to identify a culture where benevolence is not a prized value (Schwartz, 2012). Even the most primitive of societies hold benevolence as a core value - often more so than modern societies. Not only is benevolence a ubiquitous value, but it is also a desired one. When asked what the most important value we expect others to demonstrate is, the answer, more often than not, is kindness[95]. However, like with any personal value, it is a value that can never be fully actualised. We could always be more generous, more kind, more understanding. Steven Spielberg's iconic film, Schindler's List pointedly demonstrates this, when Oscar Schindler, having saved 1,200 Jewish souls from the Nazi concentration camps, declared "*I could have got more. I could have got more, I don't know. If I just…I could have got more.*"[96]

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[95] "*Do unto others as you would have them do unto you.*" also known as the "Golden Rule" and forms the basis of most mainstream religions.

[96] There are of course some examples of what can be considered pure benevolence through acts of complete self-sacrifice. A solider throwing himself on a hand-grenade to save his comrades.

Similar to autonomy, benevolence has an affective component. Not only does the experience of helping others have a positive affective outcome, but witnessing the opposite of benevolence results in a strong negative affective response (Fredrickson, 2001; Gruenewald et al., 2007)[97]. For example, when we see harm come to others through acts of malice, spite, violence, or hostility, we tend to have strong feelings about it, like anger and disgust. Finally, benevolence also represents an ideal of how we would like the world to be (*e.g., kind, friendly, inclusive, etc.*), but it also says something about how we believe we can get there (*e.g. people should be more kind, friendly, welcoming, and inclusive*).

Because of their abstract nature, our personal values are difficult to pin down or define exactly but nonetheless play a crucial role in informing what we deem fundamentally important in life. They act as core affective catalysts which help shape our attitudes, emotions, thinking, and ultimately, behaviour towards the world.

6.3. Core Beliefs

A concept that is intertwined with, but somewhat distinct from personal values is core beliefs. Whereas personal values are what we deem fundamentally *important*, core beliefs are what we foundationally deem to be *true*. These beliefs are not to be confused with facts, like the existence of gravity, but are normative ontological *assumptions* that we make about ourselves, people (*essence of human nature*), the world (*e.g. just vs. unjust*), and the future (*e.g. determined vs. undetermined*). These core convictions are how we believe the world to be and filter how we perceive and interpret our experiences.

Put another way, our core beliefs are the mental schemas that we rely on to make sense of a fundamentally unknowable world (Riso et al., 2007). They form a vital part of the frameworks we use to construct the best available approximations of reality to us. But, and this is key, the primary function of our core beliefs is not to objectively mirror reality back to us, but rather to create constrained but practical representations of reality to maximise our chances of survival (McKay & Dennett, 2009). As such, our core beliefs mostly function as

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[97] See Sophie's Choice as an example of the opposite of benevolence being thrust upon someone. Interestingly, benevolence, or the act of giving support to others, has been associated with positive effects on an individual's physical health. Specifically, research has found a correlation between giving support and lower systolic and diastolic blood pressure. For further details, see.

predictive engines that allows us to make rapid unconscious causal judgments about objects and events. These predictive judgements then inform our attitudes and subsequent behaviour. For example, if you have "*the world is a fundamentally dangerous place and people, especially strangers, can't be trusted*" as core beliefs, you might also then conclude based on your contextual experience that "*there is high probability that immigrant men are dangerous and cannot be trusted*". As a result, should you encounter a strange man with a culturally alien appearance alone on a street at night, this core belief will start making predictions about how this man might behave. It may inform you that there is a risk of being harassed, attacked, or worse. You may then engage in risk mitigating behaviour, like crossing the street or getting ready to defend yourself by gripping your house keys in a defensive manner. Put another way, our core beliefs help us decide how to behave, given a specific stimulus, to maximise our chances of survival.

While this paints a rather bleak picture of how our beliefs operate, especially in terms of how they influence our prejudices and stereotypes, our beliefs extend beyond this and also inform which social groups and institutional affiliations are most likely to maximise our chances of survival long-term (Feldman, 1988). Fortunately, our core beliefs are not entirely agnostic of reality (Liu & Xu, 2023). New evidence can update these beliefs through learning. However, the bar for evidence to update a core belief is set quite high because doing so makes us vulnerable (Kube & Rozenkrantz, 2021). This is because we have to reconstruct a core part of our sense-making mechanisms which makes us anxious because we are forced to engage with the world in an unfamiliar manner. Updates to our core beliefs are therefore affectively challenging and cognitively '*expensive*'[98] (Kaplan et al., 2016).

But not all beliefs are core beliefs. So what makes a belief a core belief? Firstly, a core belief is something that speaks to a basic and fundamental truth that we hold dear and seldom question (Beck, 1997). They often relate to fundamental aspects of life, like the '*true*' nature of humanity, morality, or the nature of the world (Rokeach, 1973). Secondly, our core beliefs are formed early in life because of significant experiences or interactions with parents, caregivers, peers, society, the media, and others (Ainsworth et al., 1978; Bowlby, 1988). Thirdly, once established, core beliefs are enduring and usually persistent and can be

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[98] For the tech geeks out there, it would be the equivalent of a firmware update on a PC.

resistant to change, even in the face of contradictory evidence (Kaplan et al., 2016; White et al., 2020). Fourthly, like our personal values, our core beliefs are generalisable and apply trans-situationally (Klein & Kunda, 1992). As such they tend to apply broadly, extending beyond specific contexts. Fifthly, our core beliefs mostly operate below our conscious awareness (Turner, 2016). Most of us may not even realise we hold a particular core belief, but they can nonetheless still significantly impact our affect, and consequently, how we think and behave. Sixth, our core beliefs can be self-reinforcing, leading us to seek out experiences that confirm our beliefs, thus causing a circular feedback loop (Beck, 1997). This self-perpetuating cycle of belief validation further filters our perceptions and narrows our capacity for alternative interpretations[99]. Seventh, our core values are also affectively charged and often carry a significant emotional weight (Conte et al., 2023). Therefore, they can provoke strong emotional reactions, especially when challenged. As a result our core beliefs exert a significant influence on our thoughts, feelings, and behaviour. They fundamentally shape how we interpret events, how we feel about ourselves, how we interact with others and how we exist in the world more generally. Finally, because of all this, our core beliefs place constraints on what we think is possible in this world. They influence how weighting is assigned to evidence and how probabilities are calculated when evaluating potential courses of action (Brosch et al., 2018). Therefore, different beliefs will have assigned different chances of success to a course of action.

Let's look at a few examples to understand this concept in action. A pervasive and not uncommon core belief shared by many is that: '*human beings, at their core, are inherently selfish and motivated primarily by self-interest*'. As per our characteristics of a core belief, this is an axiom that some of us hold as a fundamental truism, with many an economic and political philosophy built upon it. Those who hold such a view probably settled on it early on in life, having observed the behaviour of their parents, their peers, and the world around them more generally. Such a view is more probable to emerge out of an environment characterised by resource scarcity and/or a culture of competition – *survival of the fittest*. Once one adopts such a belief, it tends to remain ingrained throughout life. Even when those

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[99] In neurobiological terms this would be the equivalent of Long-Term Potentiation or cognitive psychologists would refer to "automaticity" where through repetition, processes tend to become automatic and thus processing occurs more quickly and efficiently (often at the cost of accuracy when dealing with novelty).

that hold this belief encounter counter examples like acts of kindness, self-sacrifice, or altruism, these are generally dismissed as exceptions that prove the rule[100]. Alternatively, arguments are made that even acts that appear inherently altruistic are in fact self-serving because they result in personal satisfaction, reputational enhancement, or at the very least a sense that their efforts will result in some form of future, if not guaranteed, reciprocity[101].

This core belief also applies across different domains of life. Those who hold this belief do so in their personal lives (*romantic relationships and friendships only work if there is mutual reciprocal benefit*), at work (*no one will ever help you out of kindness at work, there is always a cost*), and towards society (*I am voting for a political party that values self-reliance and minimises social welfare. Social welfare only creates an environment where people leech off the system and ultimately strips them of their agency*).

Most of those who hold such a core belief are not conscious of the fact that it is influencing how they evaluate the world and make decisions about it. Afterall, who sits and ruminates on their personal ontological views on human nature, other than perhaps a small band of philosophers. Furthermore, such a core belief isn't difficult to self-reinforce. Because we tend to skew towards a negativity bias, one simply has to open a newspaper or watch the news to find examples to affirm one's core beliefs. Or when managing people at work, it is easy to conclude that employees are just fundamentally lazy and selfish, should things not be going your way. Our confirmation biases are always hard at work making sure our core beliefs remain just that.

Also, should this core belief be challenged, it is likely to evoke a strong affective response[102]. One just has to think of a family dinner where the stereotypical cantankerous uncle is challenged on a view that embodies such an ontological presupposition. Tempers are unlikely to remain sheathed. As anyone with close family ties knows, people generally

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[100] See Any Rand's body of work as a prime example.
[101] I do this because I hope that someone will do the same for me one day.
[102] The affect inherent to the challenging of core beliefs is perfectly encapsulated by the televised debates between US public intellectuals Gore Vidal and William F. Buckley Jr. during the 1968 United States presidential election. Buckley, an ardent supporter of conversative political views which embodied this largely pessimistic view of humanity, got quite worked up when Vidal challenged him. Watching these two intellectual giants of their time become agitated, and at times angry with each other ("*Have you no decency, sir?*"), at least to me, made it clear that there is little hope of escaping our emotions when our core beliefs are being challenged. For if they can't, what hope have we?

prioritise their core beliefs at the expense of their harmonious relationships, even if this proves to be a cause of friction. Finally, this core belief places constraints on what we think is possible. If we believe that people are by their very nature selfish and greedy, policies like social welfare will not be evaluated as a viable option because such systems, according to this view, incentivise abuse and exploitation.

Another example of a core belief is holding a firm deterministic view of the future. Those that hold such views believe that all events are predetermined and that individuals have little to no control over what happens. Again, this speaks to a basic and fundamental truth that some of us adhere to, but rarely seriously interrogate. How many times have we heard people say, "*que sera, sera*" ("*what will be, will be.*"), "*it's written in the stars*", "*every cause has an effect*", "*fate has already been decided*", "*it's in the cards*", "*there's no changing destiny*", etc. Such a view may take hold for a variety of reasons, from living in an incredibly stable world where very little changes, to living in a very capricious one where there is no apparent connection between your own will and future outcomes. Or even being brought up in a strict religious ideology where one is repeatedly told that an omnipotent deity has already decided the future.

Much like any other core belief, once such a conviction sets in, confirmation bias will ensure that it persists. Instead then of recognising individual achievement as a function of hard work, it may be is seen as luck or advantage. Such a view is also one that generalises across different life domains. Those that hold such view may believe that their own future, the futures of others, and/or the world have already been determined. Again, few of those that hold this view are fully aware of it, it is more of an unconscious feeling about the future than a fully articulated philosophy. This deterministic view of the future is also a self-reinforcing one, events that are difficult to explain are framed as the will of some extrinsic force like fate (*i.e. an external locus of control*). Such a core belief limits our ability to see the outcomes that occur in the world as anything but predetermined. Everything we subsequently encounter is post-hoc interpreted as result of '*hidden*' albeit linear cause and effect (*i.e. I can explain why that happened thanks to 20/20 hindsight*). Also, should one challenge such a core belief, one is likely to be dismissed as naïve for believing that your own will can have any bearing on the outcome of the future. This core belief, like all other core beliefs, fundamentally shapes how

we interpret events, how we see our roles in society, and how we interact with others. As a result, such a core belief also constrains what we think is possible as a strict adherence to it results in a generally fatalistic attitude that sees most proactive behaviour as largely pointless. Proactive actions to drive change in the world such as protesting, voting, etc. are likely to be viewed as largely futile and will have a negative affective association.

In conclusion then, our core beliefs play a critical role in influencing our actions and behaviour throughout life in discernible, and often, predictable ways. These deeply ingrained beliefs function as a cognitive framework or lens through which we interpret our experiences and help us make predictions about the world, which in turn assist us in surviving its complexity. As a result, our core beliefs shape our expectations, decisions, and responses across situations.

6.4. What is the Relationship between Personal Values and Core Beliefs?

Values and beliefs are interrelated in interesting ways, combining to influence our attitudes and behaviours when we are faced with complex risks. At the most basic level, our personal values represent *what we want the world to be and how we get there*, while or core beliefs represent *the world as we have deemed it to be and what is therefore possible* (Beck, 2011; Sagiv et al., 2017). The former represents the ideal end state, while the latter represents the current state. For example, you can believe that you live in a world largely devoid of benevolence but can still hold kindness as a personal value.[103] Let's look at a few examples, of how our personal values and core beliefs can interact to influence our attitudes and ultimate behaviour.

In most societies there are groups of people that place a great deal of value on tradition, conformity, and security. These same individuals may hold a core belief that society in its current form is corrupt, sinful, and wayward. The intersection of these values and beliefs will likely result in a view that, for the future to improve, we must go back to the way things were in the past (*Make *place name* great again!*). Consequently, you are more likely to endorse policies that push back against heterogeneity (*No to immigration!*), prioritise law and

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[103] Or you can hold justice as a personal value but believe that the world as it is largely devoid of justice, perhaps why so many people identify with vigilante heroes like the Batman, the Green Arrow, the Punisher, the Daredevil, etc.

order, as well as celebrate and valorise tradition. However, should you prioritise a different set of values, say universalism and benevolence, while still believing the state of world is dire and the future looks grim, you may likely endorse a very different set of policy approaches. For example, you might think the solution lies in more progressive approaches like radical diversity (*pro-cross-cultural immigration*), greater social support, more compassion, and a rejection of tradition in favour of inclusive cultural practices more representative of the times (*Happy Holidays, not Merry Christmas!*).

In conclusion, our personal values and core beliefs are distinct yet deeply intertwined constructs that significantly shape how we deal with complex, risk-laden problems. They place constraints on what we think are viable solutions to problems, and as a result, when faced with complex problems, tend to unconsciously steer our decision-making processes (Steenhaut & van Kenhove, 2006). They dictate how we assess risks, evaluate potential solutions, and choose actions, ultimately helping to illuminate the way in which we respond to challenges and uncertainties. While our reason still has a role to play, one can think of our values and beliefs as at the basis of our gut feelings about whether a course of action is a viable one.

6.5. Neurobiology, Personal Values, Core Beliefs, and Affect

A while ago I was walking the streets of Dublin in Ireland, when I came across a sign outside a bar that read as follows: "*No religion, no politics, no Covid conversations allowed in the pub! We want you to enjoy your pints without falling out. Talk about Love Island or the amazing traffic lights in town.*" At first reading I was bemused, but then I began to wonder, why we couldn't have conversations about these topics without stirring our emotions to a point where people literally come to blows. Surely, as rational adults we can listen to reason and hear what others have to say, without taking it personally or getting worked up about it.

As many a proprietor of drinking establishments the world over knows, it is unfortunately not that simple. This is because our personal values and core beliefs are fundamental to the way we engage with the world. These are the mental frameworks that allow us to make sense of reality and are an integral part of our identities. Our personal values and core beliefs are the figurative building blocks of the mental schemas we require to navigate through, and survive in, this world. They allow us to maintain a relatively stable response

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pattern when life throws unknowns our way (Schwartz 2012). Consequently, these cognitive frameworks constructed out of our personal values and core beliefs become extremely precious to us. Without them, our ability to make sense of reality would quite literally crumble. We would be left to think through, from first principles, every response to the myriad novel/random experiences we encounter on a near daily basis. This represents an impossible task. Consequently, our personal values and core belief frameworks are, unfortunately, relatively fragile. This is because our personal values and core beliefs cannot form a definitive basis on which to establish *the truth* of the world, largely because, if philosophers like Kant, Hume, Nietzsche, Foucault, Kuhn, Lyotard, Derrida, Lacan, and Rorty are to be believed, such a truth is fundamentally not accessible to us. So, while some frameworks can be set up to be a bit more flexible, by for example, adopting a somewhat paradoxical view of the world as simultaneously good and bad (cognitive flexibility), those that choose the extreme ends of these perspectives typically end up with very fragile mental schemas that are easily rattled, resulting in strong defensive affect.

As a consequence, when some of us are confronted with evidence or views that counter or undermine our core, but somewhat brittle, sense-making frameworks, we are then left with only two options: (1) realign the situation with our personal values and core beliefs or (2) realign our personal values and core beliefs to the situation. It should not be hard to see why the latter is much harder than the former. We are far more likely to first try and defend our framework by dismissing or explaining away counter points and evidence (Caddick & Feist, 2022). This is much easier than accepting that the ontological foundation upon which our world is built may be flawed and needs to be painfully rebuilt. There are of course rare instances where this does happen. People are capable of evolving their mental schemas when confronted with new evidence that can't be explained away, but this is typically a last resort. We are far more likely to only want to slightly modify our frameworks than we are to abandon them completely[104]. As a result, we tend to want to ignore evidence that contradicts our view, and if that fails, we will deny the evidence, and if that fails, we will do our best to refute it, and if that fails, we do our best to contort it to fit into our mental frameworks.

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[104] This often requires mental gymnastics which requires that the person contort evidence to fit their world view. Just watch a flat-earther provide 'evidence' for their view and this form of reasoning is on full display.

However, the same rules do not apply when we are evaluating evidence that affirms, supports, or extends our values and belief frameworks. As we saw in the chapter on motivated reasoning, for evidence that serves that purpose, we tend to set the bar quite low in terms of rigor.

We now know that we have fragile mental frameworks that help us navigate this world and if they are challenged, we typically get angry, sad, disgusted, or annoyed. To reduce this negative emotive response, we are motivated to take steps to defend our frameworks. Let's look at an example to further illustrate the mental mechanics involved here.

If achievement and power are core values that you subscribe to, and you believe that the current state of the world is sufficiently just, you are more likely to embrace evidence that denies or downplays the potential impact of climate change. This is because this evidence is least threatening to your mental framework and will result in you being supportive of maintaining the status quo. If you are no longer able to sufficiently explain away the evidence of climate change, and you may accept it as a reality, but would be more likely to support policies solutions that cohere with a liberal free-market economic view. This is because Neoliberalism resonates with the values of achievement and power as it represents an ideology where individual competence, competition, and dominance are valorised. Consequently, for those that adhere to these values and beliefs, solutions to issues of significant societal risk, like climate change, are more likely to be found in market forces guided by the invisible hand. This is not necessarily because these are the best available solutions, but because these solutions most cohere with their personal values and beliefs.

The same is true for people who have built their personal values and beliefs frameworks around equality and a view that the world has been fundamentally corrupted by neoliberal market forces. Because of these cognitive frameworks and their associated assumptions, they may be more inclined to endorse policy solutions centred around punitive measure on those disproportionally benefiting from the causes of climate change, like fossil fuel companies, and support market and environmental regulation.

So, if evidence, facts, and opinions cohere with our values and belief frameworks we experience positive affect. We generally <u>feel</u> that all makes sense in the world, and we know what is going on. This sense is further reinforced when we find communities of people that

resonate with our views. However, when we encounter the opposite, a sense that our world view is being undermined and the ontological foundations we spent years building are being eroded, the affective response is typically powerful. We respond with disbelief, confusion, anger, and even, in extreme cases, disgust and violence[105] (Tao et al., 2022).

Drawing from neurobiological research, the affective response to the confrontation of one's core values and beliefs can be understood through patterns of brain activation. Core values and beliefs, as suggested by Brosch et al. (2012), are processed in distinct neural circuits, activating areas such as the medial prefrontal cortex (mPFC) and dorsal striatum, which are associated with self-referential thinking and reward processing, respectively. This highlights the deeply ingrained nature of these values within our neural architecture. When these core beliefs are challenged, as per Kaplan et al. (2016), the insula, a region associated with negative emotional processing and risk, displays heightened activity. This heightened activity in the insula may correlate with stronger affective responses when core beliefs are challenged, possibly making it harder for the individual to adapt or change their perspective. This aligns with the observation that when our foundational beliefs are questioned, we tend to experience powerful negative emotions, including disbelief and anger.

Additionally, the alignment or misalignment between presented evidence and an individual's core values and beliefs might shape the brain's computation of value during decision-making. For example, when an individual's core values are aligned with self-enhancement and power, evidence that aligns with these values (e.g., denying the impact of climate change) may be processed as having higher '*neuroeconomic weight*', thereby reinforcing the individual's pre-existing belief system. In contrast, evidence that threatens this value system might elicit a robust neural response in areas associated with emotion and conflict, such as the insula and anterior cingulate cortex (Brosch et al., 2012; Kaplan et al., 2016). This differential neurobiological processing underscores why contradictory evidence might evoke strong affective responses, including discomfort or moral outrage.

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[105] No wonder bars have these disclaimers. Fighting that which we find disgusting or morally reprehensible somehow always feels justified to us. However, this affective feature may become a useful way to assess our individual values and belief frameworks. For example, if you believe that the status quo is just, you will likely disagree with, or even feel contempt for people who agitate for change; or if you loath tardiness, you likely value punctuality, etc.

In summary, the neurobiology of values and beliefs and the resulting affect suggests these concepts are strongly integrated into our cognitive and emotional processing. This integration, while fundamental for coherent navigation through life, can also set the stage for intense emotional conflict when those values are challenged, reflecting the broader fragility and precarious nature of these cognitive frameworks. This is not just an abstract philosophical notion; it has tangible, observable correlations in the brain's activity and organisation (Brosch et al., 2012; Kaplan et al., 2016).

Thinking about our values and beliefs in these dialectic terms helps us understand the role that affect plays in these cognitive schemas. They aren't just a collection of *goals* and *truths* that make us feel *good*, they are also about actively creating a world where the things that oppose our values and beliefs -or the things that make us feel *bad*- are removed, kept at a distance, or generally minimized.

6.6. Personal Values & Core Beliefs - Hierarchies of Dynamic Psychic-Tension

One of my favourite moments in the House of Cards novels penned by Michael Dobbs, involves the protagonist, Francis Urquhart, reprimanding a minor politician caught in a scandalous affair. He dismisses the wrongdoer as merely "*a plump little bag of squirming appetites*". I find this amusing description not only apt for the disgraced MP, but also a reflection of Urquhart himself, seemingly unaware of his own insatiable desires. In essence, we are all a tumultuous mix of conflicting desires. We yearn for power, yet long for affection; we strive for independence but seek companionship; we celebrate hard work yet cherish leisurely pursuits.

Our personal values and core beliefs function in a similar manner, often supplementing or clashing with each other. For instance, if we champion novelty and creativity, appreciate the exploration of new ideas, the formation of original theories, or endeavour to try new things, the associated activities may stand in stark contrast to the values of tradition, conformity, and security. To illustrate, many deeply conservative religious institutions discourage innovative thinking and novelty to prevent these ideas from undermining their established order (*i.e. a fragile values and beliefs framework*). An extreme example is Boko Haram, the Nigerian radical Islamist group whose name literally means "*Western Education is Forbidden*".

They actively oppose the education of girls and women and insist on the absolute primacy of their religious traditions and education.

Or if we hold a belief that the world fundamentally operates according to the law of indeterminism (*i.e. the future is what you make of it*), we can't simultaneously hold the belief that the world works according to determinism (*i.e. the future is set*). These examples help illustrate some of the tension that exists between values and beliefs. However, there are many more such instances: personal achievement vs. benevolence, security vs. freedom, collective outcomes vs. individual rights, etc.

Because of this tension, while conflicting personal values and beliefs are to some degree part of all of us, in the absence of compelling external reasons to prioritise one over another, we tend to default to one side. As a result, we are inclined to arrange our values and beliefs in a sort of hierarchy, thereby building our cognitive frameworks through the prioritization of certain personal values and beliefs as core principles, at the expense of others (Iijima et al., 2020). We then relegate the latter to lower tiers of importance. The intriguing question is - why do we do this?

6.7. The Genesis of our Personal Values and Core Beliefs Orientations

The development of personal values and core beliefs is a multifaceted process influenced by various internal and external factors. According to Ceiciuch and Schwartz (2017) and Dovidio, Zomeren et al. (2018) there are two primary lenses through which this development is traditionally viewed: the phylogenetic perspective and the ontogenetic perspective. The phylogenetic perspective emphasises the evolutionary role of group membership in shaping our values and beliefs, suggesting that our need for group survival has conditioned us to adopt shared values. These shared values, established through a process of dialogue and common understanding, form the essence of different cultures (Hofstede 2001).

Conversely, the ontogenetic perspective delves into individual variations within these shared values and beliefs, attributing them to a mix of biologically based individual differences and socio-cultural influences. Within this perspective, families are seen as vital channels for transmitting values, but the process isn't linear (Schönpflug, 2001). Individuals,

especially during adolescence, undergo a phase of 'individuation' where they develop personal values, sometimes rebelling against or aligning with those of their parents (McPherson, Smith-Lovin et al. 2001). This alignment or rebellion can be influenced by biological differences, alternative social groups, or a combination of both.

Yet, these two perspectives may not capture the entire spectrum of influence on our values and beliefs in today's complex society. A more encompassing view, which embraces a complex perspective, integrates factors ranging from early childhood interactions (Döring, Schwartz et al. 2015), cultural norms (Chai and Kim 2009), institutional socialization (Schwartz 2014), genetics, neurobiology (Brosch and Sander 2013, Jost, Sapolsky et al. 2018), personal experiences (Sagiv & Schwartz, 2022), and education (Gamage, Dehideniya et al. 2021). For instance, our early life environment shapes our worldview, while our socio-cultural background sets the foundation for our value system (Chai and Kim 2009). As we grow, various institutions play a role in our socialization, impacting our understanding of the world (Schwartz 2014). Additionally, genetic, and neurobiological differences, as well as our unique life experiences, mould our values and core beliefs in diverse ways (Tyng, Amin et al. 2017, Sagiv and Schwartz 2022). Education serves as a dynamic force, capable of both reinforcing and challenging our existing values.

In summary, the evolution of our values and beliefs is a lifelong journey influenced by an intricate interplay of factors, both innate and external. While they may be resistant to change, they are neither static nor singularly derived. Understanding these origins and influences provides a foundational step before delving into the intricacies of individual differences and the overarching influence of culture and norms. Consequently, the values that we ultimately prioritise and that become core to our identities are likely the product of the interaction between our biology and environment, or as Marcus (2004) eloquently phrased it, "*nature provides the first draft, which experience then revises*". This revision can be modest or a complete overhaul.

6.8. Personal Values and Core Beliefs vis-à-vis Cultural Norms

As we have seen, our cultural norms, or the shared expectations and rules that guide our behaviour within a particular society can, but do not always, operate as a driving force in the development of our personal values and core beliefs. In some instances, we grow into

the values and beliefs of the societies we find ourselves in. For example, we more often than not adopt the religion of our immediate communities, etc. However, in some cases other forces like our biology and personal experience conspire to produce a set of personal values and core beliefs that does not cohere with the dominate culture. Here I can provide myself as an example, I rejected my community's religion despite my mother's best efforts - ten years of Sunday School - to keep me on the straight and narrow.

However, there is more to this dynamic interplay. In cultures with few, of what Sumner[106] termed '*mores*', or significant norms whose violation is considered serious and often subject to strict societal sanction, individuals with values and beliefs that run contrary to those dominant in that society, may feel freer to express them. However, there are cultures where a wide array of strictly enforced mores do apply. Here individuals are required to suppress their alternative personal values and core beliefs in order to evade sanction and/or penalties (Hofstede, 2001). This latter group aren't therefore willing to go against what feels right to them according to their personal values and beliefs, but the penalties for not following the norms of that society outweigh the affective benefit of following your personal convictions.

As such, individual variation in personal values and core beliefs exists across most cultures. However, the ability to freely live those personal values and core beliefs is not as universal (Sagiv & Schwartz, 2022). One only has to think of countries like Iran, and the recent revolt against the wearing of headscarves by women as an example. A brief uprising was held by women across the country in protest against the mandated wearing of the hijab in public. Many women who do not share the conservative religious values of the dominant culture rebelled and publicly started burning these garments. However, the authorities cracked down on these protests through arrests and physical violence. While the protests resulted in modest reforms, in Iran the dominate religious culture and its mores still prevails (Akbar Mahdi, 2004). However, if anything, these protests proved that there is a significant proportion of their population that do not share the deeply held traditional values and beliefs of the ruling class of that country.

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[106] Folkways: A Study of the Sociological Importance of Usages, Manners, Customs, Mores, and Morals" (1906)

It's important to note that individuals often find themselves either resonating with or in discord with the prevailing cultural norms that apply to them, resulting in a strong emotional reaction (Berns & Atran, 2012). These emotions are often interpreted as feelings of belonging or the lack thereof. For some, the feeling of not belonging can persist without any resultant actions, but for others, it prompts a response. When individuals find themselves in discord with these dominant cultural norms, viewing them as limiting, wrong, or even abusive, they face a triad of options: (1) they can acquiesce, conforming despite their reservations, (2) they can rebel, actively resisting the status quo, or (3) they can leave, detaching from the environment entirely. On the other hand, individuals who resonate with the dominant cultural norms tend to wholeheartedly embrace, support, and defend them. This is vividly illustrated by Jost's System Justification Theory, which demonstrates how individuals, even those oppressed by these norms, will continue to support them if they align strongly with their personal beliefs and values (Jost, 2020).

In sum, while there is significant variation in personal values and core beliefs among most populations, not all societies permit the expression of a wide variety of values and beliefs, especially not if they run contrary to those of the dominate cultural normative framework.

Now that we have a better understanding of how cultural norms help create, filter, and sanction our personal values and core beliefs, let's look at a few conceptual frameworks that help us understand how we can vary according to these dimensions. These frameworks will in turn enable us to operationalise these constructs in the empirical part of our study.

6.9. A Personal Values Framework – Schwartz's Circumplex

Several frameworks exist to differentiate personal values. A few, such as Hofstede's Cultural Dimensions and Kluckhohn and Strodtbeck's Value Orientations, were designed to identify variations in value orientations across cultures (Hills, 2002; Hofstede, 2011; Kluckhohn & Strodtbeck, 1961). Others, like Inglehart's Materialist-Postmaterialist Values Theory, were crafted to trace differences in values through different stages of societal evolution (Inglehart & Abramson, 1999). Additionally, there are other quasi-values frameworks like Maslow's Hierarchy of Needs and McClelland's Theory of Needs which were constructed to decipher what motivates us, but as we saw in our earlier definition, can also be read as values frameworks (Maslow, 1943; McClelland et al., 1976).

Of significant interest to us is Schwartz's Value Inventory, developed by social psychologist Shalom H. Schwartz, who conducted substantial research on personal and cultural values[107] (Schwartz, 1992). Schwartz proposed that there are ten broad values that are universal and rooted in one or more of three fundamental needs of human existence: biological requirements, social interaction coordination, and the survival and welfare of groups. These are (1) self-direction, (2) stimulation, (3) hedonism, (4) achievement, (5) power, (6) security, (7), conformity, (8) tradition, (9) benevolence, and (10) universalism.

These ten comprehensive values can further be divided into four intermediary order value orientations: openness to change, conservation, self-enhancement, and self-transcendence as well as two sets of higher order values orientations: social focus vs. personal focus and growth-anxiety-free vs. self-protection – anxiety-avoidance orientation. Schwartz suggests these orientations are universal, capturing the range of motivations recognised across all cultures. He organised these values into a circular structure, known as "*Schwartz's Circumplex*," based on their conflict or compatibility levels. Values adjacent on the circle

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[107] The other values framework that came to the fore was the Rokeach Value Survey. Rokeach's framework introduces 18 instrumental values, representative of behaviour modes like honesty, responsibility, and ambition, as well as 18 terminal values, denoting end-states of existence such as a comfortable life, world peace, and family security. It underscores the concept of value prioritisation. However, the bifurcation of values into terminal and instrumental classes, coupled with the extensive value lists of this model, make it difficult to operationalise, thus making it a less ideal candidate for inclusion in our study.

share similarities, while those further apart are progressively dissimilar. Directly opposing values on the circle are in conflict, as illustrated in Figure 6.1.
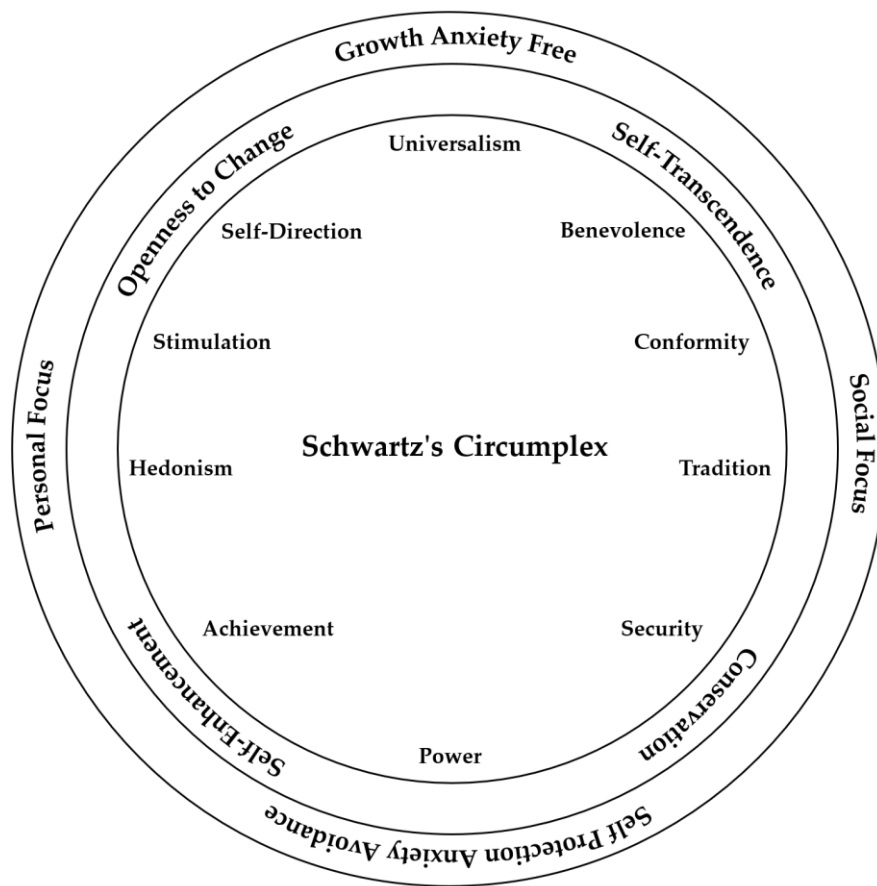
Figure 6.1: Visual Illustration of Schwartz's Circumplex of Personal Values

In Table 6.1 all ten of Schwartz's personal values along with a description of their associated affective triggers are listed. The first column references positive affective triggers, while the second references negative affective triggers.

Table 6.1: Schwartz's Ten Personal Values and their Affective Triggers

#	Value	Positive Affective Triggers	Negative Affective Triggers
1	Self-direction	Independent thought and action-choosing, creating, exploring	Dependence, submissiveness, indecisiveness, passiveness, conformity, etc.
2	Stimulation	Excitement, novelty, and overcoming challenges in life.	Monotony, conformity, stability, Unwillingness to take risks, over-regulation, etc.
3	Hedonism	Pleasure and sensual gratification for oneself.	Asceticism, stoicism, judgment of pleasure seeking, rules that constrain access to pleasure, etc.
4	Achievement	Personal success through demonstrating competence according to social standards.	Failure, lack of recognition, underperformance, unfair competition, stagnation, etc.
5	Power	Social status and prestige, control or dominance over people and resources.	Lack of control, disrespect, noncompliance, failure, challenges to authority, etc.
6	Security	Safety, harmony, stability of society, of relationships, and of self.	Risk, uncertainty, instability, conflict, change, etc.
7	Conformity	Restraint of actions, inclinations and impulses likely to upset or harm others and violate social norms.	Nonconformity, dissent, breaking from convention, individualism, sticking out, etc.
8	Tradition	Respect, commitment, and acceptance of the customs and ideas that traditional culture or religion provide the self.	Change, disrespect, non-traditional approaches, secularism, loss of heritage, etc.
9	Benevolence	Preserving and enhancing the welfare of those with whom one is in frequent personal contact (the 'in-group').	Selfishness, injustice, cruelty, indifference, exploitation, etc.
10	Universalism	Understanding, appreciation, tolerance, and protection for the welfare of all people and for nature.	Intolerance, inequality, harm, self-centeredness, conflict, violence, etc.

This model provides useful insight in what people deem to be fundamentally important and provides a structured way to understand and compare individuals' and groups' values, beliefs, and their subsequent related behaviours.

But what of that which we deem to be foundationally true. What frameworks are available to us to make sense of core beliefs?

6.10.   A Core Beliefs Framework – Douglas' Cultural Theory of Risk

And Juliet declared: "*What's in a name? That which we call a rose, by any other word would smell as sweet.*" Anyone with even a passing familiarity with Mary Douglas and Aaron Wildavsky's Cultural Theory of Risk should relate to our Shakespearian epithet. Rarely does one come across a theory so useful, yet so nebulous in title. Besides going by the Cultural Theory of Risk, it also goes by Grid-Group Cultural Theory, Grid-Group Analysis, Cultural Bias Theory, Social Cultural Theory, or simply Culture Theory. However, this at first annoying feature exists precisely because of an iterative developmental process that took place over decades with it being applied to varied contexts, each time taking on new labels to accommodate new applications. If anything, its many names are a credit to its robustness. Originally, Douglas developed Culture Theory to describe differences more systematically across the remote cultures she encountered in her study as an anthropologist (Douglas & Wildavsky, 1983). Douglas was interested in rituals, symbols, witchcraft, food and drinking habits. Seemly frustrated with the fact that everyone in her anthropological circles was using their own terms to talk about these observed differences[108], she set out to create a framework to systematise these types of observations. Little did she know that her theory would find fertile ground across a multitude of disciplines in the social sciences. It turned out to be quite good at making predictions about how people respond to collective risk. As such, this makes it a near perfect model, not only to further our understanding of core beliefs, but also to understand why people lean towards different policy solutions when it comes to issues of significant societal risk. But what exactly is the Cultural Theory of Risk aka Grid/Group Theory aka the Theory of Sociocultural Variability?

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[108] No doubt out of sheer frustration ☺

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As we saw earlier, while we can hold a variety of core beliefs about ourselves, others, the world, and the future, the Cultural Theory of Risk focuses in on our beliefs about how much say social mores and systems have in how we live our lives.

The grid-group cultural theory, or as we will reference to it going forward, the Cultural Theory of Risk, developed by Mary Douglas and Aaron Wildavsky, broadly categorised people into four groups – the hierarchists, the individualists, the egalitarians, and the fatalists – based on extreme ends of two sets of core beliefs (Douglas & Wildavsky, 1983; Mamadouh, 1999). Those that fall somewhere in the middle of these two beliefs are considered by Douglas as "autonomous" in that these profiles were able to exercise some degree of flexibility in their beliefs on these two continuums. The first belief is called the '*grid*' and refers to the degree to which one believes that an individual's life is circumscribed by externally imposed prescriptions. That is the degree to which we believe external forces play a role in the positions we can assume in the world. The second belief axis is called '*group*' and speaks to how much one's beliefs are bound by collective ties and obligation. It speaks to the degree to which we believe that collective efforts, even if at the cost of individual liberties, are the optimal way to address collective risk.
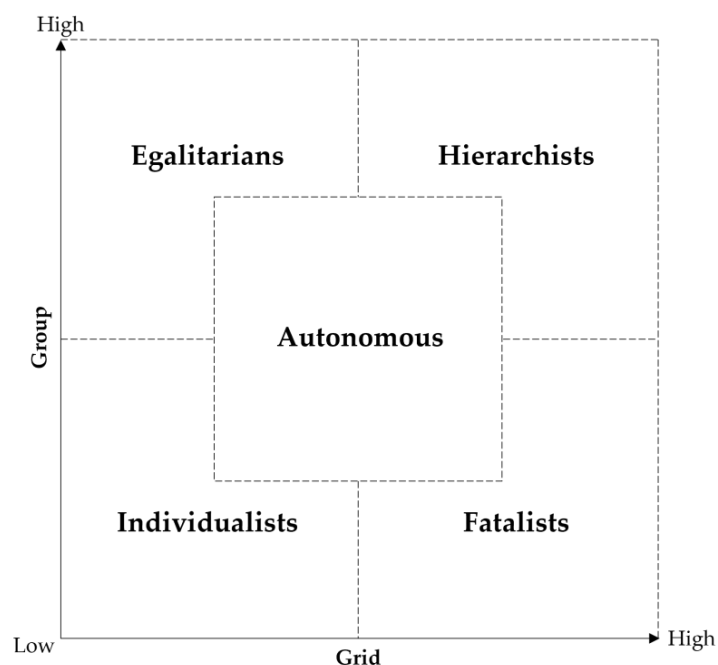
Figure 6.2: Douglas & Wildavsky's Cultural Theory of Risk

While there are other more nuanced ways to represent this beliefs framework and its implications, I have opted for simplicity over complexity. Going forward, I am going to focus on Douglas' four main categories or in sociological terms '*ideal types*' ala Max Weber, to illustrate this theory. In the real-world, our beliefs frameworks can get very complicated with individuals shifting position on this framework depending on, for example, the level of risk (e.g., national vs. global) being considered. However, our desire for simplicity necessitates a reductionistic approach in favour of practicality. As Box & Draper (1987) argued, all models, no matter how sophisticated, are by definition wrong, the practical question is how wrong it has to be not to be useful. So, while I firmly acknowledge the shortcomings of the model as presented, for our purposes of illustrating how people can vary in belief orientations, it is good enough. With that caveat out the way, let's further elucidate our four groups by discussing the grid and group orientations as well as analysing their associated levels of trust in self and others:

6.10.1. The Hierarchist

Hierarchists occupy the top right of our model as they tend to be high on both the grid and group beliefs, characterised by a distinct blend of strong group boundaries and binding social prescriptions. They reside within clearly defined roles – be they gender-based, caste-oriented, class-specific, religion-based, feudal-based, pseudo-scientific-based[109], etc. This structure is championed for its beliefs which emphasise the collective, placing the whole above the individual.

Consequently, the hierarchist typically embraces the idea of divisions of labour, specialisation, and a strong sense of hierarchical relationships within their nested groups. The concept of fairness is viewed through the lens of equality before the law. When things go wrong, they believe that blame should be placed on the deviants who disrupt the social order or fail to adhere to established norms.

However, those who adhere to this belief as the best way to deal with collective risk are prone to misplaced trust in authority and expertise (Hood, 1998). This is because at their core, hierarchists hold a firm belief in the significance of social order and the institutions that

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[109] Race-based 'scientific' theories, phrenology, Social Darwinism, etc.

uphold it. Trust is placed in expertise, formal roles, and authoritative structures as pillars of stability and predictability amidst the chaos of the world. As a result, when it comes to risk management, hierarchists generally perceive complex risks as manageable under the effective control and regulation of trusted institutions. This trust is deeply rooted in their conviction in the efficacy of these established systems and structures. Consequently, hierarchists highly regard expert knowledge, usually favouring scientific and technical risk assessments over lay opinions or perspectives of non-experts (*not all opinions are equal*). They generally believe that collective risks are best addressed through structured, top-down approaches (public policy).

Despite this trust in established order, hierarchists are not necessarily blindly trusting. They have the capacity and willingness to question institutions, especially when they appear to be failing in their roles. However, their typical response is to seek solutions within the system – such as enhancing regulations or replacing ineffective leaders – rather than resorting to radical changes or challenging the system as a whole (Grint, 2008).

6.10.2. The Individualist

Positioned in the lower left quadrant of the model, individualists believe in minimal regulation and weak group bonds. Unlike their hierarchist counterparts, they are unconstrained by rigid social prescriptions and as a result believe that they should be left to freely engage in transactions with others as they would in a marketplace. They believe that social boundaries are flexible and open to negotiation, with each individual largely unhindered by others[110]. However, falling under the control of someone, or controlling over others is acceptable, provided that control was acquired through competitive means (*i.e. meritocracy*). As such, individualists fundamentally believe in the primacy of personal autonomy, opposing rigid roles or established social hierarchies. They believe that an individual's talents and competencies should solely dictate one's standing. Therefore, they prize societies characterised by dynamic labour roles, varying social statuses informed by personal achievements, and a palpable sense of independence.

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[110] These individuals would typically not look favorably on institutions such as a monarchy where positions are ordained.

Individualists also believe that fairness occurs only through the prism of personal freedom and equal opportunities. Equality based on anything else would be considered discriminatory. In the event something goes wrong, they typically believe that the reason would be because there was an infringement of individual liberties and/or lack of competition.

Systems of social organisation driven by the core of beliefs of the individualist do have vulnerabilities created through the pitfalls of excessive individualism, such as social isolation, a lack of cooperation, and a lack of collective responsibility (Hood, 1998).

Furthermore, individualists are not necessarily anti-authoritative institutions, they just believe that these institutions should exist primarily to safeguard personal freedoms. As a result, they support institutions that foster independence, a person's right to choose, and trust people to assume agency in their own lives (*i.e. do your own research and making up your own mind*). Institutions that fulfil this function are viewed as tools for stability and adaptability amidst an uncertain world.

In the realm of risk management, individualists perceive risks as personal challenges to be overcome with resilience and creativity. They place their trust in individual capability and the power of personal choice to navigate our complex risk landscape. While valuing personal experiences and insights, individualists usually favour their own risk assessments and intuitive judgments over collective opinions or authoritative perspectives. They maintain that risks are best managed through personal strategies and bottom-up approaches.

While individualists staunchly defend personal freedom, they aren't devoid of social sensibilities. They acknowledge the role of societal norms and rules, especially when these safeguard individual rights and freedoms. Their typical approach to problems prioritizes personal choice and freedom and advocates for minimum constraints and regulations, rather than subscribing to top-down, collective solutions.

6.10.3. The Egalitarian

Located in the top left quadrant of the model, egalitarians, embody the belief that the world should be marked by low external prescriptions but strong group affiliations. Rather than

engaging in free transactions with others as individualists do, egalitarians believe in collective decisions and consensus. Boundaries within these groups are well-defined and generally accepted by all members. In an egalitarian setup, influence is shared equally among the group members, underlining their shared identity and commitment. They believe that for us to survive in this complex world, we need to pursue our collective welfare through a level playing field.

Fundamentally, egalitarians advocate for equality and shared responsibility, firmly opposing rigid roles or hierarchies that favour one individual over another. They believe that everyone's voice should have equal weight in decision-making processes. Consequently, these groups are marked by shared responsibilities, equal social statuses grounded in group membership, and a strong sense of communal solidarity.

Their concept of fairness is rooted in collective equity and shared opportunities. In the event things go wrong, they believe blame should be placed on those who seek to elevate themselves above the group or disrupt its harmony. However, such societies may be vulnerable to the pitfalls of excessive collectivism resulting in deadlock through lack of consensus, as well as stifling of individual initiative and discouraging diversity of thought (Hood, 1998).

Egalitarians possess a deep belief in the importance of group solidarity and the institutions that facilitate it. They champion collective wisdom and structures that foster shared decision-making, viewing them as tools for stability and resilience amidst an uncertain world.

When it comes to risk management, egalitarians see risks as shared challenges that need to be addressed collectively after extensive consultation, with careful consideration, and cooperation. Their trust lies in the collective capability of their group to navigate a complex risk landscape.

Egalitarians highly value and believe in the collective experiences and insights of their group, usually favouring communal risk assessments and collective wisdom over individualistic opinions or authoritative perspectives. They believe that risks are best managed through collective strategies and consensus-based approaches.

While egalitarians champion group solidarity, they do acknowledge the need for individual freedoms, especially when these contribute to the overall wellbeing of the group. However, their typical approach to problems is rooted in the belief that collective decision-making, advocating for shared responsibilities and cooperation, rather than promoting individualistic, self-serving solutions, is the way to go.

6.10.4. The Fatalist

Located at the bottom right of the model, fatalists present a unique orientation characterised by a high belief in external prescriptions but weak group bonds. Unlike the interaction prevalent in other orientations, fatalists believe that they find themselves at the mercy of circumstances and forces beyond their control. In a word, they experience the world as 'disempowering'. They perceive social prescriptions and boundaries as constraints that restrict their agency. In a fatalist setup, influence over others or control within their network is often minimal, if not non-existent. This pattern is driven by a sense of powerlessness and acceptance of whatever comes their way.

Fundamentally, fatalists often feel marginalized or overlooked within their social structures, seeing little room for personal initiative or influence. They believe that their standing is largely determined by external factors. Consequently, these groups are often characterised by rigid roles, predetermined statuses, and a pervasive sense of resignation and detachment.

Their concept of fairness is often viewed cynically, with a belief that the '*game*' is rigged in favour of the powerful. Blame, in their view, is often misplaced or targeted at those who are powerless to defend themselves. These groups may be vulnerable to apathy, lack of initiative, and low social cohesion (Hood, 1998).

Fatalists typically harbour a deep scepticism towards the promises of institutions that claim to offer protection or improvement. They question the effectiveness of expertise and structures that are supposed to provide stability or prosperity, viewing them as tools for the powerful to maintain control.

In terms of risk management, fatalists often see risks as inevitable challenges that are beyond their control. Their trust in others and institutions is generally low, assuming that others are

equally fatalistic about the world and if they claim otherwise, they are lying for cynical reasons like maintaining power (Hood, 2000).

Fatalists may not value either personal experiences or collective insights as highly as others do, often seeing risk assessments and judgments as exercises in futility. They typically believe that risks are simply part of life and beyond their ability to control. One must just accept what comes one's way.

While fatalists may appear resigned to their fate, they can recognize when their circumstances change for the better, even if they don't actively seek such changes. However, their typical response to problems is acceptance and adaptation, rather than active engagement or advocacy for change.

These four categories represent social scripts underpinned by a core set of beliefs about how we should collectively deal with complex issues of significant societal risk.

6.10.5. The Cultural Theory of Risk as a Framework of Core Beliefs

The Cultural Theory of Risk provides a framework for understanding how different belief orientations towards societal norms and collective responsibility influence our emotional responses when confronted with potential strategies for addressing significant societal risks. More importantly, this framework suggests that it is not necessarily the issue itself that triggers our emotional response, but our reaction to the proposed policy solutions to these issues.

To illustrate this point, consider that most people generally had a neutral stance towards issues like climate change, pandemics, and vaccines until these issues became the basis for proposing and enacting global public policy. It is at this juncture that these issues began to evoke strong emotional responses. Specifically, the emotional reactions are triggered not by the issue itself, but by whether the resulting policy solutions align with or contradict individuals' core belief orientations when it comes to managing collective risk.

This point becomes clearer when one considers that vaccines were not widely contested until mandates were introduced; few attempted to challenge the existence of the COVID pandemic until lockdown measures were enacted; and questioning the science of climate change wasn't prevalent until policy solutions emerged that demanded significant lifestyle

changes from individuals. Thus, the cultural theory of risk highlights the interplay between our belief systems and our emotional responses to policy decisions, rather than the underlying issues those policies are aiming to address.

When it comes to the issue of climate change, for example, each of Douglas's profiles would likely be drawn to different solutions while finding others objectionable. To illustrate let's investigate the types of policy positions these four groups may be drawn to and how they might, in turn, respond to policy solutions that contravene their belief frameworks.

To solve climate change, the hierarchists would be attracted to structured, systematic solutions that involve the expertise of established institutions. They would likely support international treaties, robust regulatory policies, and technological advancements directed towards mitigating its effects (Silverman, 2013). Their faith in scientific knowledge and existing power structures would drive their support for top-down strategies, such as global initiatives to improve green technology, strict emissions standards enforced by global governing bodies, or efforts to present further deforestation by placing limits on what countries can do with their natural resources for the greater climate good.

On the other hand, individualists, would be drawn towards market-based solutions that give room for innovation, competition, and individual freedom. They might favour policies that incentivise businesses to reduce their carbon footprint or that stimulate the development of green technologies (Silverman, 2013). Solutions such as carbon trading or tax breaks for energy-efficient practices might appeal to them. This is because they believe that if given the freedom and right incentives, individuals and businesses can and will come up with creative, profitable solutions to the climate crisis.

The egalitarians would likely advocate for collective, cooperative efforts that emphasise equal responsibility and shared sacrifice. They may be drawn to solutions that require systemic changes in societal consumption and production patterns, such as transitioning to renewable energy sources, reducing meat consumption, or implementing mandatory recycling programs. They may also advocate for the redistribution of resources and wealth to account for the fact that climate change often disproportionately impacts disadvantaged communities (Silverman, 2013).

Fatalists, with their sense of resignation, might be less willing to support active solutions to climate change, viewing them as largely futile efforts against the inevitable (Silverman, 2013). However, if they were to support any policies, they might lean towards those that focus on adaptation rather than prevention. This could include measures such as investing in infrastructure to cope with rising sea levels or developing drought-resistant crops.

However, the belief orientations that guide us toward solutions resonating with our core values—eliciting a positive emotional response—may simultaneously lead us to react negatively to solutions that contradict these values. In these instances, we are likely to have a visceral sense that these opposing solutions won't work, leading us to perceive them as unworkable, illogical, or doomed to fail.

For example, hierarchists may find the individualist's laissez-faire approach to climate change policy solutions irresponsible and too uncertain, given their belief in structured systems and top-down management. Egalitarian solutions may seem overly idealistic and unworkable due to the perceived lack of control and enforceability. Fatalists' passive stance and focus on adaptation could be frustrating as it undermines the hierarchists' faith in system regulations and proactive risk management.

Equally, individualists may perceive the hierarchist's reliance on regulations and bureaucracy as stifling innovation and hindering autonomy and growth. The egalitarian emphasis on collective responsibility could be seen as an affront to individual freedom and the belief in the power of market dynamics. Fatalists' resignation to fate might appear defeatist and overly passive, ignoring the potential for individual ingenuity to address the climate crisis.

A similar line of logic could be applied to the egalitarians and the fatalist with each of these belief orientations responding to the policy solutions favoured by the other orientations negatively.

In conclusion then, the Cultural Theory of Risk offers a model that allows us to conceptually systematise individual differences in core beliefs orientations according to one's grid and group orientation. It is important, at this point to re-emphasise, that, individuals and groups do not always fit neatly into a single category (Douglas & Wildavsky, 1983). They may shift

between these perspectives over time or depending on the specific context. The Cultural Theory of Risk nonetheless provides a practical and useful framework for understanding differences in core beliefs.

6.11.   Personal Values, Core Beliefs, and the Denial of the Mainstream Consensus

Now we have a better understanding of how we vary according to personal values and core beliefs as well as how these abstract-psychic-artifacts combine to create cognitive, sense-making frameworks which inform how we want to respond to complex collective risk. We also now know that when we come up against values and beliefs that run contrary to our own, we experience an <u>affective</u> response which motivates us to shore up and reinforce our sense-making frameworks.

To explain then why some of us find it difficult to accept the mainstream consensus on issues of significant societal risk, we only have to look at the values and beliefs embodied by the constellation of mainstream institutions responsible for this consensus. As we know, when it comes to issues like climate change, pandemics, and vaccines, there is a global eco-system of institutions involved in, and responsible for, informing us about these complex risks as well as for generating and advocating for potential interventions to mitigate these risks (i.e. technical solutions and public policy).

While this eco-system exists as a constellation of real work organisations, there is an important distinction that needs to be introduced here. Going forward, when I refer to these institutions, I am referring more to the phenological manifestations of these institutions which are more focused on peoples' subjective experiences, perceptions, and understandings of them. This means that while I acknowledge there is a body of literature that does a great job of deconstructing this eco-system, what I am more interested in is what is conjured up in someone's mind when they think of the institutions that make up this eco-system. As such, I am not suggesting that these institutions can be formally and carefully defined, but rather that they also exist as subjective representations of where we believe power to be concentrated. One way to think of this idea is when we say, "*they say we have a decade to mitigate the worst effectives of climate change*", who are they '*they'* in this context? *They* are the mainstream institutions I am referring to.

6.11.1. Global Eco-System of Institutions Responsible for the Mainstream Consensus

But who makes up this phenological global constellation of institutions and which values and beliefs do they embody?

6.11.1.1. *Mainstream Science*

Let's start with **mainstream science** because this is where the alarm bells on issues of significant societal risk typically first start ringing. As an institution '*mainstream science*' commonly refers to the collective body of scientists, researchers, and scholars that tend to follow a standard, widely accepted approach to scientific inquiry known as the scientific method. This method involves systematic observation, measurement, and experiment, as well as the formulation, testing, and modification of hypotheses. Mainstream science is also associated with an established community of universities, research institutions, and government bodies that carry out scientific research. These institutions operate off a set of theories, concepts, facts, and approaches in relation to understanding the world. They are policed and supported by identified journals and other publication outlets, citation impact ratings, prestige of universities and research institutions, and grant funding. When it comes to climate change, pandemics, and vaccines, this is where knowledge about these complex risks is generated and where solutions are formulated.

6.11.1.2. *Mainstream Media*

The next set of institutions making up this eco-system is the global **mainstream media**. As an institution, this refers to traditional forms of mass communication that have widespread reach and significant influence on public perception[111]. This includes newspapers, television, radio, and more recently, certain digital outlets. The term "*mainstream*" here is used to distinguish these outlets from smaller, independent, or alternative media sources. Reuters, the BBC, Yomiuri Shimbun, Le Monde, Der Spiegel, the Guardian, The New York Times,

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[111] It is important to note here that in this context, when I refer to the mainstream media, I am not referring to state media (even though I included the BBC). By some definitions the Russian and Chinese state media could also be considered "mainstream" but because these refer to institutions that do not adhere to the same institutional principles, and exist to serve a national ideological master, they are explicitly excluded. This is also not to say that the mainstream media I am referring is incorruptible and superior. These institutions, especially as the funding models have changed, have shifted their priorities, and are influenced by a complex set of forces that don't always align with the values they are supposed to live up to.

CNN, PBS, DW, Al Jazeera etc. are examples of some of the institutions that make up this global mainstream media network. The outlets frequently cross-reference each other and generally adhere to a similar code of ethics. These institutions look at what mainstream science and governments are saying about issues of significant societal risk and are then responsible for informing and promoting public awareness around these issues.

6.11.1.3. Global Public Sector

Core to our eco-system of mainstream institutions is a collection of **global public sector organisations**. These are entities established by formal political agreements between different nations. They manage a wide array of issues that transcend national borders and require international cooperation, such as economic stability, health crises, climate change, peace and security, human rights, and sustainable development. These organisations play a pivotal role in managing global risks and addressing challenges that no single country can tackle alone. These institutions include the UN, WHO, UNFCCC, WB, EU, AU, ASEAN, etc. These organisations attempt to manage and mitigate the risks associated with issues of significant societal risk by promoting cooperation among nations, through advocacy and advancing policies to collectively manage these complex global risks.

6.11.1.4. Mainstream Public Health

In addition, when it comes to global public health issues, there is another layer of mainstream institutions involved. The term **mainstream public health** institutions refers to the conventional systems, structures, and institutions involved in the protection and improvement of the health of people and communities. The mainstream public health ecosystem includes a wide range of actors and entities, including doctors, hospitals, pharmaceutical companies, insurance providers (public & private), and public health agencies. When it comes to pandemics and vaccines, these institutions are entrusted with the management of the risks associated with dangerous highly commutable deceases.

This global eco-system of mainstream institutions exists as a decentralised network that generates data and conclusions on issues of significant societal risk, communicates these risks to the public, and proposes policy interventions to reduce the risk associated with these issues. But what values and beliefs are embodied by these institutions?

6.11.2. Values and Beliefs of Global Mainstream Institutions

Now that we have a better picture of this eco-system of mainstream institutions and their role in managing the risk associated with issues of significant global societal risk, let's try to understand which values and beliefs are embodied by these institutions according to Schwartz's Circumplex and Douglas' Grid/Group profiles (Douglas & Wildavsky, 1983; S. Schwartz, 2012). It is important to note here that what I mean by "*embodied*" by these institutions goes beyond the values and beliefs they have articulated from themselves. Again, here I am referring more to the phenological manifestation of these institutions focused on the values and beliefs attributed to them phenologically in our collective consciences. This is because, while these global mainstream institutions have a role to play in how they are perceived, there are other forces at play when people implicitly assume/assign the values and beliefs that they associate with these institutions. However, by looking at how they function and the values that they espouse, we can get an idea of how these institutions are perceived more generally.

6.11.2.1. *Phenological Values and Beliefs of Mainstream Science*

As we know, the mainstream science community is, for the most part, driven by the pursuit of knowledge for the betterment of humanity. This resonates with Schwartz's values of universalism and benevolence (*self-transcendence*). While some of the individuals making up the institutions that form part of the mainstream science community may be engaged in their toils for the purpose of self-enhancement, this does not appear to be aligned with the collective values associated with this mainstream institution. For example, climate science aims to understand and address climate change risks, which affects all of humanity. Because mainstream science relies on institutions as well as a structured and regulated system of inquiry and validation, including peer-review, it seems to cohere most with Douglas's hierarchist orientation, or the belief that complex risk is best managed through the divisions of labour, specialisation, and a strong sense of hierarchical relationships within nested communities of researchers. Mainstream science is also committed to giving voice to experts in a particular field assigning these individual's views more weight when it comes to making policy recommendations. This speaks to a high grid orientation on Douglas's framework. Similarly, this mainstream institution typically supports solutions that speak to

utilitarianism, or policy solutions that rely on a certain amount of collective responsibility and some degree of self-sacrifice (as is the case with climate change where solutions have included reduced consumption, as well as lifestyle changes, etc).

6.11.2.2. *Phenological Values and Beliefs of the Mainstream Media*

Similarly, the institutions that make up the **mainstream media** operate within defined organisational structures (hierarchical) and -for the most part- are guided by journalistic ethics that emphasise fairness, accuracy, and serving the public interest[112] (universalism). They also embrace specialisation and adhere to hierarchical relationships. Certain outlets and journalists are respected more than others in this network. There are also clear hierarchies within these organisations with editorial boards, editors, and journalists all playing their respective roles. Because of their significant influence in shaping public discourse and perception about various issues, they are meant to assume a benevolent role in educating and informing the public. The mainstream media also tends to echo the solutions proposed by mainstream science and the global public sector (which as we have, and will see, are inherently hierarchist in their orientations). The mainstream media are therefore seen as largely in service of the other mainstream institutions.

6.11.2.3. *Phenological Values and Beliefs of the Global Public Sector*

By definition global public sector organisations such as the UN, WHO, and EU embody a benevolent, universalist, and hierarchist orientation. One only has to look at the charter of the UN and its Sustainable Development Goals, to see these values at work through programmes to eliminate poverty, ensure health and education for all, and protect the planet (UNDP, 2015). Their aim of fostering cooperation and mutual assistance among nations is also an example of the values of transcendence in action. These bodies operate based on a hierarchical structure, with each member nation having a defined role and responsibility. They also tend to promote risk mitigation policies that draw on a hierarchist orientation, top-down solutions with collective responsibilities and a degree of mutual scarify.

6.11.2.4. *Phenological Values and Beliefs of the Global Public Sector*

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[112] Although, it could be argued that the profit motive has corrupted this value in some of these institutions.

Mainstream public health, aka the medical establishment, also fits this pattern. Benevolence is inherent in their role of providing care and maintaining health. Meanwhile, universalism is often reflected in the principles of medical ethics, such as benevolence and justice, which require doctors to act in the best interest of the patient and to treat all patients fairly. However, it's worth noting that '*Big Pharma*' has been criticised for not always prioritising universalism, with accusations that their profit-driven, rather than health-driven, motivations have corrupted these organisations (Deangelis, 2016). Still, the ideals that drive pharmaceutical development are rooted in the creation of drugs and treatments that improve quality of life and thus align with universalism[113]. In addition, this set of mainstream institutions also embody the beliefs of the hierarchist in that they generally accept that solutions (or risk management) are based on structured professional hierarchies, specialization, and established procedures to ensure patient safety and find solutions for health risks.

In sum, while there is definitely some divergence in the values and beliefs espoused by this eco-system of mainstream institutions. Most of us implicitly associates these institutions with the values of benevolence, transcendence, and conformity embodied in the general belief that the hierarchist approach is the best way to manage collective global risk.

6.11.3. Risk Mitigation Policy of Global Mainstream Institutions

Now let's look at some of the public policy positions, generated, advocated, and pursued to help manage the risk associated with issues of significant societal risk like climate change, pandemics, and vaccines.

As we now know, the principles of universalism, self-transcendence, and a hierarchist approach are not only reflected in these mainstream institutions, but also the solutions and policies put forth by them (Grint, 2008). These institutions, when dealing with these issues, tend to adopt strategies that favour collective benefit over individual interest, and follow structured, top-down methodologies which resonates with the hierarchist view of how to best manage risk. Let's look at a view of the policies pursued by these institutions to

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[113] There are just real differences through which means this betterment is motivated. For certain ideological positions profit and universal betterment are not mutually exclusive.

understand how the values and beliefs according to which these institutions operate are echoed in their policy solutions.

6.11.3.1.   Climate Change Risk Mitigation Approaches

Institutions like the United Nations Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC) take a hierarchist approach to managing climate risk. They gather global scientific consensus and use it to inform international negotiations and agreements, such as the Paris Agreement, which seeks to limit global warming to well below 2 degrees Celsius. This approach embodies the values of universalism and self-transcendence, as it requires countries to look beyond their national interest and cooperate for the collective benefit of the planet. Carbon emission regulations are a key part of this strategy. These are meant to be implemented and enforced by national governments (hierarchist) and aim to reduce the collective environmental impact (universalism). Furthermore, many countries have adopted policies to transition to renewable energy and promote energy efficiency, which involve significant societal and economic changes but are seen as necessary for the broader goal of preventing catastrophic climate change.

6.11.3.2.   Pandemics Risk Mitigation Approaches

The response to pandemics like COVID-19 also reflects these principles. The World Health Organisation (WHO) plays a central role in coordinating the global response (hierarchist), and its guidance is based on the collective scientific understanding of the virus and its spread. Lockdowns and social distancing measures were implemented by governments worldwide to mitigate the spread of the virus based on the advice of these global public health institutions. These measures, although they limit individual freedoms, were deemed necessary for the greater good of public health (e.g. universalism and self-transcendence).

6.11.3.3.   Vaccines Risk Mitigation Approaches

The development, distribution, and administration of vaccines also embody these principles. The fast-paced research and development of COVID-19 vaccines were the result of global scientific collaboration and public funding. Regulatory bodies like the FDA and EMA played a critical role in assessing the safety and efficacy of these vaccines (hierarchist). Vaccine

distribution has raised complex issues of equity and fairness, with global institutions, governments, and advocacy groups stressing the need for fair distribution between countries to end the pandemic (universalism). Vaccine mandates by governments and employers, while controversial, were seen by many as a necessary measure to protect public health and achieve herd immunity (self-transcendence).

In summary, mainstream institutions tend to favour risk mitigation strategies that involve structured, top-down regulation (hierarchist approach) and prioritize the collective good over individual interests (universalism, self-transcendence) when it comes to global challenges like climate change and pandemics just like one would expect.

6.11.4. Backlash Against Risk Mitigation Policy of Global Mainstream Institutions (Kahan's Cultural Cognition)

As we saw earlier in this chapter, not everyone shares the values of transcendent and benevolence nor does everyone believe that the hierarchist approach to confronting global risk is the best way to go. As a consequence, the public policy approaches put forth by these global mainstream institutions are not without controversy as they raise complex questions about the balance between individual rights and collective responsibilities, the role of government in regulating behaviour, and the distribution of burdens and benefits in society.

When we then bring these mainstream solutions face-to-face to people with opposing values and beliefs, in particular those that value self-enhancement, aka autonomy, and the belief that the individualist approach is the way to manage complex risk, it becomes easier to see why some of us have trouble accepting the mainstream consensus of issues of significant societal risk. Not all of us share the values enshrined in these global mainstream institutions nor do we share the belief that the hierarchist approach is the best one to use to manage the complex risk associated with these problems.

As a result, those that hold values and beliefs that do not resonate with those embodied by this eco-system of global mainstream institutions are left with few choices. Either they radically change their personal values and core beliefs, aka their cherished sense-making frameworks, or they challenge the legitimacy of these organisations, their conclusions of these issues, or they rebel against the proposed policy (Kahan, 2008). Give that the former is

extremely difficult, the latter becomes the default strategy. But, and this is a critical feature of our model, this all tends to happen below our conscious awareness. This is something that is affectively experienced, it is a feeling that unconsciously motivates us to take action to defend our sense-making frameworks from what is emotionally experienced, as a *threat*.

As we saw in our chapter on denial, when it came to climate change, people tend to then undermine either the mainstream institutions themselves, the legitimacy of conclusions, or the effectiveness of the proposed policies. For example, the UNFCCC has been corrupted by the socialist green energy lobby, or climate change is a natural phenomenon that isn't as dangerous as these institutions claim, or switching to electric cars will never have any kind of climate impact because the environmental effect of producing their batteries is greater than the resulting carbon savings (no net carbon offset), etc. The same types of arguments are made when it comes to pandemics and vaccines. The elite of WHO has been corrupted by '*Big Pharma*', "*the pandemic is not as lethal as these mainstream institutions claimed*", "*the vaccines weren't properly tested*", etc.

While some of these conclusions are self-generated by piecing together bits of information, others come ready packaged courtesy of a constellation of alternative institutions that have position themselves in opposition to mainstream institutions. These institutions typically operate according to a different set of values and beliefs (or at the very least do not valorise the values and beliefs of the mainstream) and as a result, have '*alternative facts*', different conclusions, and different proposed policies to deal with issues of significant societal risk. For example, Fox News in the US has a reputation for leaning towards a conservative political stance. As a result, it has historically tended to reflect values and beliefs more commonly found in the US's Republican party (strong economic individualist beliefs in dealing with collective risk), which has traditionally been more sceptical of or opposed to aggressive action on climate change, compared to the Democratic party.

It is important to note that Fox News is a large network with many individual hosts and contributors, so their viewpoints are not uniform. However, there are a few general trends[114] that can be identified:

- **Scepticism about the severity of the problem:** In line with a conservative viewpoint, some hosts and contributors on Fox News have expressed scepticism about the science behind climate change, suggesting that the threat is exaggerated or that there is significant disagreement among scientists. These claims have been challenged by most climate scientists, who agree that climate change is real, largely caused by human activities, and poses serious risks.

- **Emphasis on economic costs**: Fox News coverage often focuses on the economic costs of actions aimed at reducing carbon emissions, such as regulations or taxes on fossil fuels. They argue that these policies could harm the economy, lead to job losses, or disproportionately affect certain industries or regions.

- **Critique of international agreements**: Fox News has also been critical of international efforts to combat climate change, such as the Paris Agreement. They often argue that these agreements unfairly burden the United States while allowing other countries, especially major polluters like China and India, to continue emitting greenhouse gases.

- **Discussion of alternative solutions:** While generally sceptical of the mainstream consensus on climate change and opposed to aggressive regulatory action, some on Fox News have discussed alternative solutions. These could include market-based approaches, like carbon trading, or investment in new technologies, like nuclear power or carbon capture.

These critiques and proposed solutions adhere with an individualist (in opposition to the hierarchist) and embody the values of self-actualization (not self-transcendence).

People, in turn, gravitate towards institutions that most resonate with their sense-making frameworks made up of their personal values and core beliefs (Briñol & Petty, 2009; Ecker et

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[114] It's also worth noting that some of Fox News's climate coverage has evolved over time, in step with shifting public opinion. As more Americans have come to view climate change as a serious problem, there have been instances of Fox News providing more balanced coverage or acknowledging the need for some form of action.

al., 2022). If the orientation of the mainstream is experienced, or *felt,* as threatening to their sense-making framework, they will turn to alternative institutions that supports this world view for validation.

There is then a feedback loop at play where we are drawn to institutions that embody a set of values and beliefs that resonates with us. These institutions then put out their views and solutions on issues of complex societal risk. Those of us that have strongly identified with mainstream institutions because of this experience sense-making resonance, then trust what these institutions are telling us, and we then internalized these views as they re-enforce our sense-making frameworks. Few of us recognize this epistemic trust relationship explicitly, most of us think we have come to conclusions on these issues using our reason and logic alone.

Put another way, we come to strongly identify with the views put forward by these institutions and will work hard to defend them because these views help us maintain a semblance of coherence in an otherwise disorganised, threat ladened, and chaotic world (Jost, 2020)[115]. However, if we don't resonate with the values and beliefs of these mainstream institutions, we are unlikely to find their proposed solutions palatable exactly because these tend to go against our values and beliefs. Instead, these individuals will then seek out alternative institutions (or come to our own conclusions based on '*research[116]')* that resonate with their sense-making frameworks. In short, for affective reasons, we tend to identify with and trust those institutions that most resonate with our personal values and core beliefs. We then place our <u>trust</u> on these matters of complex risk in the institutions that most resonate with our values and beliefs frameworks.

6.12. Values & Beliefs: What can we Conclude?

When it comes to denialist beliefs on issues of significant societal risk, it is not just whether we have the capacity to trust or not, but also who we ultimately trust. We saw that our

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[115] Identity theory suggests that we adopt roles based on the identities we craft through our symbolic interactions. The strength and resilience of these identities are contingent upon the number of connections they grant us with others. Once these identity ties are established, we commit to defending them. Thus, if an individual or circumstance threatens the values and beliefs of that network of ties, the involved individual will be motivated to protect the network, thereby preserving identity prominence.

[116] Usually a few google searches and a few YouTube videos.

decisions regarding who to trust was largely driven by our affectively-laden values and beliefs. Schwartz's Circumplex and Douglas' Cultural Theory of Risk provided us with a framework to conceptualize and operationalise why some of us are more likely to trust the eco-system of global mainstream institutions that take the lead in risk mitigation on issues of significant societal risk, as well as why others may have difficulty placing their trust in these institutions.

We can therefore put forth a series of research proposition. Firstly, individuals who prioritize social and self-transcendent values are likely to be more supportive of the mainstream consensus, especially relating to our issues of concern. Similarly, those who score highly on the hierarchist dimension are also predicted to lean towards endorsing the mainstream perspectives on these critical societal matters. Conversely, individuals who exhibit strong tendencies towards the individualist dimension are expected to show less agreement with mainstream consensus on significant societal risk issues. In fact, these individuals might exhibit a higher tendency towards denial or scepticism regarding mainstream views.

This concludes the review of all the component of our theoretical model of denial. In the next chapter, we assemble all the pieces into a system map to help guide us through the empirical research undertaken to test it.

Chapter 7 – Towards a Complexity Model of Denial

"If you don't know where you are going, any road can take you there."

— Lewis Carroll

In this chapter we bring all the components of our theory of together. We are going to briefly revisit all the stops along our journey into the wonderland of denial. Once our tour is done, we are going to take to the sky to see our expedition from an elevated perspective. This view is presented courtesy of a systems map that visualises our theoretical landscape as well as how the different waypoints on it could be causally linked. From this vantage point we will consider what the best methodological approach would be to operationalise our theory. We conclude this chapter by explaining what benefit we can derive from such an approach[117]. But before this, let's retrace '*the what*', '*the how*', '*the why*', and '*the where'* of denial.

7.5. The Wonderland of Denial – A Tour

Our journey down the rabbit hole started with a deep dive into **denial** on complex issues of significant societal risk. That is views, attitudes, and behaviours in contradiction to the mainstream consensus related to global social problems which lead to a high degree of societal risk. For the purposes of this study, we set boundaries and limited our investigation to climate change, pandemics, and vaccines. This departure point helped answer the "*what*" question of our inquiry. We also saw that researchers have traditionally approached understanding how people end up engaging in denial using simple linear monocausal models and tended to limit their explanations to **either** psychological **or** sociological ones. As we saw, none of these answers have proven to be particularly satisfying with each variable investigated providing only fractional insight into our phenomena of concern.

At our second stop in the hall of doors, we found ourselves looking for a key into the world of denial that didn't reduce it to the banal (*i.e. stupidity, ignorance, or malice*). The key we found was **motivated reasoning**. Here we saw how affect and our unconscious conspire to activate certain cognitive biases to ensure that our desire for the world to make sense (cognitive constraints) <u>and</u> our need to ensure that the world feels right (affective

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[117] Hint! *We are all mad here!*

constraints) are met[118]. We saw that no one is immune to motivated reasoning. This concept thus answered the '*how*' question by helping illuminate the cognitive processes involved in denial. However, motivated reasoning in-and-of itself only explains the mechanisms to get to this outcome, it does not explain what triggers and drives it.

To help explain what ignites and fuels our motivated reasoning we moved on to the pool of tears, where we dove into the concept of **trust**. We saw that trust is in itself a complex affectively-laden construct and that there a many different kinds of trust. Most relevant to this study are two types: institutional and epistemic trust. This is because when it comes to complex issues like climate change, pandemics, and vaccines we are relying on authoritative institutions to communicate knowledge on these topics to us. For us to believe these institutions requires that we have a capacity that allows us to trust more generally, and that if we do, we trust these *particular* mainstream institutions when they make epistemic claims related to these issues. This is because when these institutions make claims related to complex existentially threating problems, we tend to experience an affective response which sets off our motivated reasoning either towards the mainstream consensus[119] (aka acceptance) or away from it (aka denial). Trust is thus key to our understanding here. However, while trust helps us explain '*why*' we either lean towards or away from the mainstream consensus, it does not explain why some of us tend to reliably head in one direction while others tend to reliably go the other way. To answer this question we had to continue our journey to our next stop to find out why some of us just have more of a predisposition to distrusting mainstream institutions[120].

At the **adult attachment system** caucus race, we circled around the question related to dispositional trust. Why do some of us just have a greater willingness to trust mainstream

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[118] Cognitive Dissonance

[119] Yes, I said it. Embracing the mainstream consensus on issues of significant societal risk also requires a degree of motivated reasoning. Because of the complex nature of these topics, to believe the evidence is to believe the institutions that communicate it. This is because unlike testing say, if water boils at different temperatures at different altitudes, individuals can't come to a definitive or conclusive answer independently on these complex issues. We too must trust that these institutions are doing right by us and not taking advantage of us in our state of vulnerability.

[120] Just a point of clarification here…some of us, especially those of us that have experienced legitimate mistreatment at the hands of the mainstream institutions have good reason to distrust them. This isn't what I am referring to here. Instances where there have been evidenced-based, recorded instances of abuse of authority like the Tuskegee experiment, provide legitimate grounds for scepticism.

institutions than others? We saw, there is good reason to believe that when we are confronted with existentially threating issues like climate change and/or pandemics, our attachment systems are triggered. We learnt that once activated, this system induces a state of negative affect in us, and because of differences in our genetic and developmental make up, we differ in how we attempt to deactivate it. Here we saw that the insecure-avoidant-attachment style in particular, tends to fall back on response patterns signified by a distrust in attachment figures (in this case authoritative mainstream institutions) and an (over)-reliance on self to deactivate their attachment system. These individuals tend to be predisposed towards lower levels of dispositional trust, and consequently, lower levels of institutional and epistemic trust. But this we saw, was only part of the story. There are still some people with oodles of dispositional trust that reject the mainstream consensus on issues of significant societal risk. To find out why, we had to journey to our next stop.

At our fifth waypoint, the Caterpillar's Mushroom, we had to expand our theory to understand why some of us, when we reach the fork in road on issues of significant societal risk, still choose the path of denial despite having a *normal* capacity for institutional and epistemic trust. Here we saw that it was not so much a lack of dispositional trust, but a poor match of **personal values** and **core beliefs** relative to those associated with mainstream institutions that was at play here. This mismatch led to experiences of negative affect (cognitive dissonance) in response to the policy solutions proposed by these institutions which are antithetical to their personal values and core beliefs. To alleviate this dissonance, they tend frame this negative affect towards these institutions as low trust which triggers motivated reasoning. Once triggered, they become driven to find evidence which undermines the legitimacy, the conclusions, and the policy recommendations of these institutions thus allowing them to resolve this experience of dissonance. These individuals also tend to seek out alternative institutions that resonate with their values and beliefs as they feel more comfortable placing their trust in them. Therefore, they are also more likely to trust these alternative institutions on their conclusions on these issues. This causality loop could of course also work the other way around, where a person's values and beliefs lead them to alternative institutional affiliations prior to awareness of issues of significant societal risk. Regardless, because of their strong identity connections with these alternative institutions, they may end up trusting these institutions over mainstream ones should these

alternative institutions decide to oppose the mainstream consensus[121]. This despite the fact that they may have taken no issue with the mainstream consensus on a personal level (i.e. the proposed policy doesn't in principle, strongly oppose personal values and beliefs) absent of the influence of an alternative institution.

This then brings us to our current stop, The Duchess' House- where the Cheshire Cat lives, as we try to riddle out how to operationalise our theory. We need to ground it in a sufficiently robust, but flexible enough, methodological framework so that we can empirically test our model. This needs to be done in a way that will hopefully allow us to explain why a conservative rural Texas cowboy and a liberal urban Yorkshire housewife, may come to the **same** denialist conclusions on issues of significant societal risk despite having few, if any, superficial psychological or sociological characteristics in common. Again, while it's tempting to dismiss these conclusions as ignorant or stupid[122] we now know that there is very good reason to believe the truth is more complicated. Or as the Cheshire Cat once said: "*I'm not strange, weird, off, nor crazy, my reality is just different from yours.*"

To understand where we end up on issues of significant societal risk, lets plot all our theoretical waypoints and explore how they are causally connected.

7.6. A Systems Map of Denial

The systems map presented below, visualises our theoretical landscape, as well as attempts to illustrate how the different theoretical waypoints on it are causal linked.

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[121] The difference here is perhaps best illustrated through an example: If you were a political centrist prior to the pandemic but felt that lockdowns and vaccine mandates were beyond the pale, you may likely have found yourself increasingly empathising and even supporting alternative institutions that echoed this view. However, if you were a religious zealot prior to the pandemic and your church told you that the government's response to the pandemic was an attempt to suspend civil liberties, this is just a case of trusting the institution that you have the strongest identity connection with over a mainstream one. The former is thus a case of your evaluation of some issue leading you to experience it as something that runs contrary to your values and beliefs, thus driving you towards an institution that reaffirms the view that the mainstream's stance on this issue is wrong. However, the latter is different, here, for example, the person in question may not object to vaccine mandates if asked outside the context of their social network, but because their desire is so strong to remain affiliated with this alternative institution, they are more likely to trust/endorse/defend its views on this topic.
[122] Which they of course are, in some cases in both directions, towards denial and acceptance.
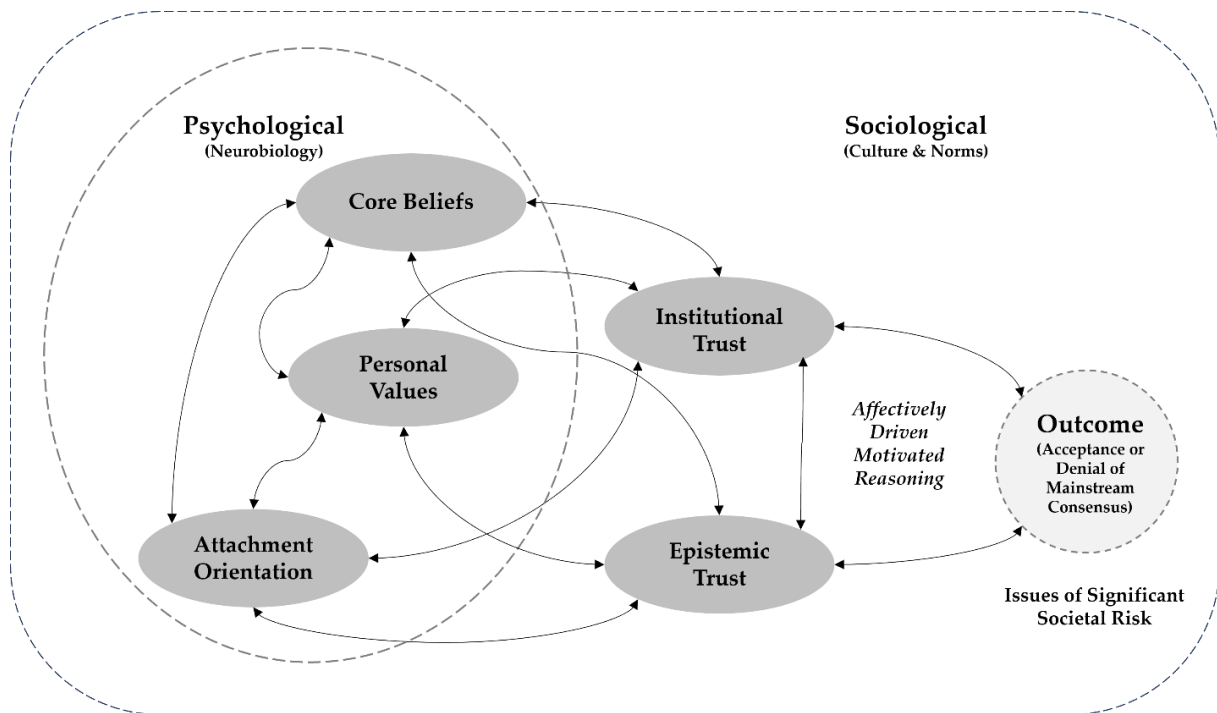
Figure 7.1: A Systems Map of Denial Related to Issues of Significant Societal Risk

There is a saying, "*you can't use old maps to explore new worlds*". This certainly applies to our map's primary purpose, which is to describe the different routes one can takes to come denialist conclusions on issues of significant societal risk[123]. While the components on this systems map are all interconnected, on a case-by-case basis (aka individual level), the strength (or weakness) of the connections between these components helps predict which route a person is mostly likely to take to get to a denialist (or acceptance) outcome. Unlike, say, a Structural Equation Model map which maps a single route, our systems map proposes that there are at least **two major routes** one can take to get to the same denial outcome (though there are no doubt many more less travelled one). The directions for these two routes are as follows:

7.6.1. The Psychological Route

The first major route one can take to get to this destination is the more psychological one, where our attachment orientations lead to the development of a disposition either towards being more or less trusting. Specially, those of us with insecure-avoidant-attachment styles may be more prone to epistemic mistrust, and by implication less mainstream institutional trust. This lack of trust more generally leads these individuals, when confronted with

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[123] Although the same map can be used for explaining acceptance as well.

existentially threating issues of significant societal risk, to attempt to self-sooth. This involves engaging motivated reasoning (doing your own "research", hypermentalization, etc.) towards the alleviation of cognitive dissonance leading to denial. However, while this attachment orientation-trust-denial pathway is the strongest network path for this group, their core beliefs and personal values are also likely influenced by their attachment orientations to varying degrees. This in turn may lead them to seek out alternative institutions that affirm and reinforce their attachment influenced values and beliefs.

7.6.2. The Sociological Route

The second major route to denial is the more sociological one. Here the social institutions that one has the strongest identity connection with, strongly influence the position one takes on issues of significant societal risk. Consequently, denial is not so much the result of the rejection of the mainstream consensus on psychological (attachment) grounds, but the result of attempts to defend the position of the institution that constitutes a critical part of their identity[124]. In addition, a negative affective response to mainstream policies on these issues (e.g., vaccine mandates, etc.) can also lead us to seek out institutions that better resonate with our values and beliefs and support the types of views that fit better according to our worldview. As a result, we either find ourselves in institutions that endorse denialist views which we adopt, or our values and beliefs lead us to distrust the mainstream consensus and then seek out institutions that reaffirm these views. Either way the outcome is denial, and trust in alternative institutions that reject (have rejected) the mainstream consensus on issues of significant societal risk, is the cause.

Our two routes, which can also be thought of as profiles, with their rich network of connection and interrelatedness are characterised by the properties of emergence, feedback loops, and dynamisms. This then suggests that denial should not be researched using reductionist linear models. Rather, everything we now know suggests that we should consider an alternative methodological approach to operationalise our theory and that this approach needs to embrace complexity.

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[124] A great example here is a teenager standing next to her mother on a picket line during the COVID pandemic protesting vaccine mandates on religious grounds. This individual when asked why she opposed the vaccine mandate could only muster '*God will protect us*' while her mother looked on approvingly.

7.7. Why Case-Based Configurational Complexity?

One approach that is well suited to the study of denial and the different profiles (routes) that may lead to it, is the relatively new methodological approach known as case-based configurational complexity. According to Castellani, Barbrook-Johnson et al. (2019) and Castellani and Gerrits (2023) case-based configurational complexity seeks to understands phenomena as a result of multiple, intersecting causal conditions, rather than attributing outcomes to single variables. It embraces the complexity of real-world situations and emphasises the role of context, considering that different combinations of conditions can lead to the same outcome, while the same conditions can lead to different outcomes in different contexts. As such, case-based configurational complexity, on the face of it, sounds ideal for the study of denial. But first what is complexity, and should we consider denial a complex phenomenon?

7.7.1. What are Complex Systems…Briefly?

Morin (2008) explained that a complex system is a system that has many parts, and these parts are connected and interact with each other in numerous ways. It's not just about the number of parts, though. What makes a system "*complex*" is that the parts are connected in such a way that the overall behaviour of the system can be hard to predict. This is because even a small change in one part of the system can lead to big changes in the system as a whole. This does not mean that the system is random or that there are infinite outcomes. Rather, outcomes emerge within a range of possibilities, some more probable than others. Let's look at some of the priorities of a complex system to better understand what we mean.

- **Emergence**: This is a process where new properties, behaviours, or complexities arise as a result of the interactions of simpler parts in a system. Social media platforms like Twitter[125] or Facebook are made up of millions of individual users, each posting, liking, and sharing content. Emergence is seen when certain topics or hashtags "*go viral*." No one plans for these trends—they emerge naturally from the interactions of users within the system. One tweet or post can unexpectedly spark widespread

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[125] Now rebranded "X" for reasons beyond the comprehension of this mere mortal.

discussion or even lead to real-world events, such as protests or celebrations (Morin 2006).

- **Self-Organisation**: Complex systems are capable of self-organisation. This means that structure or order can arise spontaneously from the interactions within the system, without any external control. Languages evolve and change over time, adding new words and phasing out old ones. This isn't typically a top-down process controlled by a central authority. Instead, it's a form of self-organisation, where the system (in this case, the language) evolves based on the interactions of its parts (the speakers). Slang terms, for example, can emerge organically in small groups and then spread, becoming standard terms used by many (Morin 2006).

- **Non-linearity**: This refers to the fact that changes in a complex system aren't always proportional to the inputs. A small change can have a huge effect, or a big change might have little to no effect. This makes the behaviour of complex systems difficult to predict. For example, the global economy is a classic example of a complex system. A small change, like a new tax policy, can have disproportionate effects. It might stimulate certain industries but cause others to contract in a country far away. The recent phenomenon of cryptocurrencies like Bitcoin is another great example. A single tweet from a prominent figure can cause wild fluctuations in their value, demonstrating the non-linear relationships in this economy (Morin 2006).

- **Dynamism**: Complex systems are always changing, never static. They're dynamic, constantly adapting and evolving over time. For example, political systems are constantly in flux, shaped by the actions and beliefs of politicians and citizens alike. Changes in public opinion, shifts in alliances, policy changes, elections—these dynamics can rapidly change the landscape of a nation's politics. The rise of new political movements or the sudden fall of a once-dominant party are examples of the dynamic nature of political systems (Morin 2006).

Another way to help understand what a complex system is to make a distinction between what is complicated and what is complex. Cilliers (1998)might be helpful here. He noted two important distinctions that set a complex system apart from other systems.

- **Simple vs. Complex System**: At first glance this might seem obvious. However, the distinction between simple and complex is not as clear as one may think. Many systems appear simple but reveal remarkable levels of complexity when examined closely. For example, a leaf or a piece of coral may appear simple, but when examined up close as well as within the context of a large eco-system reveal remarkable complexity. Another system may at first appear complex but could actually be simply described. For example, an internal combustion engine may appear complex through the eyes of a layman, but in truth it is a closed system that operates under a finite set of principles that can be completely described (Cilliers 1998).
- **Complicated vs. Complex Systems**: Some systems have a large number of components and perform sophisticated tasks. However, this is done in a way that can be fully explained. For example, a jumbo jet with over 6 million parts can be fully catalogued and the function of each component and its relationship with other components can be fully described. Such a system is complicated. Complex systems on the other hand are constituted by parts configured in intricate non-linear relationships and feedback loops. For example, global air travel is such a complex system consisting of many independent interacting parts including airlines, airports, aeroplanes, the authorities, the weather, passengers, etc. with each of these elements interacting with each other in multiple ways (Cilliers 1998).

This then invites the question, is denial complex?

7.7.2. Should we think of Denial as a Complex System?

Knowing what we know now, it is hard to see denial of mainstream consensus on issues like climate change, pandemics, and vaccines as anything but a complex system. Denial is not simply about refusing to accept scientific facts, but rather, it's an intricate interplay of psychological, social, and cultural factors.

- **Many Interacting Parts**: Denial is fuelled by a range of elements that interact with each other. For instance, an individual's level of trust in mainstream institutions may be influenced by their core beliefs, and their core beliefs may be shaped by their social environment, education level, media consumption, and more. Each of these

factors influences, and is influenced, by the others, creating a complex web of interactions.

- **Emergence**: The collective phenomenon of denial emerges from these individual parts. For example, if enough people in a community mistrust the mainstream consensus, that community might develop an overall culture of denial, which in turn strengthens individual members' denial. This is not a predetermined outcome, but rather emerges from the complex interactions of individuals within that community.

- **Self-Organisation**: Denial systems can show patterns of self-organisation. For instance, online communities or social media groups might form around shared beliefs, serving to reinforce and amplify denial. These communities are not usually created or controlled by a central authority, but instead arise spontaneously from the interactions of individuals sharing similar views.

- **Non-Linearity**: Changes in denial systems can be non-linear, meaning that a small input can have a large output or vice versa. For example, a single influential figure expressing doubt about vaccines could sway many people, amplifying denial.

- **Dynamism**: Denial systems are not static. They change over time. As new information comes to light, as societal norms shift, or as influential figures change their stances, the prevalence and intensity of denial can also change.

So, as we know by now, denial involves more than just the misinformation or misunderstanding of scientific facts. It's a complex system with many interacting components, including individuals' motivated reasoning (the tendency to favour information that confirms our beliefs), (mis)trust in authorities, attachment styles (which can influence trust), values, core beliefs, norms, social environment and more.

But knowing something is a complex system isn't the same as knowing how to operationalise it for research. However, it does clue us in to why other more traditional approaches may have fallen short. So how would one go about researching a complexity model of denial? First, let's start with a relatively new kind of research methodology, Complex Critical Realism.

7.8. Why should we think about Denial in terms of Complex Critical Realism?

Complex Critical Realism is an epistemological[126] approach that seeks to provide a framework for understanding the world, especially our social one, in a way that recognizes and embraces it inherent complexity. It combines elements from two major philosophical perspectives: Complex Systems Theory and Critical Realism. As we've already discussed, Complex Systems Theory focuses on understanding how many parts interact within a system to produce emergent properties that can't be predicted from the parts alone. Critical Realism on the other hand is a philosophy that posits that reality exists independently of our perceptions or interpretations[127]. It argues that our knowledge of the world is mediated through social and psychological processes, and therefore, is always subject to interpretation. Complex Critical Realism combines these philosophies to provide a nuanced way of understanding our world. It allows us to recognize that reality exists independently of our thoughts (Critical Realism), but it also acknowledges that this reality is made up of complex systems with emergent properties that can't be reduced to their individual parts (Complex Systems Theory). In other words, Complex Critical Realism proposes that the world is made up of many interacting components (like social structures, individual thoughts, natural phenomena, etc.) which interweave to form complex systems. Consequently, these systems have properties and behaviours that can't be predicted just by looking at their individual parts.

Another way to understand what we mean by Complex Critical Realism is to juxtapose it with one of the most ubiquitous and traditional philosophical approaches to research in the sciences, Positivism. Specially, Positivism and Complex Critical Realism each offer different approaches to research in social sciences like sociology and psychology. Positivism is a traditional scientific approach that assumes an objective reality that can be measured and understood through empirical observation and logical analysis. Positivism relies heavily on quantifiable data and statistical methods. It seeks to identify cause-effect relationships and generalisable laws, much like the physical sciences. Positivists believe that the researcher and the subject of research are independent of each other. It tends to simplify complex phenomena into manageable, isolated variables in order to perform controlled experiments or observations. Complex Critical Realism, on the other hand, acknowledges the existence of

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[126] Fancy word for philosophy of what we can know aka the philosophy of knowledge.

[127] It's basically the opposite of *"but with me gone, who would the world revolve around?"*.

an objective reality, it also recognizes that our understanding of that reality is subjective. As we saw, it posits that the world is made up of complex systems that can't be fully understood just by breaking them down into individual parts. This perspective values both quantitative and qualitative research methods and appreciates the complexity and interrelatedness of phenomena. It emphasises the importance of context and the interaction of various components within a system.

In the context of sociology and psychology, these differences can lead to contrasting research approaches. For instance, a Positivist might study a social phenomenon like crime rates by focusing on measurable factors such as socio-economic status, education level, or employment. They might aim to find a general law, like "*Lower socio-economic status leads to higher crime rates.*" A Complex Critical Realist, meanwhile, might approach the same issue by considering the complex system in which crime occurs, including not just socio-economic status, but also factors like community relationships, cultural norms, historical context, individual psychology, etc. They would likely argue that crime is an emergent property of this complex system and can't be fully explained by any single factor.

In essence, while Positivism seeks clear, definitive, cause-effect relationships through empirical data, Complex Critical Realism embraces the complexity of social phenomena and explores the intricate relationships among various factors, acknowledging that our understanding of these factors is influenced by our perspectives and interpretations.

In a nutshell, Complex Critical Realism is about recognising and navigating the complexity of the real world, while also acknowledging that our understanding of this complexity is always mediated through us. So how do we actualise this research methodology?

7.8.1. Critical Configuration Social Complexity

The development of Complex Critical Realism has set the stage for a new family of research methods which allow us to better study complex subjects. One such method is Critical Configurational Social Complexity. This approach enables us to study social phenomena as the emergent properties of complex systems by emphasising the importance of the unique configurations (cases) of interconnected components (networks) and the influence of social and cultural contexts (power). Two approaches synonymous with Critical Configurational

Social Complexity are Intersectionality and Case-Based Configurational Analysis (Castellani and Gerrits 2023).

Intersectionality as a research method involves analysing how different social identities like race, gender, class, sexuality, disability, etc. intersect and interact with each other, shaping individuals' experiences. While intersectionality would allow us to further explore the nexus of power relations that sits at the crossroads of denial and mainstream institutions, this will not be our focus. Rather our approach to the study of denial will be based on Case-Based Configurational Analysis, using Case-Based Computational Modelling because we want to understand how different individuals (cases) come to conclusions on issues of significant societal risk. But first, what is it and how does it work?

7.9. Case-Based Configurational Analysis

Case-Based Configurational Analysis is a research methodology that explores how various factors come together within particular scenarios to yield unique results. This technique considers each case - be it a single individual or a whole country - as a complex system existing within larger complex systems. Focusing on the social and structural environment that each case is a part of allows us to comprehend the intricacies of causation within social phenomena. It diverges from simplified '*one-size-fits-all*' approaches, instead identifying patterns across a variety of cases, each with its unique set of circumstances.

As argued by Castellani et al. (2023) Castellani and Gerrits (2023), this configurational perspective is a promising avenue for studying social complexity and complex systems. It stands out from the traditional complex systems approach by placing greater emphasis on factors like agency, identity, power, and social structure through a critical social science viewpoint. Furthermore, configurational theorising doesn't strive to isolate the cumulative effect of causative conditions, but rather seeks to understand how different combinations of these conditions can lead to a specific outcome. It promotes innovative thinking about complex social causality in four keyways:

1. It highlights the **causal asymmetry**, suggesting that the factors leading to an outcome might differ from those resulting in its absence.

2. It brings forth the concept of **equifinality**, which suggests that varying conditions can result in the same outcome. For instance, different elements within a country could lead to comparable levels of vaccine efficacy denial.

3. It introduces **multifinality**, which proposes that the same set of conditions can lead to varied results (the opposite of equifinality).

4. It underlines **conjunctural causation**, implying that a single condition's impact on an outcome depends on its qualitative relationships with other conditions. For instance, climate change denial can be influenced by political beliefs, economic interests, media habits, denial on other issues, and social context.

While specific methods such as Qualitative Comparative Analysis (QCA) provide us with the ability to conduct case-based configurational analysis, they might not always be ideal for certain research situations. Rooted in the theories of social science pioneers like Weber and Durkheim, QCA is known for identifying patterns and configurations that result in observed outcomes, viewing configurations as set theoretical relationships rather than variable correlations. This makes it a valuable bridge between qualitative and quantitative research methodologies. However, QCA's core reliance on Boolean logic (binary 1,0; yes, no; etc.) presents limitations for our research needs.

In this particular study, we are looking to operationalise our complexity model of denial using a probability approach where different facets of our theory are expressed numerically via interval measurement scales. This approach allows us to examine our research in a more holistic way, focusing on trajectories, clusters, and other such patterns. The reason we prefer this case-based approach is our interest in various clusters of configurations generating distinct typologies or profiles through the concept of equifinality.

Here, case-based computational modelling becomes a better option as it retains the fundamental principles of QCA but also enhances its capacity to handle larger datasets. Computational modelling does this by integrating a variety of dynamic systems modelling techniques which can seamlessly align with qualitative interdisciplinary methods. Even though it still uses 'traditional' quantitative variables, computational modelling stays true to its configurational focus, aligning with the ultimate goal of configurational theorising.

In conclusion, for the purpose of this research, case-based computational modelling emerges as a promising tool. It provides the capability to manage larger datasets while thoroughly engaging in configurational theorising. Thus, Case-Based Configurational Analysis shifts from traditional variable-based thinking towards understanding the intricate and multi-layered configurations that shape social outcomes. Therefore, for dissecting complex social phenomena in this study, we will be favouring case-based computational modelling over QCA.

7.10.   Why a Case-based Computational Modelling Approach for Denial?

Adopting a Case-based Computational Modelling approach for testing a complexity model of denial outcomes bears several advantages. Firstly, this approach allows us to leverage computational power to handle extensive datasets, a task which would be significantly more challenging with other methodologies. It provides the flexibility and dynamism needed to assess complex and multi-dimensional configurations which more accurately reflect the nature of denial. With this, we can incorporate a multitude of factors and variables, presenting a nuanced understanding of the social phenomena under study.

Moreover, integrating traditional psychometrics with Case-based Computational Modelling offers a novel and coherent method for examining our complexity model of denial. Notably, Computational Modelling enables the operationalization of constructs on an interval measurement scale, harmonizing seamlessly with the psychometric measures commonly employed in surveys. This synergy permits the computational model to assimilate survey data, transforming discrete measures into formats capable of illuminating intricate patterns and trajectories. Essentially, our approach marries the numerical methodologies of modern computational modelling with the configurational strategies inherent to psychometrics. This is reminiscent of cluster profiling techniques used when say a host of psychometric measures like personality measures, depression scales, and anxiety scales are amalgamated to formulate comprehensive patient profiles. In essence, this union provides a robust, holistic method to delve deep into the complexities of denial.

7.11. Chapter Conclusion

As we proceed to the next chapter, we will delve deeper into the specific methods adopted for this research. We will detail how our theory was operationalised - the specific measures that were chosen to assess our constructs, how these measures were administered, at what points in time, and who the participants were. Through this process, we will provide a roadmap of how the integration of traditional psychometrics with Case-based Computational Modelling was realised, to ensure a robust and holistic understanding of the complexity model of denial outcomes. On to the methods we go!

Chapter 8 - Methods

"If we knew what it was we were doing, it would not be called research, would it?"

— Albert Einstein

This chapter elucidates the tools and procedures that guide our research. We commence with the re-articulation of our central research questions to further delineate and direct our investigation. The remainder of the chapter provides an overview of the systematic approach, guiding us through the strategic choices made to ensure the rigor and relevance of this study. We start by first explaining our research design, then shed light on the study's population, the measures developed and utilised. We then look at how our data was collected and analysed. Ethical considerations, which remain paramount to the integrity of any research endeavour, were also addressed, ensuring that our study adhered to the highest standards of research integrity. We also openly acknowledged the limitations intrinsic to our approach, underscoring our commitment to transparency and intellectual honesty.

In summary, this methods chapter offers a comprehensive overview of the processes, tools, and protocols that underpin our investigation. The subsequent analyses and findings presented in the next chapter are rooted deeply within this methodological framework, ensuring both depth and breadth in our exploration of the nexus between psychological, sociological factors complicit in the denial of issues of significant societal risk.

8.1. Research Questions

As you will recall from Chapter 1, we started off with the research question:

> *Why do people hold denialist views, that appear to run contrary to their own self-interests, on issues of significant societal risk like climate change, the COVID-19 pandemic, and vaccinations in general?*

As we developed our complexity model of denial through Chapters 3 to 7, our research question has refined and evolved into:

> *How do psychological factors, specifically attachment orientation, and psycho-sociological factors, particularly individual values and beliefs, interact with institutional and epistemic trust to form multiple pathways leading to the outcome of denial on issues of significant societal risk?*

To analyse this intricate relationship between psychological, sociological, institutional, and epistemic trust as facets contributing to the emergence of denial, we need to disassemble our overarching research question into more specific and manageable questions. This first of which being:

> *Can multiple pathways to denial be identified (described & characteristics) based on varying levels of attachment orientation, individual values, beliefs, and trust (institutions and epistemic)?*

Following on this is a related research question that logically flows from it:

> *What are the commonalities and differences among these identified pathways?*

To help explore these commonalities and differences, specific research questions can be set that will allow us to interrogate each emergent cluster. These questions are as follows:

1. Are the different forms of denial in a cluster related? Meaning, should someone hold a denialist view, on say, climate change, are they also likely to hold such a view on pandemics and vaccinations?

2. Is there is a relationship between conspiratorial thinking and denial in a cluster? For example, do individuals in a cluster who deny climate change also think humans

never landed on the moon or that 5G cellular towers caused the COVID-19 pandemic?

3. In a particular cluster, does denial on complex issues of significant societal risk extend to other forms of public guidance provided by mainstream authoritative institutions? For example, do people then also deny the consensus on the ill-effects of tobacco smoking or long-term heavy alcohol consumption?

Typical to a configurational analysis, the next step is to explore the resulting profiles in relation to both the constructs of our theoretical model and the demographics collected. This analytical approach aids in further examining the causal relationships among our variables unique to each cluster.

In the context of trust, the research seeks to understand the relationships within each cluster between various forms of trust—generalised, epistemic, and institutional—denial, perceived societal tension, reactance, life satisfaction, political orientation, and religious orientation.

With respect to attachment orientation, we delve into the relationship within each cluster between the three major attachment orientations (secure, avoidant, and anxious) and a range of constructs, including denial on issues of significant societal risk, conspiratorial thinking, trust dimensions, personal values, core beliefs, reactance, life satisfaction, political orientation, and religious orientation.

Furthermore, our study investigates the core belief orientations in each cluster according to the Cultural Theory of Risk (Hierarchist, Individualist, Egalitarian, and the Fatalist), and their relationships with denial on societal risk issues, trust dimensions, personal values, attachment orientation, reactance, life satisfaction, political orientation, and religious orientation.

Additionally, we scrutinize the personal values orientations in each cluster based on Schwartz's Circumplex and assess their relationships with denial on societal risk issues, conspiratorial thinking, trust dimensions, core beliefs, attachment orientation, reactance, life satisfaction, political orientation, and religious orientation.

Lastly, we closely examine the demographics of each cluster, including age, sex, socio-economic status, employment status, educational attainment, and nationality. By comparing

and contrasting the demographics of each cluster, we aim to unearth the sociological forces potentially shaping these clusters.

These research questions serve as a lens for our investigation, informing the structure and specifics of our research design.

8.2. Research Design

This study employed an analytical cross-sectional survey design (Bethlehem 1999, de Vaus 2001), complemented by case-based computational modelling[128], to examine the intricate relationships between various psychological, sociological, and institutional variables. This approach was chosen for several compelling reasons:

1. The research questions in this study are expansive, encompassing a diverse range of variables. An analytical cross-sectional survey is adept at capturing a comprehensive snapshot of multifaceted variables at a specific point in time, thus serving as an effective tool for this research.

2. Cross-sectional designs are amenable to large sample sizes, which are crucial for this study's aim to derive broad, generalisable conclusions from a diverse representation of various demographics, given the investigation of complex societal phenomena.

3. In terms of pragmatism, cross-sectional studies are relatively quick and cost-effective compared to longitudinal designs. As the present research does not necessitate tracking the evolution of denial over time, this approach is fitting and practical.

4. This design is conducive to identifying patterns and potential associations among multiple variables. When coupled with case-based computational modelling, it enables the uncovering of multiple pathways leading to denial, aligning with our core research question.

5. Our study inherently involves examining the interactions between multiple factors. The analytical cross-sectional design facilitates multivariate analysis, which is essential for isolating the effects of individual variables and their interactions, thereby answering our detailed set of research questions comprehensively.

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[128] As a reminder of the reasons why chose this complexity approach, see Chapter 7, section 7.9.

6. This methodology supports clustering our data based on varying characteristics, a key aspect of our research. It aids in identifying commonalities and differences among possible pathways of denial and allows for the comparison of different clusters using diverse factors.

7. This methodology is compatible with the simulation of complex systems, enabling the identification of emergent patterns and the exploration of '*what-if*' scenarios. It is particularly suited to scrutinising the dynamics of multi-dimensional issues inherent in our research topic, where psychological and sociological factors interact in complex ways to culminate in denial.

In summary, the combination of an analytical cross-sectional survey design and case-based computational modelling presents a robust, efficient, and tailored approach for navigating our intricate research questions regarding denial, its various pathways, and its associated variables.

8.3. Study Population & Sampling Method & Sample

Having defined the overarching research design for this study, we now delve into the specifics of the population, the sample and the sampling method used in this study in the following sections.

The population of interest for this study includes adults globally who have agency over their responses to issues of significant societal risk. This population is characterised by its capacity to make independent decisions in the face of societal risks, such as the ability to vote, comply with public health protocols, or choose to receive vaccinations. The focus on adults with such agency ensures the study captures the views of individuals actively engaged with these important issues and reflects the broad spectrum of responses within the global adult population.

The final sample for this study consisted of 1,199 respondents, with roughly equal representation from men and women and from four distinct geographic regions: the United States (US), the United Kingdom (UK), the Global North -less the US and the UK(GN), and countries from the Global South (GS). These regional groupings, while imperfect, were chosen with the aim of encapsulating a broad spectrum of perspectives on issues of

significant societal risk. The chosen regions provide as holistic representation as possible given the financial and population constraints present in this study. Nonetheless, these regions attempt to captures diverse socio-economic, political, and cultural viewpoints. By distinguishing the US and the UK from the wider Global North, we acknowledge the unique socio-political and cultural idiosyncrasies of these nations while ensuring an unbiased representation through equivalent datasets. Additionally, the inclusion of the Global South guarantees a richer, more comprehensive exploration, preventing a northern-centric bias and highlighting the contrasting perspectives that arise from varied developmental stages and historical contexts. The selection of these geographical regions is thus not meant to be comprehensive, but rather a first step investigating geography/nationality as a potential influence on denial which may point to future avenues of research.

This sample was deliberately chosen to reflect a broad range of experiences and perspectives across sex/gender and geography. Moreover, all respondents were required to be 25 years of age or older, ensuring that the sample represents adults with a certain degree of life experience and potentially more developed views on issues of significant societal risk. In addition, all respondents had to be fluent in English as all the measures used were available in English only.

The sampling method employed was quota sampling, a non-probability sampling technique. This method was chosen as it allowed for the setting of specific quotas to ensure representation according to certain key traits: gender, geographic location, and age. This method allowed for a diverse, yet balanced sample. By setting specific quotas, the sample reflected a broad global population of potential research participants, without the dominance of any one group. Additionally, the quota sampling strategy provided an opportunity to investigate differences in responses according to gender and geography, using equally sized groups of respondents.

These methods of population, sample, and sampling selection support the complexity of this study's research questions, allowing for comprehensive analysis across a diverse and globally representative sample. A full breakdown on the sample demographics is provided in Chapter 9, Section 1.

8.4. Measures

For our study, a combination of newly developed and pre-existing measures was utilised to collect data pertinent to the constructs that formed part of our systems map.
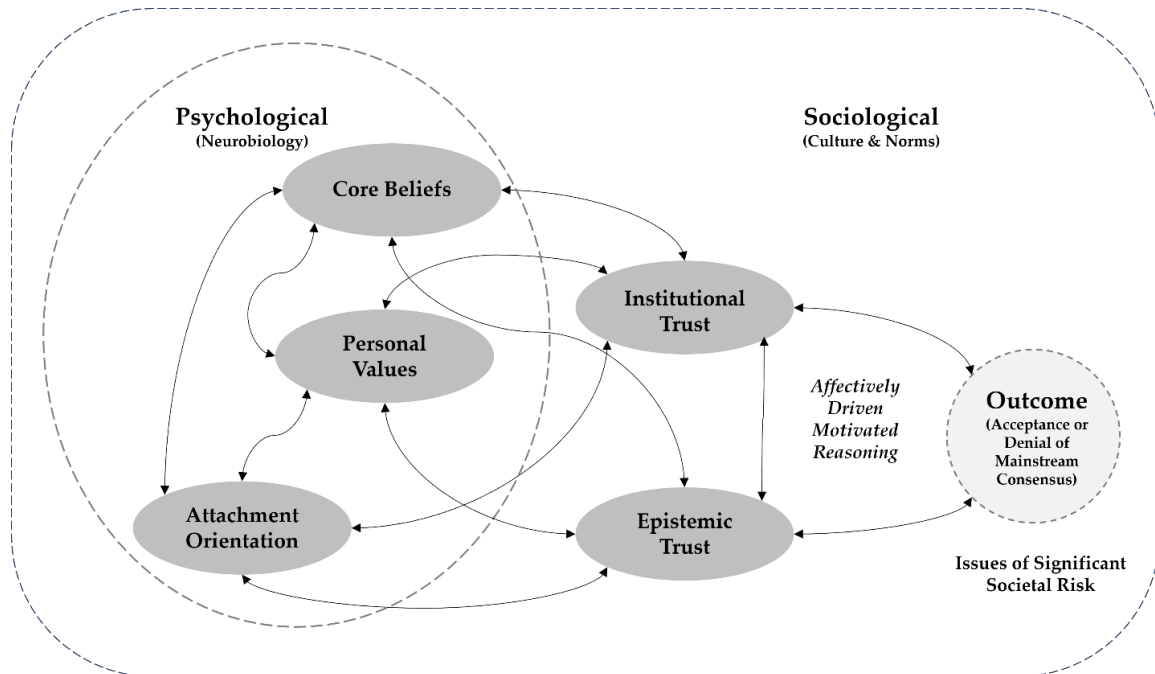
Figure 8.1: A Systems Map of Denial Related to Issues of Significant Societal Risk

The ensuing sections outline in detail the specific questionnaires, questions, and item types used, each specifically tailored to gauge the intricate factors contributing to the studied phenomena. For measures that were designed expressly for this research, the development process and piloting stages are outlined. The reliability of all measures is reported in Chapter 9 to ensure the transparency and replicability of the methodology[129]. Concurrently, any adopted measures from previous studies have been duly acknowledged. The careful selection and design of these measures are pivotal to capturing the nuanced interplay between psychological, sociological, institutional, and epistemic factors influencing denial on issues of significant societal risk. The measures selected for this study can further be broken down into primary, secondary, and demographic measures. Primary measures are focused on the major constructs on our system maps, while our secondary measures are focused on variables tangential to them like political orientation and reactance. Therefore, the selected secondary measures are indirectly related to the major constructs on our

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[129] Complete measures with response instructions can be found in the Annex A.

systems map like values and beliefs, but do not necessarily claim to assess these directly. The demographic measures, self-explanatory as they are, are listed in the final part of this section.

8.4.1. Primary Measures

As suggested by this section title, we detail the primary measures used to operationalise our system maps. Here we describe how we measured denial, trust, attachment orientation, values, and beliefs.

8.4.1.1. A Measure of Denial – The Societal Risk Denial Scale (Developed)

A key instrument employed in this study was the Societal Risk Denial Questionnaire. This tool was developed to gather data on individuals' beliefs and attitudes towards various issues of significant societal risk, namely climate change, vaccinations, COVID-19, conspiracy theories, and generally accepted public health guidance. This was done because existing tools were either too unfocused or did not meet the requisite standards for face validity. Respondents were asked to rate the likelihood of several statements being 'true' on a seven-point Likert scale, where 1 = "Extremely unlikely" and 7 = "Extremely likely".

The questionnaire consists of 20 items in five sections. The first three sections tackle the different societal risks, while the fourth looks at conspiratorial thinking, and the fifth offered a control. The climate change section explores the respondents' beliefs about the origins and impacts of climate change (e.g. *There is *NO* such thing as human made climate change*). The vaccination section gauges attitudes towards the safety, effectiveness, and perceived risk-benefit ratio of vaccinations (e.g. *The risks associated with getting a vaccination outweigh any benefits*). The COVID-19 section queries the participants' understanding of the virus, its spread, and measures to control it (e.g. *COVID-19 is *NO* more dangerous than the common flu*).

The conspiracy theories section taps into participants' endorsement of various popular conspiracy theories (e.g. *5G Cellular towers are responsible for COVID-19 outbreaks*). This was done to attempt to distinguish between the endorsement of conspiracy theories and denial of issues of significant societal risk.

Finally, a control section was included to assess respondents' beliefs about widely accepted health risks, providing a benchmark to understand their attitudes toward other societal risks (e.g. *Long-term tobacco use, like smoking, can lead to cancer*).

This questionnaire is intended to capture the spectrum of denial about these societal risks. By examining how respondents rate the likelihood of each statement being true, we can gauge their perceptions and potential denial about these significant societal issues. This tool was designed to allow for the examination of patterns in risk denial across a wide range of issues, and to facilitate comparison between groups within our sample. Its aim was to elicit responses that reflected a broad spectrum of beliefs and attitudes, from complete acceptance to outright denial of each risk.

The Societal Risk Denial Questionnaire was developed through a comprehensive process, involving multiple iterations to ensure its reliability and effectiveness in capturing the study's constructs of interest. Initial items were crafted based on a thorough review of the literature and consultation with colleagues.

Upon developing the initial draft, the questionnaire was subjected to rigorous piloting of six rounds involving 1,595 respondents. The respondents in each round were selected to ensure a broad range of viewpoints and demographics were represented. After each round, feedback was gathered, and the questionnaire refined. Items were reviewed, removed, or re-written as necessary to improve clarity, reduce bias, and enhance relevance.

This iterative process continued until the questionnaire effectively captured the intended constructs and exhibited good internal consistency. The final version of the Societal Risk Denial Questionnaire is the result of this rigorous, multi-step process, ensuring its suitability for the current study and potential adaptability for future research in related areas.

8.4.1.2. A Measure of Institutional Trust - Institutional Trust Scale (Developed)

The Institutional Trust Scale is an integral measure employed in this study, designed to evaluate participants' trust in various significant mainstream authoritative institutions, particularly those engaged in global public policy, media, science, and public health. The scale was conceived with the intent of measuring trust more broadly as a phenomenological experience rather than an objective conclusion. It encompasses a range of institutions that

have a substantial impact on public perception and action regarding issues of significant societal risk.

Participants were asked to rate their trust levels in these institutions and assess their belief in the truthfulness and the degree to which the information provided by these institutions serves the public interest. The scale operates on a seven-point Likert format, ranging from "no trust" (1) to "complete trust" (7). The institutions evaluated in this scale included:

- WHO (World Health Organisation)
- UN (United Nations)
- Mainstream Media (e.g., New York Times, BBC)
- Mainstream Science (e.g., Universities, Foundations, Labs)
- Medical Establishment (e.g., Hospitals, Doctors, Pharmaceuticals)

By gauging the extent of trust in these key institutions, this scale offers valuable insights into the role of institutional trust in shaping beliefs and attitudes towards societal risks, and how it can contribute to the pathways of denial. The Institutional Trust Scale thereby aims to shed light on the intricate interplay between psychological, sociological, institutional, and epistemic factors influencing societal risk denial.

8.4.1.3. *A Measure of Epistemic Trust – Epistemic Trust, Mistrust, and Credulity Questionnaire (ETMCQ)*

The Epistemic Trust, Mistrust, and Credulity Questionnaire (ETMCQ), devised by Campbell, Tanzer et al. (2021). is an essential instrument utilised in this study to evaluate participants' levels of epistemic trust, mistrust, and credulity.

As you will recall from Chapter 4, Epistemic trust (ET) is a concept that refers to the degree of trust individuals place in communicated knowledge. It assesses how open an individual is to accept new information as trustworthy and informative. The ETMCQ, through its three dimensions—trust, mistrust, and credulity—provides a structured view of this concept, demonstrating the complex dynamics at play when individuals encounter novel information.

The ETMCQ consists of 15 items that correspond to these three dimensions. Participants rate their agreement or disagreement with each statement on a seven-point Likert scale, ranging

from "strongly disagree" (= 1) to "strongly agree" (= 7), with "neither agree nor disagree" (= 4) in the centre. Higher scores on trust, mistrust, and credulity dimensions are reflected by strong agreement (= 7) or strong disagreement (= 1) with the respective statements.

Examples of items in each dimension include:

- Trust: "*I usually ask people for advice when I have a personal problem.*"
- Mistrust: "*I'd prefer to find things out for myself on the internet rather than asking people for information.*"
- Credulity: "*I am often considered naïve because I believe almost anything that people tell me.*"

Incorporating the ETMCQ into our study allows us to better appreciate how participants might interpret, process, and evaluate information related to communicated knowledge on issues of significant societal risks. It provides insights into the potential role of epistemic trust in either promoting or mitigating denial of such risks.

8.4.1.4. The Adult Attachment Orientations Scale (Adapted)

The Adult Attachment Orientations Scale (AAOS) was adapted and developed for this study as a combined evolution of the following scales - Gillath, Hart et al. (2009)'s State Adult Attachment Measure (SAAM), Collins and Read (1990)'s Adult Attachment Scale (AAS), and Fraley, Waller et al. (2000) the Experience of Close Relationships Questionnaire. The need for adaptation stemmed from the fact that most existing attachment scales are predominantly focused on early parental experiences and/or an evaluation of current romantic relationships. This unfortunately limits their applicability as a significant proportion of global adults aged over 25 are not involved in a romantic relationship, as reported by Fry and Parker (2021),and so there was a need for a more universally applicable instrument.

To address this gap, the AAOS was developed by incorporating elements from the aforementioned scales as well as by introducing a few new items. This scale asks respondents to evaluate their attachment styles relative to a broader interpersonal context, without necessarily being in a romantic relationship. It consists of 20 items divided into three categories reflecting secure, avoidant, and anxious attachment orientations. The Secure dimension had six items while the insecure dimensions have seven items each.

Before its finalization, the AAOS underwent two rounds of pilot testing, each involving samples of 500 participants. After each pilot, a confirmatory factor analysis was conducted using principal component analysis and a varimax rotation with Kaiser normalization. This analysis validated the three-dimensional structure of the scale, with items significantly loading onto their respective factors: secure, avoidant, and anxious.

The full AAOS and details on the piloting and the component matrix resulting from this factor analysis can be found in Annex B.

In essence, the AAOS provides a more comprehensive measure of adult attachment orientations, expanding the context of assessment beyond early parental and current romantic relationships to interpersonal ones. This broadened view provides, in my view, a more balanced assessment and helps provide insights into individuals' varying responses to societal risks.

8.4.1.5. A Measure of Personal Values – The Portrait Values Questionnaire

The Portrait Values Questionnaire (PVQ-21) is an instrument used to assess individual values (Sandy, Gosling et al. 2017). It presents 21 short verbal portraits, each describing a person's goal or aspiration, which reflects a particular value. Participants rate the extent to which the person described is similar to themselves, using a seven-point scale ranging from (1) "*Not like me at all*" to (7) "*Very much like me*". Each portrait was adapted to include an androgenous name (e.g. *Kim*, *Robin*, *etc.*) and gender-neutral pronouns were used to ensure applicability to all participants.

The portraits capture 10 fundamental values outlined in Chapter 7. For instance, the portrait "*It is important to Toni to make their own decisions about what they do. Toni likes to be free and not depend on others*" represents the value of self-direction, whereas "*Leslie strongly believes that people should care for nature. Looking after the environment is important to them*" reflects the value of universalism.

The 10 values outlined in the PVQ-21 can be further reduced into four higher-order values, or meta-dimensions, which offer a broader perspective on an individual's value system. These meta-dimensions are openness to change, self-transcendence, self-enhancement, conservation.

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These higher-order values provide a comprehensive view of the structure of human values, highlighting the tension and compatibility among different values. The meta-dimensions serve as a practical tool in the examination of how individuals reconcile conflicts and align their values in decision-making, attitudes, and behaviours.

The PVQ-21 allows researchers to understand participants' personal value orientations, offering insights into what motivates their behaviour and choices. By evaluating these underlying value structures, researchers can predict a range of social attitudes and behaviours, thus providing a broader picture of human psychological functioning.

8.4.1.6. A Measure of Core Beliefs – The Cultural Worldview Indices

The Cultural Worldview Indices, developed by Choi and Fielding (2016) as inspired by Wildavsky and Dake (2008) based on the work of Douglas and Wildavsky (1983), are a 12-item questionnaire crafted to measure core societal beliefs and values. This instrument utilises a seven-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree), asking respondents to reflect on statements related to *"how should life and society be?"* This approach allows us to measure an individual's societal perspectives and inherent cultural worldviews according to the four dimensions outlined in Chapter 7. Specifically, each dimension is operationalised using three items. For example:

- **Hierarchism**: A typical item from this category is "*The best way to get ahead in life is to work hard and do what you are told to do.*"
- **Egalitarianism**: One of the statements reads, "*Society works best if power is shared equally.*"
- **Individualism**: For instance, the statement "*Even if some people are at a disadvantage, it is best for society to let people succeed or fail on their own*" aligns with this category.
- **Fatalism**: An item used to represent this belief is "*The most important things that take place in life happen by chance.*"

In sum, the Cultural Worldview Indices offer a structured manner through which to examine societal beliefs across diverse populations, making it a valuable tool for studies exploring cultural attitudes and their influence on various societal facets.

8.4.1.7. A Measure of Core Beliefs Related to Global Risk – The Global Risk Perception Measure (GRPM) (Developed)

The Global Risk Perception Measure (GRPM) is a novel instrument developed specifically for this study to probe individual attitudes towards managing collective global risks such as pandemics and climate change. The measure employs a seven-point agreement scale to gauge the level of endorsement towards four distinct viewpoints regarding how collective risks are best managed according to the four styles set forth by the Cultural Theory of Risk. Respondents were asked to evaluate four strategies, each emblematic of the four cultural belief orientations, on issues like climate change & pandemics. Specifically, they were asked how we as a society can best deal with these collective risks. The strategies presented to them were as follows:

- **Hierarchism**: Views global risk management as a domain that should be primarily led by authoritative institutions and experts, like scientists. Here, respondents were presented with the following statement, "*Issues like climate change & pandemics are best managed by listening to authoritative institutions and experts and following their advice. They can help promote laws to protect us and use science and technology to find solutions. We should all support these institutions to ensure these plans are implemented to keep us safe.*"

- **Egalitarianism**: Argues that the most effective way to tackle global threats is through cooperative efforts within the global community, ensuring equitable responsibility sharing. The statement for this category was, "*Issues like climate change & pandemics are best managed when we work together as a global community. This means everyone shares equal responsibility to save the environment or follow health guidelines. The goal is for everyone to have an equal part in making the world safer and healthier, without anyone being left out or having too much power.*"

- **Individualism**: This orientation posits that best practices in managing global risks are derived from individuals devising their own strategies. A corresponding item from the scale read, "*Issues like climate change & pandemics are best managed by letting each person figure out their own ways to help. This can include coming up with new ideas, using new technology, and doing things on our own. The goal is to let everyone solve these*

problems in their own way, without too much control from the government or other big institutions like the UN."

- **Fatalism**: This perspective suggests that some global challenges are inevitable, and that society should focus on adaptability and resilience rather than prevention. Here the item stated, "*Issues like climate change & pandemics are best managed when we accept that some things are simply out of our hands. This means understanding that big problems like climate change or global diseases might happen no matter what we do. The goal isn't to try to prevent or control everything but to adapt and deal with things as they come.*"

The Global Risk Perception Measure (GRPM) hence provides a comprehensive lens through which to examine public attitudes and beliefs towards the management of large-scale societal risks, offering key insights that can guide policy-making and societal responses.

8.4.2. Secondary Measures

The study incorporates a series of secondary measures that, while not directly assessing the central constructs outlined in our system map on denial, offer supplementary insights. These measures provide tangential information which can enrich our understanding of the complex psychological dynamics at play. Furthermore, these measures were selected specifically for their brevity. They represent an efficient and cost-effective means to collect additional relevant data, maximising the depth of information obtained without significantly extending the length of the survey or increasing costs.

These secondary measures included the Measure of Perceived Societal Tension (EU), Fear of Disempowerment Scale aka Reactance (Developed), Generalized Trust Scale, Generalized Life Satisfaction, Political Orientation, and Religious Orientation. Each of these instruments brings additional dimensions to our study. For instance, the Fear of Disempowerment Scale or Reactance measure addresses the threat of loss of agency perceived by individuals, a concept linked to avoidant attachment orientation and trust of institutions. The Measure of Perceived Societal Tension, derived from an EU study, potentially helps enrich our understanding of the relationship between societal tension and institutional trust. Political and religious orientations offer insights into an individual's personal values and core beliefs, which are assumed to shape their response to significant societal risks. Including these secondary measures allows for a more comprehensive, nuanced understanding of the factors

influencing denial, building a richer and more detailed portrait of our study population's psychological landscape.

8.4.2.1. Measure of Perceived Societal Tension (EU)

The Measure of Perceived Societal Tension assesses an individual's perception of social divisions within their country. This instrument, which forms part of the measures administered as part of the European Quality of Life Survey, presents respondents with a range of potential sources of societal tension and asks them to indicate their perceived level of tension between these groups on a scale (Eurofound 2017).

The scale ranges from 1 (No tension), to 4 (Some tension), and 7 (A lot of tension). The sources of tension include economic divides (e.g., between rich and poor or between management and workers), gender and generational gaps (e.g., between men and women or older and younger generations), cultural and demographic disparities (e.g., between different racial and ethnic groups or between locals and immigrants), religious and sexual orientation differences, as well as political polarization (e.g., between the left and right).

By gauging respondents' perceptions of tension across these various societal divisions, the measure provides valuable insights into the perceived social climate and perceived prevailing societal challenges on an individual level. This information may be crucial for understanding the contextual backdrop against which individuals form their responses to significant societal risks.

8.4.2.2. Fear of Disempowerment Scale (Developed)

The Fear of Disempowerment Scale is a self-developed instrument designed to gauge an individual's perception of authoritative institutions such as governments, global institutions, mainstream media, and established scientific bodies. Specifically, it examines the degree to which individuals phenomenologically perceive institutions may be acting with hidden agendas, disempowering them, seeking control over the populace, and potentially limiting freedoms.

This measure is presented four statements about '*those in charge'* with respondents asked to indicate their agreement on a seven-point Likert scale, ranging from "*Disagree Strongly*" (1) to

"*Agree Strongly*" (7). An example of an is: "*Given the opportunity, the people in charge would take steps to limit our freedom.*"

While this measure draws upon the concept of psychological reactance — the emotional response to perceived threats to personal freedoms and autonomy — it is specifically tailored to maintain a focus on the phenomenology of mainstream institutions. This differentiation ensures a more precise measurement of attitudes towards these institutions, which play a critical role in shaping responses to significant societal risks. The insights garnered from this measure provide a more nuanced understanding of the public's trust in authoritative bodies and the potential impact of these perceptions on their responses to societal threats.

8.4.2.3. Generalised Trust Scale

The Generalised Trust measure is a simple, single-item scale that assesses an individual's overall trust in other people. The question asked is: "*Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?*" Respondents are asked to rate their agreement on a seven-point scale, where 1 indicates a belief that "*you can't be too careful*" and 7 signifies a belief that "*most can be trusted.*"

This measure has been utilised in various large-scale surveys, including the World Values Survey (Inglehart and Abramson 1999, Inglehart, Basanez et al. 2000), and its single-item simplicity has made it a widely adopted tool in social sciences to measure interpersonal trust.

In the context of this study, the Generalised Trust measure is included to supplement the investigation into institutional and epistemic trust. While institutional and epistemic trust are more specific and relate to trust in mainstream institutions and knowledge, respectively, generalised trust offers a broader perspective. It provides an understanding of a person's basic disposition towards trust in others, which can indirectly impact how they perceive and interact with institutions and accepted knowledge systems.

8.4.2.4. Generalised Life Satisfaction

The Generalised Life Satisfaction measure is a straightforward, single-item assessment that gauges an individual's overall satisfaction with their life. Respondents are asked: "*All things*

considered, how satisfied would you say you are with your life these days?" They indicate their level of satisfaction on a seven-point scale, where 1 signifies "*Very Dissatisfied*" and 7 represents "*Very Satisfied*."

Like the Generalised Trust Scale, this measure is also widely utilised in large-scale surveys and studies focused on assessing quality of life, well-being, and personal happiness, among other factors. It has also been used in the World Values Survey (Inglehart and Abramson 1999, Inglehart, Basanez et al. 2000), where it has helped to map global patterns in subjective well-being over time.

In the context of this study, the Generalised Life Satisfaction measure is included to explore the potential relationship between overall life satisfaction and the various sociological and psychological dimensions under investigation. As a proxy for subjective well-being, this measure can help illuminate how individuals' satisfaction with their lives might intersect with their core beliefs, personal values, and attitudes towards societal risks.

8.4.2.5. Political Orientation Measure

The General Political Orientation measure is a straightforward, single-item instrument designed to capture an individual's self-identified political leaning. Respondents are asked: "*How would you describe your political orientation?*" They indicate their political orientation on a seven-point scale, where 1 signifies "*Completely Liberal*," and 7 signifies "*Completely Conservative*."

This measure is widely used in political science research and has appeared in the American National Election Studies (ANES, 2019), where it has proven effective at gauging respondents' general ideological leanings (Berinsky and Lavine 2007).

In this study, the General Political Orientation measure is included to investigate the potential relationship between political orientation and individuals' core beliefs and personal values. As a simple but effective gauge of political ideology, it provides valuable context and offers a crucial dimension for examining how political beliefs may interact with attitudes towards societal risks and how they might be informed by personal values.

8.4.2.6. Religious Orientation Measure

The General Religious Orientation measure is a single-item scale developed to measure the importance of religious faith in shaping an individual's life orientation. The item, "*My religious faith defines my orientation in life*," asks respondents to rate their agreement on a scale of 1- "*Disagree Strongly*" to 7- "*Agree Strongly*".

This measure is designed to encapsulate the extent to which an individual perceives their religious beliefs as guiding their perspective and decisions in life. It has been utilised in various studies examining the role of religiosity in various aspects of life, such as those investigating religiosity and well-being (Park 2000).

In the current study, the General Religious Orientation measure is incorporated to explore the possible association between religious orientation and individuals' core beliefs and personal values. As religiosity can significantly influence an individual's worldview, understanding its impact can provide valuable insights into how it may inform attitudes towards societal risks and interact with personal values.

8.4.3. Demographics

The collection of demographic information is an integral part of any social research, as these characteristics often influence the attitudes, beliefs, and behaviours of individuals. In this study, a range of demographic variables were collected, including:

- Age
- Sex
- Socio-Economic Status
- Employment Status
- Educational Level
- Nationality

Age can often affect an individual's perspectives and experiences. Different generations may have unique viewpoints on societal risks due to historical and cultural differences in their formative years. Similarly, sex can influence perspectives due to the different social and cultural expectations and experiences of men and women. Of importance to note is that we deliberately chose to assess "sex" rather than "gender" based on of the question: "*What is your sex, as recorded on legal/official documents?*" which only had male and female as options. The rationale behind this decision stems from the distinct definitions of the terms. While gender pertains to the social, cultural, and behavioural attributes, roles, and norms associated with being male, female, or other identities, "sex" refers to the biological differences between

males and females, such as reproductive systems and chromosomes. By querying about sex as recorded on legal/official documents, the study aims to gather objective, standardized data consistent across respondents. This approach ensures clarity, minimizes potential ambiguities related to subjective gender identities, and facilitates a straightforward comparison and analysis in the context of the study's objectives.[130].

Socio-economic status, as assessed using the MacArthur Scale of Subjective Social Status (Adler, Epel et al. 2000), plays an instrumental role in understanding individuals' perceptions of societal risks and their perceived agency in managing them. It is suggested that individuals with a higher socio-economic status may feel better equipped and more empowered to confront these risks, while those lower on the scale might perceive themselves as more vulnerable or less capable. This choice of scale, especially in the context of the regions sampled, is pivotal due to the disparities in income distribution. Rather than solely considering objective measures, focusing on subjective positioning offers a nuanced understanding of individuals' self-perceived social standing. This is particularly relevant when evaluating the dynamics of relative deprivation versus absolute measures, as the subjective experience of one's socio-economic status can significantly influence their perception of societal challenges and their capacity to navigate them.

Educational level often correlates with knowledge and understanding of complex issues, like societal risks. Higher levels of education can influence one's perception, management, and mitigation strategies regarding these risks.

Finally, nationality was considered as it encapsulates a variety of cultural, historical, and socio-political factors that can shape one's beliefs and responses to societal risks.

All these demographic variables were self-reported attributes and came prepopulated through the sampling platform used. The process and implications of this data gathering method will be elaborated upon further in the subsequent section of this study.

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[130] A significant majority of the global population identifies their gender in alignment with their biological sex, i.e., male or female. Thus, even though there are individuals who identify as non-binary, genderqueer, or other genders, their proportion in the global context remains relatively small. Consequently, assessing behaviour based on the biological sex of individuals can still provide valuable insights into general behavioural patterns, as the overlap between gender and sex is considerable for a large segment of the global population.

8.4.4. Overview of Measures Utilised

Table 8.1: Overview of primary measures utilised.

Section A	Construct	Measure	Dimensions
Primary Measures	Denial	The Societal Risk Denial Scale (Developed)	Climate Change
			COVID-19
			Vaccination
			Conspiracies
			Control
	Institutional Trust	Institutional Trust Scale (Developed)	Global Public Institutions
			Mainstream Science
			Mainstream Media
			Mainstream Public Health
	Epistemic Trust	Epistemic Trust, Mistrust, and Credulity Questionnaire (ETMCQ)	Trust
			Mistrust
			Credulity
	Adult Attachment	The Adult Attachment Orientations Scale (Adapted)	Secure Attachment
			Avoidant Attachment
			Anxious Attachment
	Personal Values	The Portrait Values Questionnaire	Openness to Change
			Self-Transcendence
			Self-Enhancement
			Conservation
	Core Beliefs	The Cultural Worldview Indices	Hierarchist
			Individualist
			Egalitarian
			Fatalist
	Core Beliefs Related to Global Risk	The Global Risk Perception Measure (GRPM)	Hierarchist
			Individualist
			Egalitarian
			Fatalist

Table 8.2: Overview of secondary measures utilised.

Section B	Related Construct(s)	Measure	Dimensions
Secondary Measures	Institutional Trust Epistemic Trust	Measure of Perceived Societal Tension	Poor vs. rich
			Management vs. workers
			Men vs. women
			Locals vs. immigrants
			Political left vs. right
			Older vs. younger people
			Racial & ethnic groups
			Religious groups
			Sexual orientations
	Institutional Trust Epistemic Trust	Generalised Trust Scale	General Trust
	Personal Values	Generalised Life Satisfaction	General Life Satisfaction
	Personal Values Core Beliefs	Political Orientation	Political Orientation
	Personal Values Core Beliefs	Religious Orientation	Religious Orientation

Table 8.3: Overview of demographics assessed.

Section C	Related Construct(s)	Measure	Units
Demographics	All	Age	26, 26, 27…
		Sex	Male vs. Female
		Socio-Economic Status	0 – 10
		Employment Status	Unemployed, etc.
		Educational Level	No formal education; PhD
		Nationality	United Kingdom, etc.

The measures in this table form a comprehensive suite of tools used in the study to investigate the multifaceted nature of denial in the context of societal risk. The table also highlights the secondary measures and demographics data, providing further depth and context to the analysis.

8.5. Data Collection

The data collection for this study was made possible thanks to the generous financial support of the Leverhulme Trust, which provided a non-conditional grant of £7,500 GBP in 2021, supplemented by an additional £2,000 GBP of personal funds.

With these resources, the study made use of the online survey platform, Typeform, integrated with the research sampling service, Prolific.co, to carry out data collection. The measures, along with their respective instructions, were built into a Typeform questionnaire, offering participants a user-friendly surveying experience. All the items of each measure were randomised but these were kept together in separate sections so as to keep the instructions uniform for a particular measure.

The questionnaire was subsequently distributed to a specially curated sample from Prolific.co, which is known for providing access to diverse and reliable participant pools. In order to ensure balanced representation, selection criteria on Prolific.co were set to include equal numbers of male and female participants and equal representation from specified geographic regions (United States, United Kingdom, European Union, and the Global South). In addition, participants had to be individuals aged 25 and over and fluent in English reading, as the measures were provided in English only.

Each participant recruited through Prolific.co was compensated for their time at an average rate of £12 GBP per hour, ensuring ethical treatment and fair compensation for their time and contribution.

The process of data collection took place primarily over September and October of 2021, with six pilot studies conducted to refine the self-developed measures and test various constructs. The participant numbers in these pilot studies ranged from 100 to 500. Following the conclusion of the pilot studies, the study sample was collected in the last week of October 2021 and resulted in 2,004 responses. However, this initial sampling did not include measures on values and beliefs which necessitated that same respondents were once again called on to provide data in August of 2023. Of the original 2,004, 1,199 provided response that were then matched to their previous answers. This approach to data collection contributed significantly to the robustness and reliability of the study's findings.

8.6. Data Analysis

To meticulously unravel the intricate dynamics posited in our core research question—how psychological and sociological factors intertwine with institutional and epistemic trust influencing denial on pivotal societal risks—we now review our data analysis strategy.

8.6.1. Data Pre-processing

Ensuring data quality is a pivotal step in any research process. As part of our initial data cleaning procedures, all responses received were meticulously verified for their completeness. Records displaying more than 20% missing data—indicative of partial survey completion—were eliminated from the dataset. This threshold was established to maintain data integrity while not excessively truncating the dataset. This resulted in the removal of six records. Furthermore, an additional layer of scrutiny was applied to identify any consistent response patterns suggestive of disengagement or non-serious participation. Specifically, participant records that exhibited uniform selection patterns, such as choosing all "1"s across all survey items, would be discarded. No such response patterns were found.

For computing dimension-level scores, we adopted an averaging approach rather than an aggregate sum. This method has an inherent advantage in instances of missing responses. If a participant, for instance, answered four out of five items in a given dimension, the aggregate score was computed using the average of the remaining four responses. By employing this strategy, we safeguarded our data from the creation of inadvertent outliers, which would have been the case if a summed dimension levels scores was obtained.

A crucial decision in the pre-processing phase pertains to the transformation of raw data. For this study, we consciously opted against any normalisation or scaling of the data. This decision was rooted in the nature of our dataset and the analytical methods we employed, ensuring that the data's inherent structure and relationships were preserved.

Our data collection procedure involved multiple platforms, necessitating a seamless integration process. The demographic information was sourced from the Prolific platform. This data was then concatenated with the survey results procured through Typeform. To achieve this integration without error, we relied on the unique participant ID provided by

Prolific. This ID served as a unique identifier, facilitating the matching of participant responses across different rounds of data collection and across platforms.

In conclusion, the data pre-processing phase was executed with rigorous attention to detail, ensuring that the data used for subsequent analyses was free of inconsistencies, and representative of genuine participant input.

8.6.2. Selection of Analytical Methods

In our study, we have selected a combination of Self-Organising Maps (SOMs) and k-means clustering as our main analytical methods. These are implemented with the aid of Schimpf and Castellani (2020) COMPLEX-IT software tool, designed to model, and analyse complex systems. COMPLEX-IT primarily relies on:

- **Self-Organising Maps (SOMs):** The purpose of Self-Organising Maps (SOMs) is to create a visualization of multi-dimensional data by mapping it onto a two-dimensional grid. This mapping is accomplished by using unsupervised learning algorithms, which work to preserve the topological properties of the data. By organising the data into a grid, SOMs allow for the underlying patterns and structures to be reflected, providing an intuitive representation of complex data relationships.

- **k-means Clustering:** The purpose of the clustering method is to partition the dataset into k distinct clusters based on similarity among the data points. The algorithm achieves this by iteratively assigning each data point to the cluster that has the nearest centroid. This iterative process continues until the data points are grouped in a way that best represents the underlying similarities in the dataset, resulting in a set of k cohesive clusters.

While COMPLEX-IT offers scenario simulation, prediction, and forecasting this functionality was not utilised in this phase of our investigation.

The selection of the combination of SOMs and k-means as analytical methods is grounded in several key advantages. Firstly, the integration of these methods has been demonstrated to reduce misclassification (as is sometimes the case in SEM), enhancing the robustness of the findings by corroborating the solutions. Secondly, they offer flexibility and versatility, with

wide applications across various fields in the social sciences including policy evaluation, urban planning, and healthcare. COMPLEX-IT, in particular, provides a tailored environment for the complex systems analysis, facilitating not only scenario simulations but also trend predictions. Lastly, the visual inspection afforded by these methods allows for an intuitive understanding of how clusters are distributed, and reveals the underlying patterns within the data, making them highly valuable for multidimensional analysis (Schimpf and Castellani 2020).

The analytical methods of SOMs and k-means clustering come with specific assumptions that must be verified. SOMs assume the preservation of the topology of the original data, and this can be validated by examining the quantisation error and topographical error. On the other hand, k-means clustering operates on the assumption that clusters are spherical and equally sized; this is verified using pseudo f and silhouette plots to measure the goodness-of-fit. The verification of these assumptions ensures the appropriateness and reliability of these methods for the analysis (Schimpf and Castellani 2020).

The chosen analytical methods within COMPLEX-IT provide a comprehensive, flexible, and robust framework for our study. Their synergy in handling complex systems, coupled with the visual and statistical validation, ensures the integrity and reliability of our research findings. By understanding and verifying the assumptions behind these methods, we affirm the appropriateness of these techniques for our specific research goals and contexts.

8.6.3. Statistical Analysis

The statistical analysis for this research study was systematically conducted in seven carefully structured phases. These phases served as the foundation to derive meaningful insights from the raw data and to build an empirically grounded model.

- **Step 1 - Data Preparation in Excel**: The initial phase involved the data preparation which leveraged MS Excel 365. Processes like data cleaning, reverse coding of items, and the computation of dimension level scores where all done in MS Excel because it is a proven and robust platform for these preliminary operations, ensuring that the dataset was well-organised and primed for more advanced analyses.

- **Step 2 - Reliability Analysis in SPSS**: Once data preparation was complete, we shifted our attention to measure reliability. Utilising SPSS, a renowned statistical software, the reliability (typically Cronbach's Alpha and Factor Analysis) of the measures was assessed. This step was vital to ensure that the scales employed in the study were consistent and trustworthy.

- **Step 3 - Descriptive Analysis in SPSS**: The next phase revolved around gaining a preliminary understanding of the sample's characteristics. Using SPSS, descriptive statistics like means, standard deviations, and frequency distributions were computed. This provided an overarching view of the dataset's distribution and central tendencies.

- **Step 4 - Model Building using COMPLEX-IT**: The heart of our analysis was the model-building phase using COMPLEX-IT. This advanced software is tailor-made for building models that can help unravel complex relationships within datasets. With the foundational work done in Excel and SPSS, COMPLEX-IT was leveraged to shed light on the multifaceted dynamics of the variables under investigation.

- **Step 5 - Cluster Extraction from COMPLEX-IT**: A distinguishing feature of COMPLEX-IT is its ability to identify and extract clusters based on the data patterns. In this phase, we focused on extracting the resultant clusters which emerged from the modelling exercise. These clusters represent groups with distinct patterns or characteristics, offering deeper insights into the dataset's structure.

- **Step 6 - Cluster-Specific Analysis in SPSS**: With the clusters identified, each was then subjected to a rigorous analysis in SPSS. The aim here was to probe the correlations between the various dimensions within each cluster. This step provided valuable information regarding how different dimensions related to one another within specific clusters, revealing unique patterns or trends.

- **Step 7 - Comparative Analysis & Descriptive Statistics in SPSS**: The final phase involved a comparative analysis between the identified clusters. Drawing on the results from the previous phase, we juxtaposed these clusters to discern differences and similarities. Additionally, descriptive statistics were provided for each cluster, facilitating a richer understanding of their respective characteristics.

In summary, the multi-phased statistical analysis adopted in this study was geared towards not just understanding individual data points, but unravelling the intricate relationships, patterns, and clusters within the dataset. The blend of traditional statistical tools with the advanced capabilities of COMPLEX-IT ensured a comprehensive, robust, and nuanced analysis of the data at hand.

8.7. Ethical Considerations

In any research, especially one that involves human participants, upholding ethical standards is of paramount importance. It not only ensures the integrity and validity of the study but, more crucially, safeguards the rights, well-being, and dignity of the participants. This section delves into the steps taken in this research to ensure participant safety and ethical standards. Specifically, we will discuss the measures put in place to ensure confidentiality, maintain the anonymity of participants, acquire informed consent, respect the right to withdraw, and uphold rigorous data protection standards. Each of these facets was considered with utmost care, reflecting our commitment to conducting research that is both ethically sound and socially responsible.

8.7.1. Ethical Framework

For this exploratory study on societal risk and denial, a comprehensive ethical framework was diligently adopted to safeguard the rights, dignity, and well-being of participants. Grounded in the principles set forth by Durham University's Research and Ethics guidelines, this framework prioritises informed consent, ensuring participants are fully aware of the study's purpose, procedures, and their rights. Anonymity and confidentiality were central, with measures taken to prevent the collection of any personally identifiable information and rigorous protocols for data management and security. This ethical blueprint ensures not only compliance with institutional and external mandates but also upholds the trust and respect of our participants, fundamental to the integrity of this research.

8.7.2. Participant Recruitment and Informed Consent

Participants for this study were actively recruited through Prolific.co, a reputable online participant recruitment platform. To ensure transparency, understanding, and ethical adherence, all potential participants were provided with a two-part Participant Information

Sheet. Part 1 of this sheet outlined the study's purpose, methods, and expected duration of participation, while Part 2 delved into further procedural details and the responsibilities and rights of the participants.

It was emphasised to potential participants that their involvement in this research was entirely voluntary. They were explicitly informed that they had the right to withdraw at any stage without providing a reason and without any repercussions. To further ensure the privacy and trust of our participants, measures were implemented guaranteeing their anonymity. No personally identifiable information was collected, and all data was processed and stored with utmost confidentiality. These assurances and protocols were put in place to foster an environment of trust and mutual respect between the research team and the participants.

8.7.3. Data Collection Procedures

In this study, data collection was streamlined by relying on trusted platforms, Typeform.com and Prolific.co. Both these platforms have gained a reputable standing in the academic and research communities for their reliability and user-friendly interfaces. The online questionnaire was structured to avoid collecting any personally identifiable information, ensuring that respondents' answers remained strictly confidential. Instead, the focus was on gathering large samples of quantitative data on various socio-psychological constructs without capturing specific personal identifiable information, thus emphasising our commitment to participant privacy and data security.

8.7.4. Data Management and Security

The integrity and security of research data are paramount, and as such, we put in place a comprehensive Data Management Plan. Our primary method for data storage involves an encrypted and password-protected data, ensuring the immediate safeguarding of the collected information. In addition to this, the data is routinely synchronised with the Durham University cloud storage and central University storage facilities, guaranteeing consistent data backup and additional layers of protection. Adhering to best practices, our data sets were organised systematically with precise metadata standards and comprehensive data documentation, including clear labelling of data sources and

accompanying *'readme.txt'* files to provide context and details of each data set. Reflecting our commitment to long-term accountability, all research data will be preserved and archived for at least a decade, aligning with the stringent guidelines and standards set forth by Durham University's Data Management Policy.

8.7.5. Data Sharing and Accessibility

In line with the overarching ethos of collegial research and the pressing need for transparency in academia, our study embraces an open approach to data sharing. We believe that disseminating our findings and the associated data can not only foster collaboration and trust but can also amplify the potential for further scientific discovery. To streamline access, all datasets will be equipped with unique digital identifiers (DOIs), ensuring easy traceability, and referencing. Governance of shared data is of paramount importance, with the principal investigators playing a decisive gatekeeping role. Every request for data access will be evaluated, necessitating formal written agreements to ensure both the integrity of the data and its responsible use. Our targeted timeline for broader data accessibility is set for Nov 2023. Since our data collection is rooted in anonymity, we are confident in our ability to share this data with minimal restrictions, further endorsing the principles of open research while safeguarding participant interests.

8.7.6. Data Withdrawal

Given the foundational principles of anonymity employed during data collection in this study, it becomes inherently challenging to isolate and withdraw specific datasets post-submission. As no personal identifiers or contact information is associated with the collected data, it becomes impossible to match a participant's identity with their respective set of responses. As a result, once a participant has submitted their responses, the data becomes part of an indistinguishable pool, making withdrawal unfeasible.

8.7.7. Potential Ethical Risks and Mitigation Strategies

One potential ethical risk arises from the collection of general demographic information. Even without direct identifiers, certain combinations of demographic details could inadvertently make an individual recognizable, especially within smaller or unique populations. To mitigate this risk, the study employs several strategies. First, all the

demographic data collected is broad, ensuring that no fine-grained details that might pinpoint an individual are gathered. Second, when reporting or sharing data, demographics are presented in aggregate form, making it highly improbable that any single participant could be identified.

Furthermore, participants interacted with fixed-response questionnaires only which eliminated the possibility of open-ended feedback. As a result, there's no opportunity for participants to provide sensitive disclosures as part of the standard data collection process. However, the research team's contact information, including my own and that of my supervisor, has been shared with participants. In the event any participant directly contacted us, sharing information that hinted at potential harm to themselves/ others or indicated involvement in illegal activities, we recognised a duty of care. In such cases, even as we prioritise participant confidentiality, we are prepared to take necessary actions, potentially including breaking confidentiality, solely for the purpose of safeguarding. Participants are made aware of this potential response in the event of direct communication in the informed consent process.

8.7.8. University and External Policies and Standards

This research is rigorously guided by a framework of ethical considerations, stemming both from institutional mandates and broader external standards. We meticulously adhere to several specific policies set forth by the university, department, and pertinent external bodies. Among these are the Durham University's Data Management Policy & Procedures, Data Security Policy, and Ethics Policy, alongside other relevant protocols. Each of these policies offers directives and standards that have shaped the design, execution, and data management of our study. This alignment ensures our commitment to the highest level of ethical conduct in all research activities.

8.7.9. Conclusion and Ethical Assurance

In the realm of academic research, upholding the highest ethical standards is paramount, and this study unequivocally remains devoted to this principle. Every facet of our research design, data collection, and subsequent processes has been executed with an unwavering commitment to ethical rigor. We are profoundly grateful for the oversight and invaluable

guidance provided by both Durham University and our study advisors. Their expertise has been instrumental in ensuring that our endeavours resonate with integrity, transparency, and respect for all participants involved.

8.8. Methods Chapter Summary

In this chapter we delved into the methods employed to test our Complexity Model of Denial, starting with a review and evolution of our original research question. We then focussed on our research design comprising of an analytical cross-sectional survey strategy, which targeted a global adult population using a non-probability quota sampling method resulting in a diverse set of ±4,000 respondents (including pilots). We then shifted our focus to elaborating on how we transformed our systems map into variables as well as how we then assessed these using primary, secondary, and demographic measures. In subsequent sections, we looked at the online platforms used to facilitate the collection of data which helped facilitate global representation and fair compensation. We then continued on to our data analysis strategy which focused primarily on case-based computational modelling using Complex-IT. Thereafter we looked at the ethical considerations undertaken as part of this study including how confidentiality, anonymity, and informed consent were guaranteed. To conclude, we explore the potential limitations of the research design, sampling method, measures used, as well as the data collection and analysis approaches used. In the next chapter, we get to the good stuff, exploring the findings.

Chapter 9 - Findings

"All models are wrong, but some are useful."

— George E. P. Box

In this chapter, we explore the results obtained from our analysis of the data. Initially, we clarify the primary characteristics of our sample. We then show the reliability of our measures, providing some assurances on the dependability of our study's scales. Subsequently, we report on the relationships between the key components of our model of denial of issues of significant societal risk. However, central to the findings, is the presentation of evidence of the different pathway's individuals can take on our proposed model to reach the same conclusion. Here we will rely on a cluster solution devised using COMPLEX-IT, which offers pivotal insights into the multifaceted dynamics of the variables scrutinised. From our model, distinct clusters emerge—each encapsulating unique patterns and features. A granular examination of each cluster uncovers how varied dimensions interplay within them. Finally, we contrast and compare these clusters, shedding light on their distinguishing and shared attributes, enriching our understanding of their underlying nuances. The goal of this chapter is to present the findings of our research to you in systematic way to make sense of a data set that involves a large number of variables and an even larger number of cases. For readers unaccustomed to complexity methods, this approach may at first feel a bit unusual, however persistence will pay dividends.

9.1. Sample Description

In this section, we offer a comprehensive overview of the sample from which our data was drawn. An in-depth understanding of the sample's characteristics is pivotal to appreciate the context and nuances of the findings presented later. Here, we detail the demographic, socio-economic, and other pertinent features of our participants, providing a clearer backdrop against which the study's results can be interpreted (see Figures 9.1 through 9.7 as well as Table 9.1). Unless specified differently, assume all figures relate to the final sample of n=1,119.
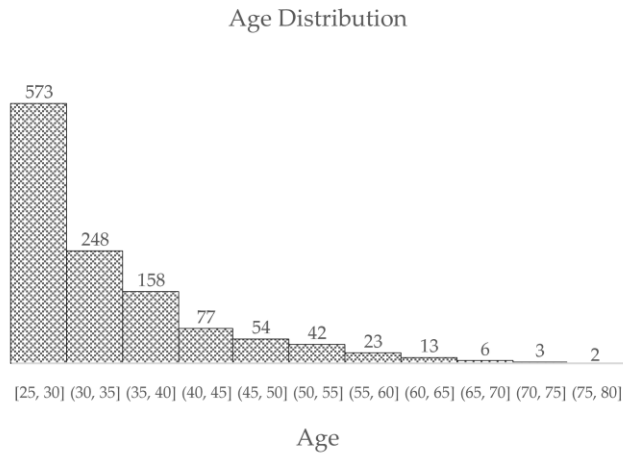
Figure 9.1: Age Distribution
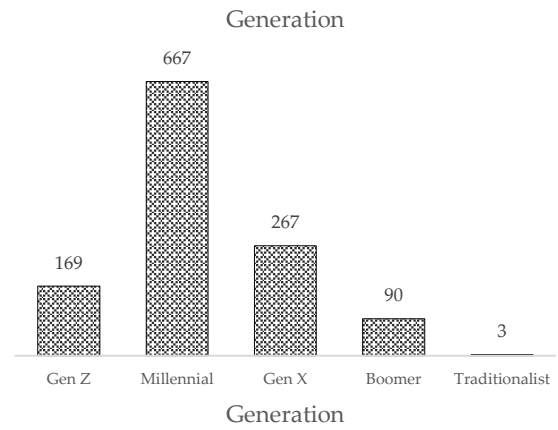
Figure 9.2: Generation Distribution
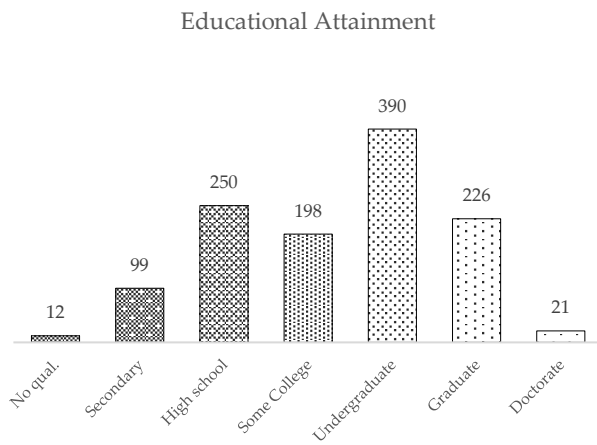
Figure 9.3: Educational Attainment Distribution
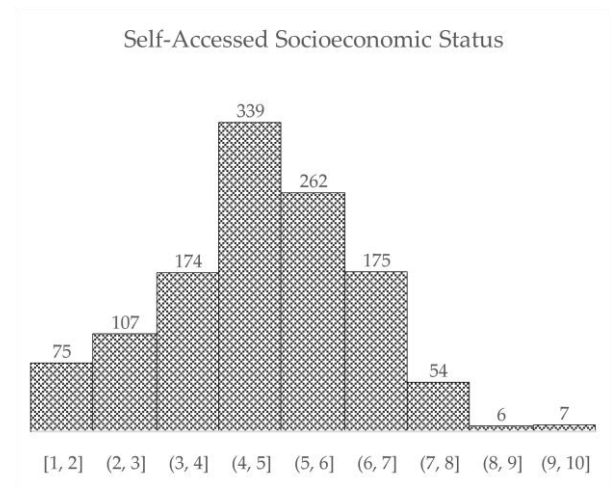
Figure 9.4: Socio-Economic Distribution
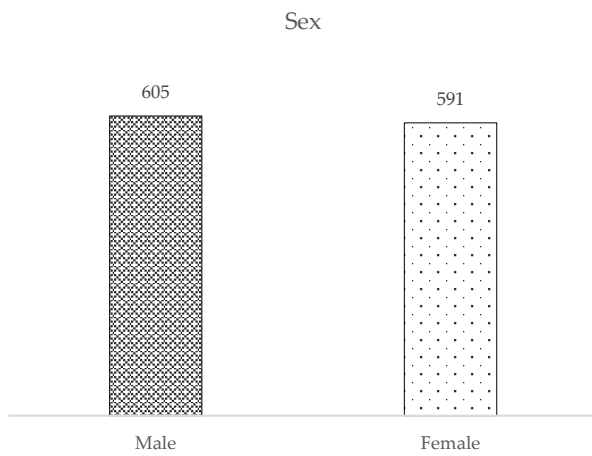
Figure 9.5: Gender Distribution
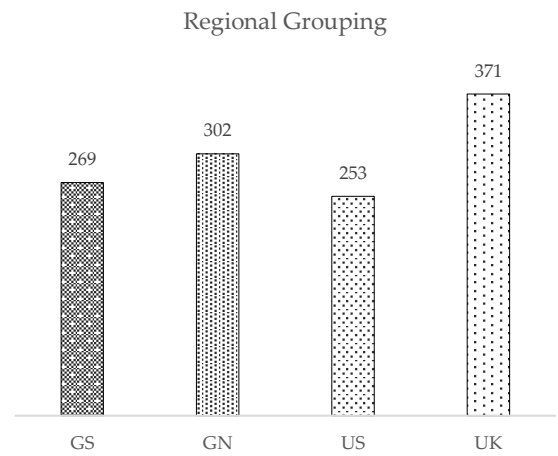
Figure 9.6: Geographical Distribution

255

Nearly half of all participants were under the age of 30, with a sample age range of 25 to 85 years of age. Around half of the respondents fell between the ages of 25 to 30 at the time of data collection. Consequently, around half of participants are Millennials (see Figures 9.1 & 9.2). The major of respondents (70%) reported having at least a high school diploma, some college, or an undergraduate degree (see Figure 9.3). In terms of self-assessed socio-economic status, the majority placed themselves around or below the average (see Figure 9.4). The gender distribution of the sample was virtually even as per the sampling strategy (see Figure 9.5). In terms of a nationality breakdown, Table 9.1 provides the necessary details. While 30 nationalities were represented, as per the sample strategy, these were categorised into four global regions US, UK, GN, GS (see details on subsequent page).

Table 9.1: Sample Distribution by Nationality

#	Country of Residence	Geo Region	#	%
1	United Kingdom	UK	372	31.0%
2	United States	US	255	21.3%
3	South Africa	GS	222	18.5%
4	Poland	GN	43	3.6%
5	Portugal	GN	41	3.4%
6	Italy	GN	39	3.3%
7	Mexico	GS	38	3.2%
8	Canada	GN	35	2.9%
9	Spain	GN	23	1.9%
10	Greece	GN	22	1.8%
11	Netherlands	GN	16	1.3%
12	Ireland	GN	15	1.3%
13	France	GN	14	1.2%
14	Germany	GN	14	1.2%
15	New Zealand	GN	6	0.5%
16	Sweden	GN	5	0.4%
17	Australia	GN	4	0.3%
18	Chile	GS	4	0.3%
19	Czech Republic	GN	4	0.3%
20	Finland	GN	4	0.3%
21	Latvia	GN	4	0.3%
22	Estonia	GN	3	0.3%
23	Slovenia	GN	3	0.3%
24	Austria	GN	2	0.2%
25	Belgium	GN	2	0.2%
26	Denmark	GN	2	0.2%
27	Hungary	GN	2	0.2%
28	Japan	GN	2	0.2%
29	South Korea	GS	1	0.1%
30	Norway	GN	1	0.1%
31	Switzerland	GN	1	0.1%
	Total		**1199**	**100.0%**

The four regional groups were based on the desire to test our theory in different global contexts. The Global South (GS), the Global North (GN), with the US, and the UK separated out for special attention. Despite our sampling strategy, slightly more residents of the United Kingdom participated (31% UK) versus respondents from other designated geographical regions for this study, the Global South (22% GS), the Global North (25% European Union States + Canada + Australia, etc.), and the US (22% United States). The Global South sample was disproportionately made up of South African respondents (85%) and a small number of Mexican, and Chilian nationals.
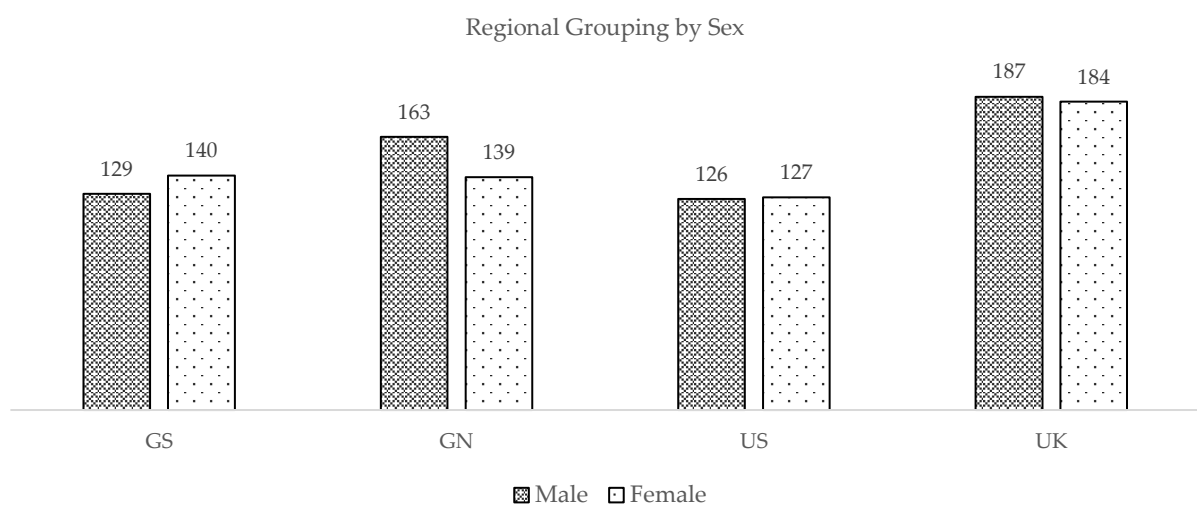
Figure 9.7: Regional Group Sex Distribution

Overall, the sample distribution by geographical region and sex was relatively even, with the exception of the respondents from the Global North, where males represented a slightly higher proportion (54%) of this sample regional subgroup.

9.2. Reliability

In the following section, we address the reliability of the measures employed in this study. We utilised Cronbach's Alpha, to evaluate the reliability (internal consistency) of the measures we used. This statistic provides insights into the extent to which items within a scale cohesively measure the same underlying construct. The results presented here largely confirm the robustness of our instruments.

Section	Construct	Measure	Dimensions	# items	n	α
Measures	Denial	The Societal Risk Denial Scale (Developed)	Climate Change	4	1188	.911
			COVID-19	5	1175	.790
			Vaccination	4	1179	.835
			Conspiracies	6	1174	.706
			Control	5	1179	.569
	Institutional Trust	Institutional Trust Scale (Developed)	Mainstream: Global Public Institutions, Science, Media, Public Health	5	1174	.888
	Epistemic Trust	Epistemic Trust, Mistrust, and Credulity	Trust	5	1176	.753
			Mistrust	5	1177	.628
			Credulity	5	1183	.735
	Adult Attachment	The Adult Attachment Orientations Scale	Secure Attachment	6	1189	.888
			Avoidant Attachment	7	1177	.787
			Anxious Attachment	7	1174	.826
	Reactance	Fear of Disempowerment Scale	Fear of Disempowerment (Reactance)	4	1189	.885
	Personal Values	The Portrait Values Questionnaire (PVQ)	Benevolence	2	1191	.532
			Universalism	2	1191	.508
			Stimulation	2	1193	.692
			Self-Direction	2	1193	.466
			Achievement	2	1193	.736
			Power	2	1189	.486
			Tradition	2	1194	.303
			Conformity	2	1189	.712
			Security	2	1197	.601
	Core Beliefs	The Cultural Worldview Indices	Hierarchist	3	1183	.690
			Individualist	3	1187	.637
			Egalitarian	3	1190	.736
			Fatalist	3	1188	.712
	Institutional Trust Epistemic Trust	Measure of Perceived Societal Tension	Poor vs. rich, Management vs. workers, Men vs. women, etc.	9	1162	.810

For obvious reasons, no internal reliability scores for single item construct measures are reported. However, where dimensions were assessed using multiple items, the internal consistency observed across these items was reported. More specifically, the "*Societal Risk Denial Scale*" designed specifically for this study exhibited an overall average alpha score of.76, indicating a reasonably high level of internal consistency across the sub-dimensions assessed. Similarly, the "*Adult Attachment Style Questionnaire*" adapted for this study performed even better, with an average dimension level alpha score of .83. The results of a complete factor analysis of this adapted attachment questionnaire can be found in Annex B. Equally, the "*Institutional Trust Scale*", the "*Epistemic Trust, Mistrust, and Credulity Questionnaire (ETMCQ)*", and the "*Fear of Disempowerment Scale*" had reasonably high to high, average dimension level alpha scores between .7 & .9. In contrast, the "*The Portrait Values Questionnaire (PVQ)*" displays relatively varied reliability across its dimensions. Notably, some dimensions such as "*Tradition*" (.303) and "*Self-Direction*" (.466) exhibit disappointing low alpha scores, suggesting that these dimensions might not have consistently measured their intended constructs. Such low alpha scores raise concerns about this measure's ability to reliably capture these specific value constructs. Finally, the data collected appears to have a mostly consistent sample size across measures, ranging around 1,175 to 1,197 respondents indicating that the vast majority of respondents (±99%) completed all measures. In conclusion, while most of the measures used in our study exhibited high reliability, special consideration needs to be given to results obtained on certain dimensions of PVQ when making inferences.

9.3. Results

Now that we have established where the data came from and that it is generally reliable, we can turn our attention the results. This is done in two sections. In the first, we look at how the constructs included in our model related to each other when looking at the sample as a whole. Then, in the second, having employed COMPLEX-IT to cluster out our sample using the main facets of our model (denial & trust), we investigate the similarities and differences observed among these clusters.

9.3.1. Model of Denial related to Issues of Significant Societal Risk

In this section we report the two-tailed, zero-order correlation relationships between the various constructs that comprise our model. Correlations marked with '*' were significant at <.001. This analysis allows us to obtain a descriptive overview of how our constructs of concern are related to each other more generally. A complete correlation table of all variables is included in Annex C.

9.3.1.1. *Observed Relationship between Denial & Trust*
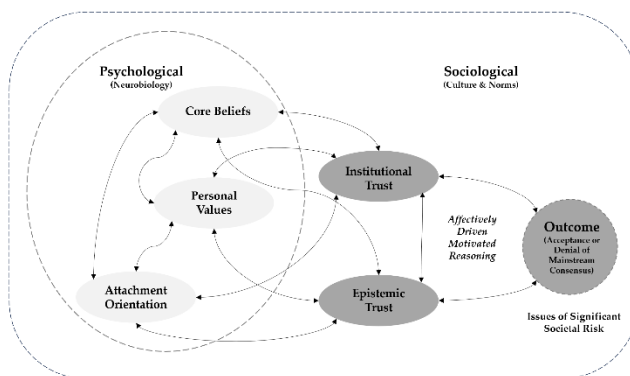
Figure 9.8 System Map – Denial & Trust

The map presented in Figure 9.8 not only serves as a reminder of our model, but also helps to highlight which particular relationships we intend to focus on in each this section. Based on the dark grey dimensions highlighted on the map, we will examine the relationship between our outcome, which is the denial of mainstream consensus, and trust. This includes both institutional/epistemic trust and generalised trust, even though the latter isn't explicitly shown on the systems map. On the next page these highlighted areas are zoomed in on in Figure 9.9 which details the observed relationship between the variables.
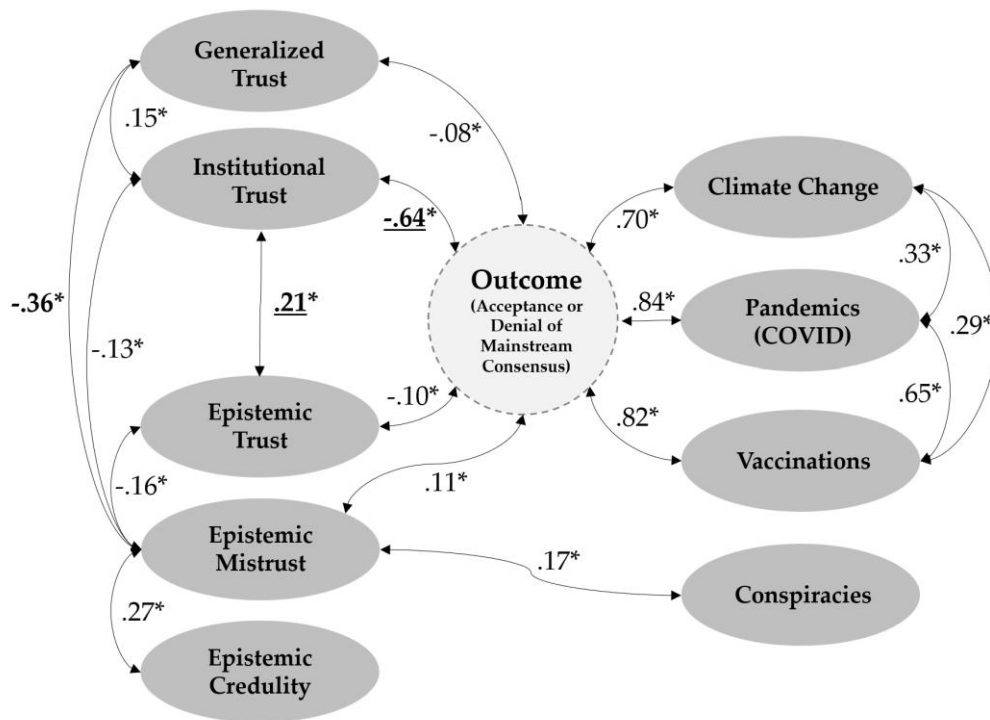
Figure 9.9: Observed Relationships between Denial & Trust in Total Sample

For the purposes of our model, and given their strong interrelation to each other, the three measures of denial were collapsed into a single "*denial of the mainstream consensus (DMC)*" variable by taking the averages of the scores obtained on climate change denial, pandemic denial, and vaccine denial. In the context of our study, a higher score of our denial measure indicates a greater propensity to reject the mainstream consensus on all three issues, while a higher trust score indicates a greater propensity for trust, except for epistemic mistrust where a higher score here indicates the opposite.

Possibly the most striking, yet unsurprising, finding (see here is the strong negative relationship between mainstream institutional trust and DMC with a correlation coefficient of -.64. Epistemic trust, mistrust, and generalised trust respectively had rather weak, yet significant correlations of -.10, .11, and -.08 with DMC respectively. However, epistemic trust appears to have a moderate yet significant relationship with institutional trust. Taken as a whole, and consistent with previous studies, the data suggests that distrust of mainstream institutions is a key driver of denial of the mainstream consensus on issues of significant societal risk, while epistemic trust appears, at least in part, to be a driver of institutional trust rather than being a significantly related to denial itself. While not entirely relevant to our model, a significant and strong negative relationship (-.36) was observed

between generalised trust and epistemic mistrust suggesting that epistemic mistrust may be rooted in a more generalised mistrust of others.

9.3.1.2. Observed Relationship between Trust & Attachment Orientation
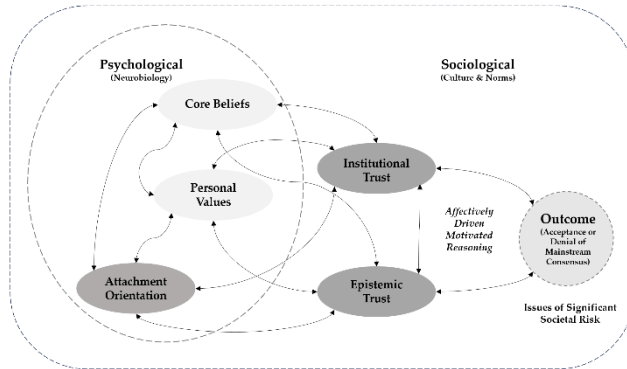
Figure 9.10: Systems Map - Trust & Attachment

A significant part of our theoretical model was built on the premise that our attachment orientation impacts our ability to trust. Next, we'll look at the relationship between attachment orientations and trust.

As can be observed in Figure 9.11 on the next page, contrary to our hypothesis that avoidant attachment would result in significantly less institutional trust, the data suggested only a weak, but statistically significant, negative relationship at -.09. However, the hypothesis that anxiously attached individuals would demonstrate the greatest levels of institutional trust appears to be supported, albeit, only moderately with a .21 correlation. Similarly, the more secure a person assessed themselves to be, the greater their levels of institutional trust. However, once again, this relationship was on the weaker side at .18.
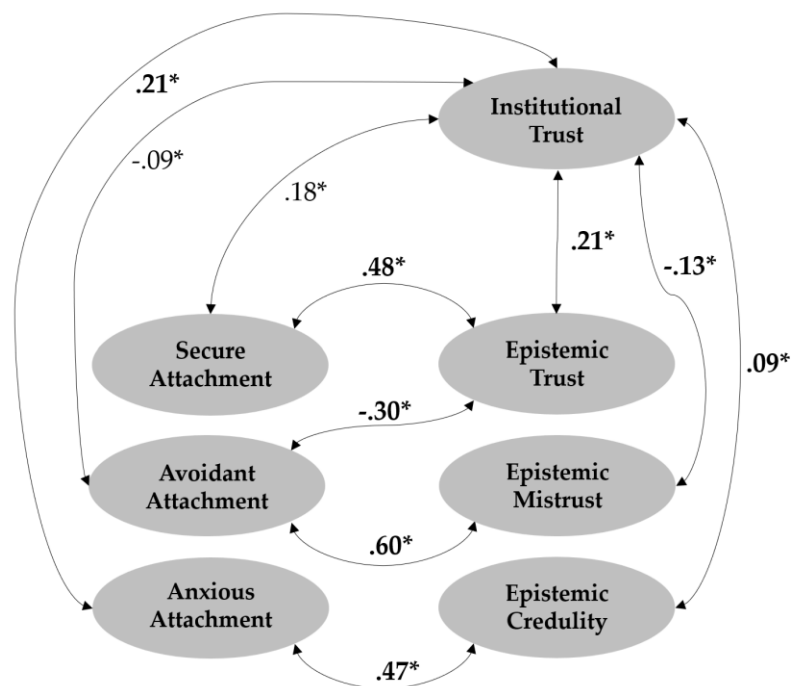
Figure 9.11: Attachment & Trust

Strong relationships were observed between self-reported attachment orientation and the dimensions of epistemic trust. More specifically, epistemic trust appears to be strongly related to secure attachment (.48*) and negatively correlated with avoidant attachment (-.30*). Epistemic mistrust on the other hand, appears to be strongly associated with an avoidant attachment orientation (.60*). Epistemic credulity had a significant and strong relationship with an anxious attachment orientation (.47*).

In sum, it would appear that while one's attachment orientation has a weak to moderate relationship with institutional trust, it appears to have a significant and strong relationship with epistemic (mis)trust and credulity. While not included in Figure 9.11, generalised trust was positively correlated with a secure attachment style (.29*) and negatively correlated with an avoidant attachment style (-.26*). No relationship was observed between generalised trust and anxious attachment style (.02). Therefore, we can likely conclude that our attachment orientation significantly influences our epistemic trust, suggesting that early relational experiences might at some level shape/influence our trust in communicated knowledge and authoritative institutions.

9.3.1.3. Observed Relationship between Trust & Core Beliefs
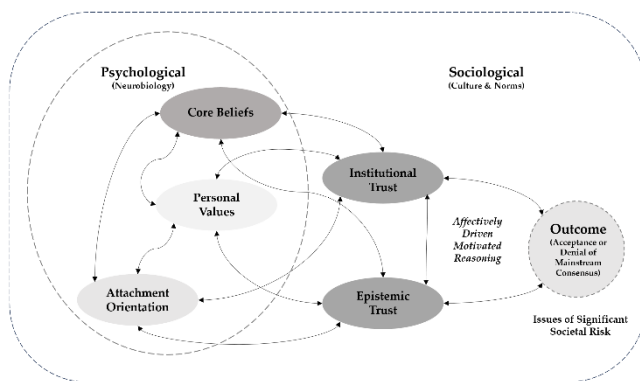
Figure 9.12: Trust & Core Beliefs

Next, we'll look to our core belief orientations to see how this impact our trust. Core belief orientations, according to Douglas' Cultural Theory of Risk, were assessed using two distinct measures, the first of which was specifically designed for this study by asking respondents to identify which approach they thought was best suited to dealing with issues of significant societal risk, while the second measure was the "*Cultural Worldview Indices*" which assessed these dimensions more indirectly and in a general manner.
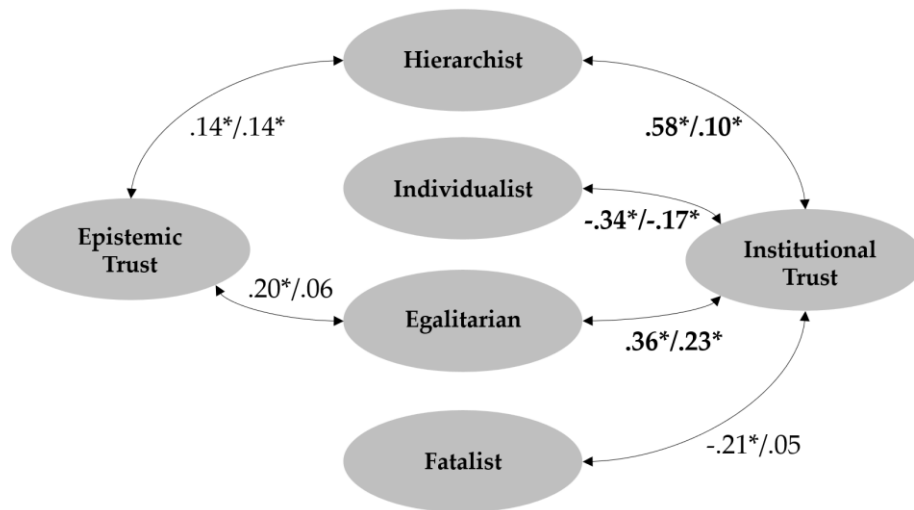
Figure 9.13: Core Beliefs and Trust

On both measures, institutional trust demonstrated robust relationships with the various core belief orientations that form part of Douglas and Wildavsky (1983)'s model. As theorised, both a hierarchical and egalitarian orientations demonstrated a significant positive relationship with institutional trust, while an individualist orientation revealed a moderate to strong negative correlation on both measures. The relationship between a fatalistic orientation and institutional trust is less clear with the two measures delivering inconsistent results. The hierarchist and egalitarian orientations were also positively related to epistemic trust, though these relationships appeared to be weaker than those observed for institutional trust. Taken together, it would appear our core belief orientations have a large and significant impact on our willingness to trust mainstream institutions. While not depicted in Figure 9.13, the individualist and fatalist belief orientations had a weak but significant relationship with epistemic mistrust (.09/.14 and .08/.15 respectively). No significant correlations were observed between any of the core belief orientations and generalised trust.

9.3.1.4. Observed Relationship between Trust & Personal Values
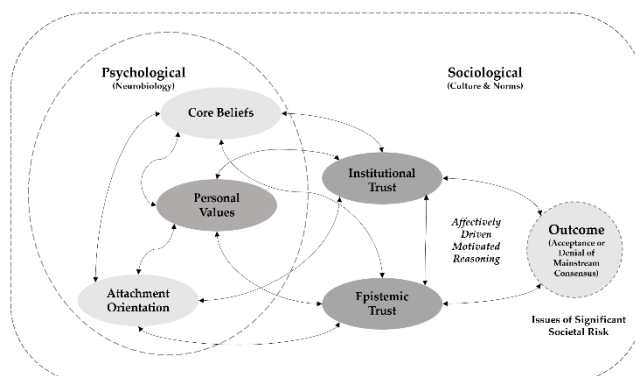
Figure 9.14: Systems Map - Trust & Values

But what about the relationship between one's values orientation and trust? Only a few of the values and value amalgams were weakly related to institutional trust. Higher levels of benevolence and

universalism, which in turn helped constitute the self-transcendence and the social and growth-anxiety-free values orientation amalgams, were significantly, but weakly related to institutional trust.
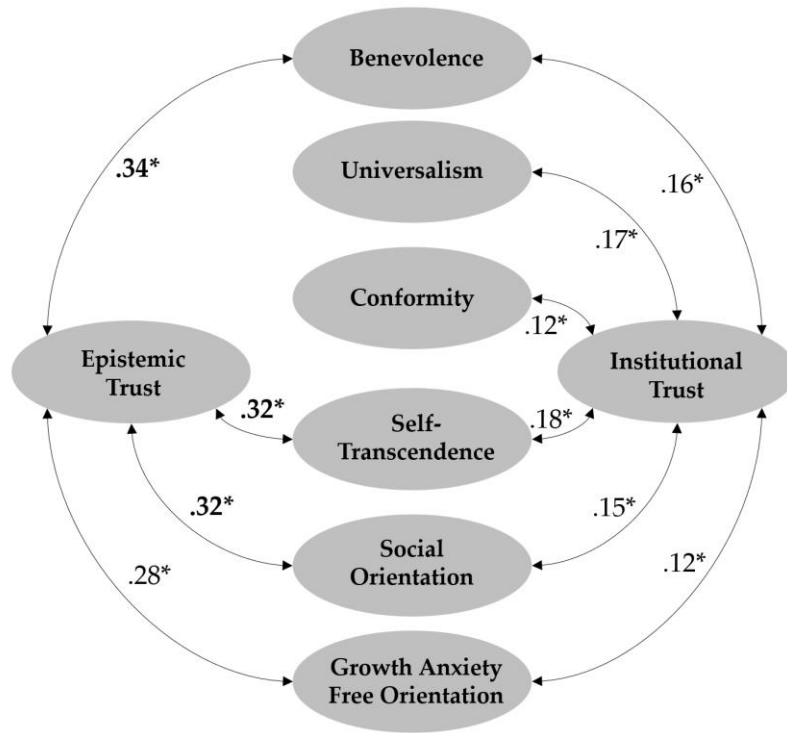
Figure 9.15: Personal Values & Trust

However, benevolence, as well as the social and growth-anxiety-free values orientations amalgams were more strongly and significantly related to epistemic trust, suggesting that there may be a values component to this form of trust. No other noteworthy relationships were observed between personal values and the other facets of epistemic trust, mistrust, and credulity. It would appear then that our values orientations have more to say about our faith in communicated knowledge (epistemic trust) than our trust in mainstream institutions.

9.3.1.5. Observed Relationship between Trust & Secondary Variables

Along with the constructs collected as part of the systems map, data was also collected on other theoretically relevant sociological and psychological constructs.
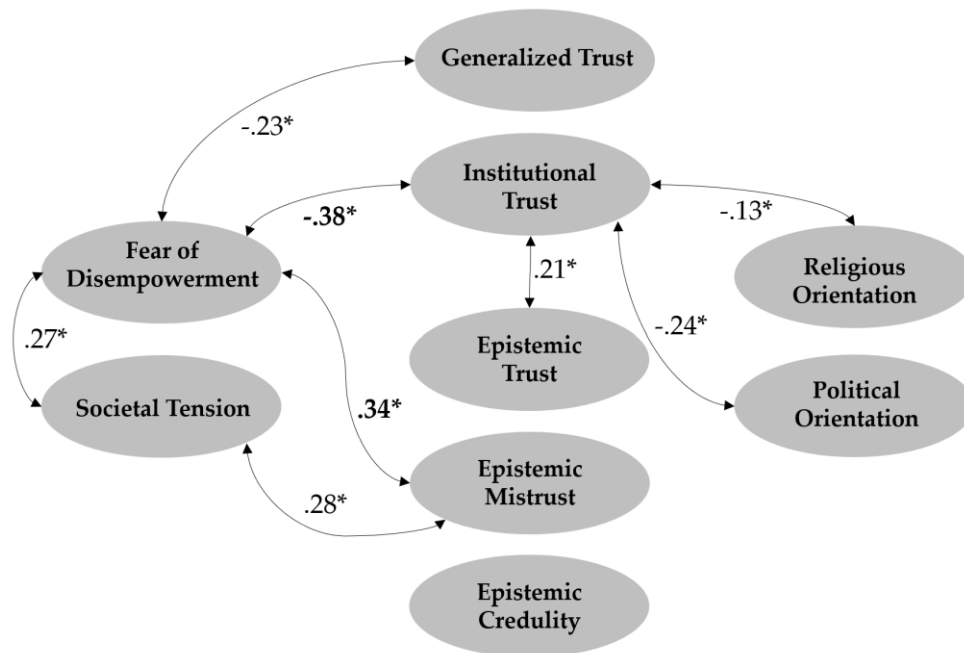
Figure 9.16: Secondary Variables & Trust

Both reported political orientation and religious orientation were somewhat negatively correlated with institutional trust. While these relationships were on the weaker side, they appear to trend in manner which would suggest that politically conservative views and religiosity are related to mainstream institutional distrust. However, the relationship was not as strong as with the fear of disempowerment (aka reactance), where there was a significant and strong negative relationship between it and mainstream institutional trust (-.38). It should hardly come as a surprise that those that believe that "*those in charge*" are acting with malevolent intent, may be sceptical of communicated knowledge originating from mainstream authoritative institutions. Reactance was also significantly correlated with epistemic mistrust (.34) and had a moderate negative correlation with generalised trust (-.23). No discernible relationship between generalised trust and either political or religious orientation was observed. Unlike what was reported in the Eurofound (2017) study, societal tension did not demonstrate any kind of significant relationship with institutional trust (.02) but was significantly, albeit moderately, related to epistemic mistrust (.28) and a fear of disempowerment (.27). Of further interest, is that epistemic trust and credulity were unrelated to reported religious and political orientations.

9.3.1.6. *Observed Relationship between Personal Values & Core Beliefs*
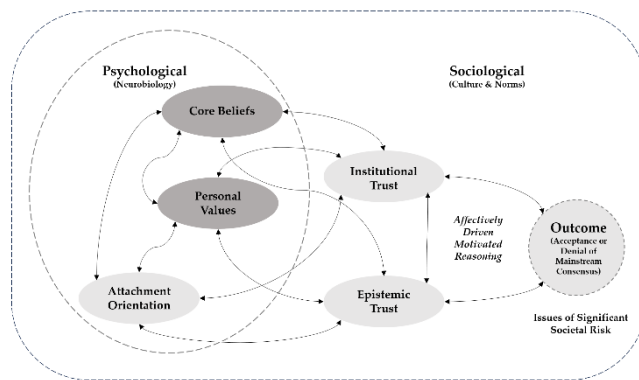
Figure 9.17: Systems Map - Beliefs & Values

The next set of relationships to investigate which form part of our model is that between core beliefs and personal values as per Figure 9.18. Of the four core belief orientations, only two demonstrated any kind of relationship with the personal values assessed as part of this study. Our observations revealed no discernible relationship between the personal values or personal values amalgams and individualist/fatalist core belief orientations. The only exception being a weak positive relationship between the individualist core belief orientation and the value of self-direction (.15*/.14*). However, several moderate to strong correlations were observed between the hierarchist and egalitarian belief orientations. Hierarchists appear to value security and conformity as well as the values amalgams of conservation, social-orientation, and self-protection-anxiety-avoidance. Egalitarians on the other hand, had significant and strong correlations with universalism, self-transcendence, and a growth anxiety-free orientation but no relationship with conformity. While the egalitarian orientation had a stronger relationship with the growth-anxiety free values amalgam, the hierarchist orientation appeared more aligned with the self-protection-anxiety-avoidance amalgam. Though both appear to share a social personal values orientation, the hierarchist is more aligned with a desire for security and conformity while the egalitarian orientation is more aligned with self-transcendence. Either way, as predicted by our theoretical model, what we deem to be fundamentally important and what we deem to be foundationally true appears to be informed by one another, at least for a particular subset of values and beliefs.

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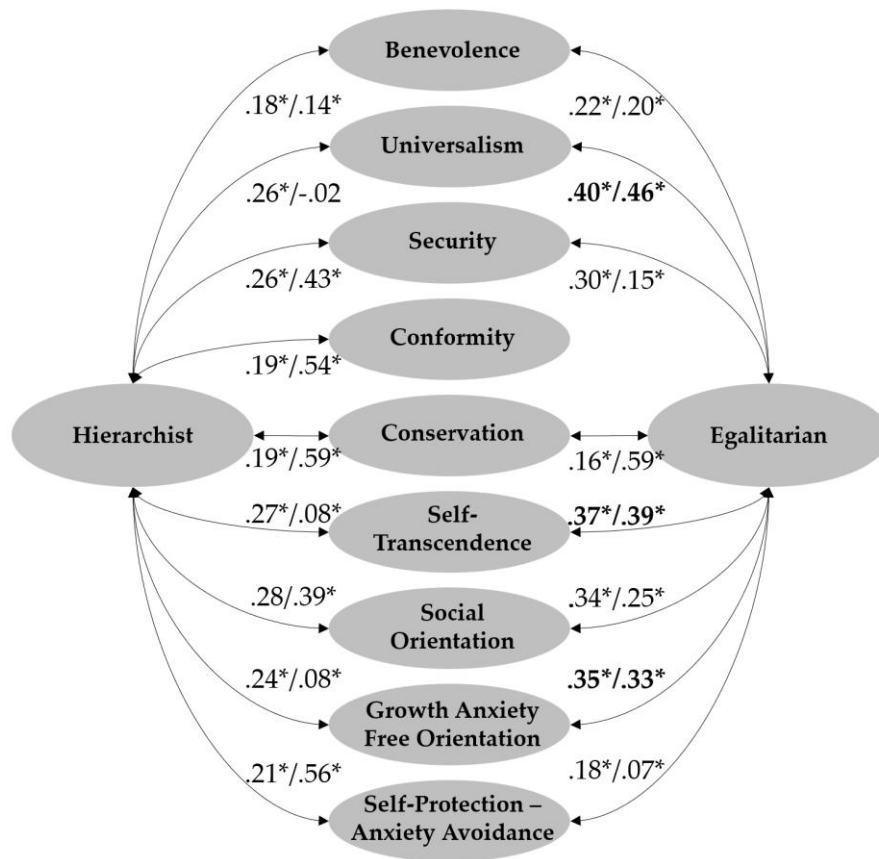
Figure 9.18: Core Beliefs & Personal Values

9.3.1.7. Observed Relationship between Attachment & Core Beliefs
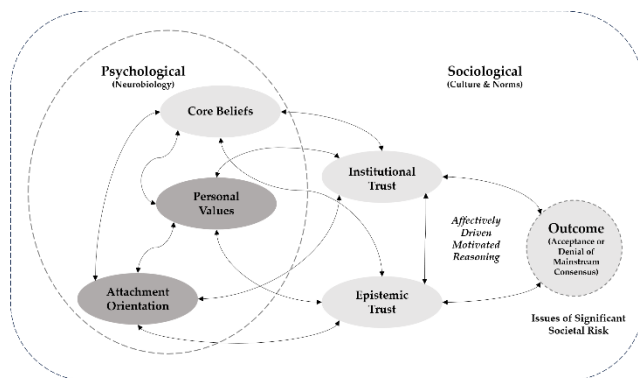
Figure 9.19: Systems Map - Attachment & Values

As per Figure 9.20, it would appear as if our attachment orientations exerted a weak to moderate force on our values orientations. More securely attached individuals seem to be somewhat more likely to endorse benevolence and universalism as personal values while no such positive relationship was observed in the two insecure attachment styles. To the contrary, an avoidant attachment style was negatively correlated with benevolence and seemed to suggest a lower overall social values orientation. The anxious attachment style appeared to have the strongest connection with personal values overall, with moderate significant positive relationships with benevolence, power, self-enhancement, social/personal focus, and a self-protection anxiety-avoidance

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values orientation. Neither the secure, nor the avoidant attachment style, demonstrated any additional values relationship.
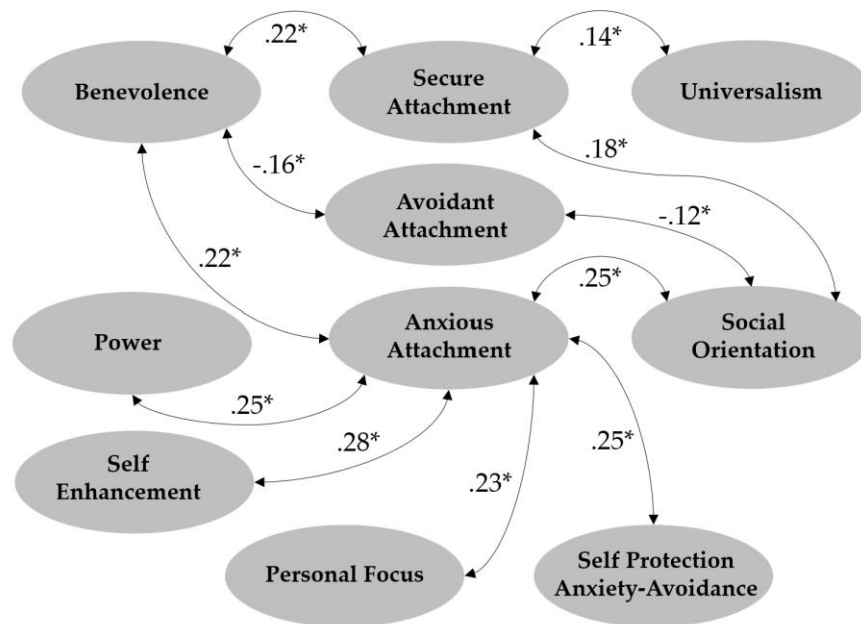
Figure 9.20: Attachment Orientation & Personal Values

9.3.1.8. Overview of the Relationships observed in the Model on Denial of Issues of Significant Societal Risk

Informed by the findings presented so far, the system map presented in Figure 9.21 provides a graphical overview of the strength of the relationships observed between the various components that make up our model[131]. In the map below, the thicker the line, the stronger the observed relationship between the components of the model. When looking at the data as a whole, it would appear as if denial of issues of significant societal risk is driven largely by the distrust of mainstream institutions. This distrust, in turn, appears to be significantly influenced by our core belief orientations. However, our propensity (or lack therefore) for epistemic trust also appears to exert a moderate but significant influence over our ability to trust mainstream institutions.

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[131] For a detailed overview of how these components were operationalized please see section 8.4
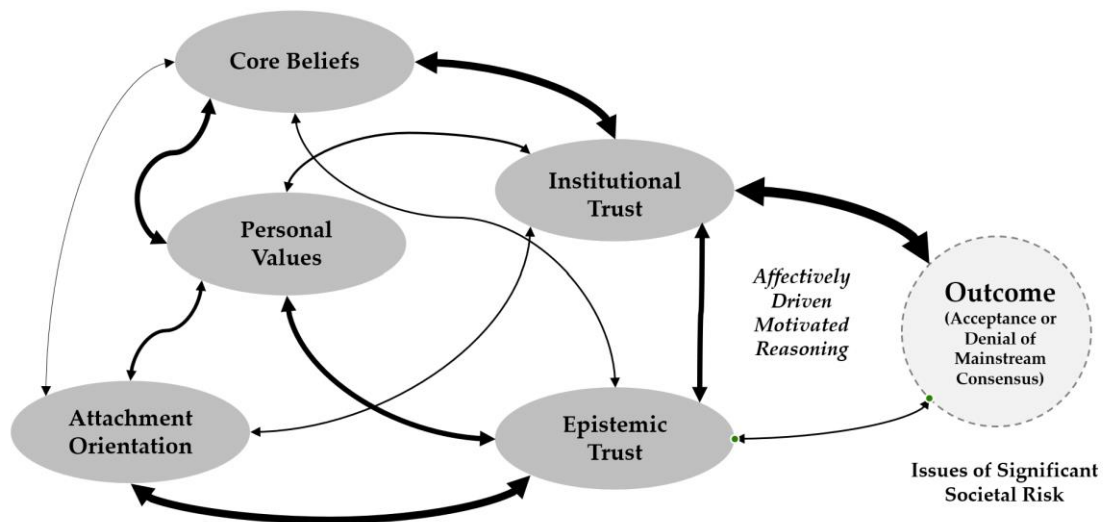
Figure 9.21: Summary of dimensional relationships based on the zero-order correlation results

In turn, our willingness to trust communicated knowledge (epistemic trust) appears to be strongly related to (perhaps influenced by) our attachment orientations and our personal values orientation, although the latter appears to do so to a lesser extent. However, our attachment orientation did not appear to exert a strong influence over our willingness to trust mainstream institutions, although a moderate but significant relationship was observed particularly for anxiously attached individuals. Core beliefs, which had an outsized impact on institutional trust, appears to be influenced by our personal values orientation, but not our attachment orientation. Our attachment orientation did however appear to have a moderate impact on our personal values orientation.

So that is that. We have our answer…or do we? In the next section, using case-based computational modelling we see that the story is, well, more complex than that. When subjected to clustering according to the two core elements of our model, denial and trust, we see that not everyone follows this same path to denial.

9.3.2. Case-based Computational Model of Denial

Our denial and trust variables were fed into COMPLEX-IT and using K-mean centroids, a three-cluster solution was obtained that resulted in a pseudo-F of 336.03 and an average cluster silhouette size of .17. The table below summarises the results based on differences in dimension level averages observed in each cluster.

Table 9.3: K-Mean Centroids Cluster Solution (Average of each dimension on a 1 to 7 scale)

Cluster	Size	CliC	Cov	Vax	IT	ET.T	ET.M	ET.C	Gen.T
(1)	519	1.94↓	2.13↓	2.34↓	4.91↑	5.08↑	2.67↓	4.91↑	3.76↑
(2)	426	2.35↓	3.64↑	3.67↑	4.10↑	5.25↑	3.73↑	4.10↑	3.35↓
(3)	247	4.14↑	4.62↑	4.69↑	2.24↓	4.57↓	2.51↓	2.51↓	3.28↓
Total/Ave.	1192	2.54	3.19	3.30	4.07	5.03	3.02	4.07	3.51

This cluster solution was the extracted from COMPLEX-IT and paired with all the observed variables obtained from the sample. Now let's look at how these three clusters compare to one another on beliefs, values, attachment styles, political and religious orientation, socio-economic status, etc. All variables assessed are reported for each cluster in Table 9.4 which summarises the results observed along, with one-way ANOVA F-test statistics. However, let's first investigate these differences by dimension.

9.3.2.1. Clusters vis-à-vis Denial

On the three variables of denial there are significant differences of interest that were observed pointing to nuanced distinctions among the derived clusters. Clusters 1 and 2 displayed below-average levels of climate change (CliC) denial, with Cluster 1 aligning closely with mainstream consensus across all domains, thereby termed "*Accepters*". Cluster 3 exhibited above-average levels of denial, across all three domains including climate change (CliC), pandemics (COV) and vaccines (Vax), distinguishing itself as the "*Denialist*" group. Cluster 2, or "*Hesitants*", demonstrated a general acceptance of climate change but expressed reservations about pandemics and vaccines, indicating a nuanced stance that merits further exploration within our study.

To elaborate, in our study the term "*Denialist*" is preferred over a term such as "*Sceptic*" to label individuals who consistently doubted well-established scientific claims about climate change, pandemics, and vaccines, as indicated by their scores above the midpoint on a Likert scale. This choice is clarified by differentiating between scepticism and denialism in a scientific context. Scientific scepticism embodies a critical approach, demanding robust evidence before accepting claims. It's a cornerstone of scientific inquiry, necessitating the rigorous evaluation of evidence. However, the pattern exhibited by Cluster 3 in this study deviates from this form of scepticism. Despite the overwhelming evidence supporting

climate science, epidemiology, and immunology, these individuals consistently displayed an above average level of doubt.

As discussed in Chapter 2, given the complexity and volume of evidence in these fields, a thorough evaluation of all available information is often beyond the capacity of the general public, likely represented in this sample. While acknowledging the possibility of genuine sceptics within the group, it seems reasonable to assume that the overwhelming majority fall outside this category based on the defined criteria. Thus, the term "*denialist*" is employed to denote a stance that extends beyond healthy scientific scepticism, reflecting a systematic doubt across on a variety of topics based on a distrust in institutions rather than a critical evaluation of the empirical evidence from across diverse scientific areas. This echoes Bardon (2020) use of the term denial when he defined it as being when someone is personally threatened by some set of facts and consequently fails to assess the situation properly according to the evidence, instead arguing and interpreting evidence in light of a pre-established conclusion.

This label is not meant to be pejorative but to accurately represent the observed trend of distrust in established scientific facts in favour of some pre-established conclusion. The use of "*denialist*" better encapsulates the behavioural pattern identified in this research.

Furthermore, while the distinction between the "*Denialist*" and "*Accepters*" seems rather straight forward with a large significant mean difference of **2.35** (m=4.48 vs. m=2.13), the observed differences between the "*Denialist*" vs. "*Hesitant*" and "*Accepters*" vs. "*Hesitants*" may require further justification. As first glance a mean difference on DMC between "*Denialist*" vs. "*Hesitant*" of **1.27** (m=4.48; m=3.21) and **1.08** (m=2.13; m=3.21) between "*Accepters*" and "*Hesitants*" on a 7-point Likert scale may not appear that significant. In fact, on this evidence alone it would appear as if Hesitants could easily be folded into either the "*Denialist*" and "*Accepters*" cluster. However, there are few things to consider before drawing such a conclusion. Firstly, the scale used to determine DMC ranged from "*Extremely Unlikely*" to "*Extremely Likely*" and had no expressed neural point. This is unlike some Likert scales where a *neutral* or *no opinion* mid-point is included. Thus, in this instance a comparison with the mid-point of 4 on the 7-point scale would be inappropriate. This does not mean that the scale used failed to elicit a range of responses. However, because of the

statement prompt: "rate the likelihood of each being *TRUE'*" and the use of "*Extremely*" at the endpoints of the scale, the majority of responses tended to range between 2 and 6. It is reasonable to assume though, when it comes to complex issues, like those assessed in this study, that most individuals are unlikely to endorse the extreme ends of the scale. Therefore, for our purposes, a response of two is interpreted as "*likely true*" while responses above two expresses increasing levels of doubt. A score of 3 is interpreted as of "*significant doubt"* while a score of 4.5 or above interpreted as "very *likely not true*".

While clarification of the scale's operationalization helps us understand why the scale was used in such a nuanced manner, it does little to illustrate if the differences observed on said scale are practically significant for all three clusters. To assuage such fears, as captured in Tables 9.4 and 9.5, several statistical procedures were carried out to demonstrate the distinctness of each cluster. Firstly, the results of a one-way ANOVA $F(2, 1196) = 1283.81$, $p < .001$, $\eta2 = .682$ along with a Bonferroni post-hoc analyse result on the DMC variable was undertaken. The Bonferroni post hoc test for multiple comparisons of mean differences between three clusters on the dependent variable, DMC revealed that the mean difference between "*Accepters*" and "*Denialist*" is significant, $M = -2.35$, $SE = 0.47$, $p < .001$. "*Accepters*" has a mean that is significantly lower than that of "*Denialist*" by approximately 2.35 on the DMC scale. In addition, the mean difference between "*Accepters*" and "*Hesitants*" is also significant, $M = -1.08$, $SE = 0.04$, $p < .001$. "*Accepters*" had a mean that is significantly lower than that of "*Hesitants*" by approximately 1.08 on the DMC scale. And finally, and perhaps most notably, the mean difference between "*Denialist*" and "*Hesitants*" was significant, $M = 1.27$, $SE = 0.49$, $p < .001$. "*Hesitants*" has a mean that is significantly lower than that of "*Denialist*" by approximately 1.27 on the DMC scale. These results indicate that all three clusters differ significantly from each other on the dependent variable DMC. In addition, a Bonferroni correction has been applied to control for Type I error due to multiple comparisons for which a significance level of 0.05 was set. The significant p-values observed ($< .001$) across all cluster comparisons confirm that the mean differences are not due to chance, and the confidence intervals suggest that the true mean differences between clusters are relatively robust and likely to replicate in similar studies. These differences were replicated across the individual dimensions that make up the composite DMC score (i.e. CliC, COV, Vax) and the same outcome was achieved in all cases. The practical significance

of these differences was further reinforced by Cohen's d, a measure of effect size across mean difference. The Cohen's d between "*Accepters*" and "*Denialist*" was 1.84, indicating a large effect size interpreted as a substantial difference in overall DMC between these two clusters. The effect size between "*Accepters*" and "*Hesitants*" is 1.40, also indicating a large effect size. The effect size between "*Hesitants*" and "*Denialist*" was 1.44, suggesting that the difference in overall DMC between these two clusters was also large and practically significant. Again this test was re-run for the composite dimensions of DMC individual. All effect sizes were large and practically significant with the exemption of one, "*Accepters*" vs. "*Hesitants*", which showed a small effect size of 0.40 suggests a much less pronounced difference on climate change between these groups (as mentioned earlier).

These differences are illustrated in Figure 9.22 as well as the observed difference on Conspiracies and General Facts. Differences were observed across all dimension accessed except on 'DMC General Facts' which served as a sanity check to see if respondents were providing considered responses, but also whether they were accepting of common public health guidance, like "*driving while under the influence of alcohol is dangerous*", "*smoking can damage your health*", and "*eating too much sugar is bad for your health (diabetes, obesity)*". All three clusters accepted these general facts as very likely true. This observation further reinforces the difference observed across the clusters on DMC dimension are not due to chance.

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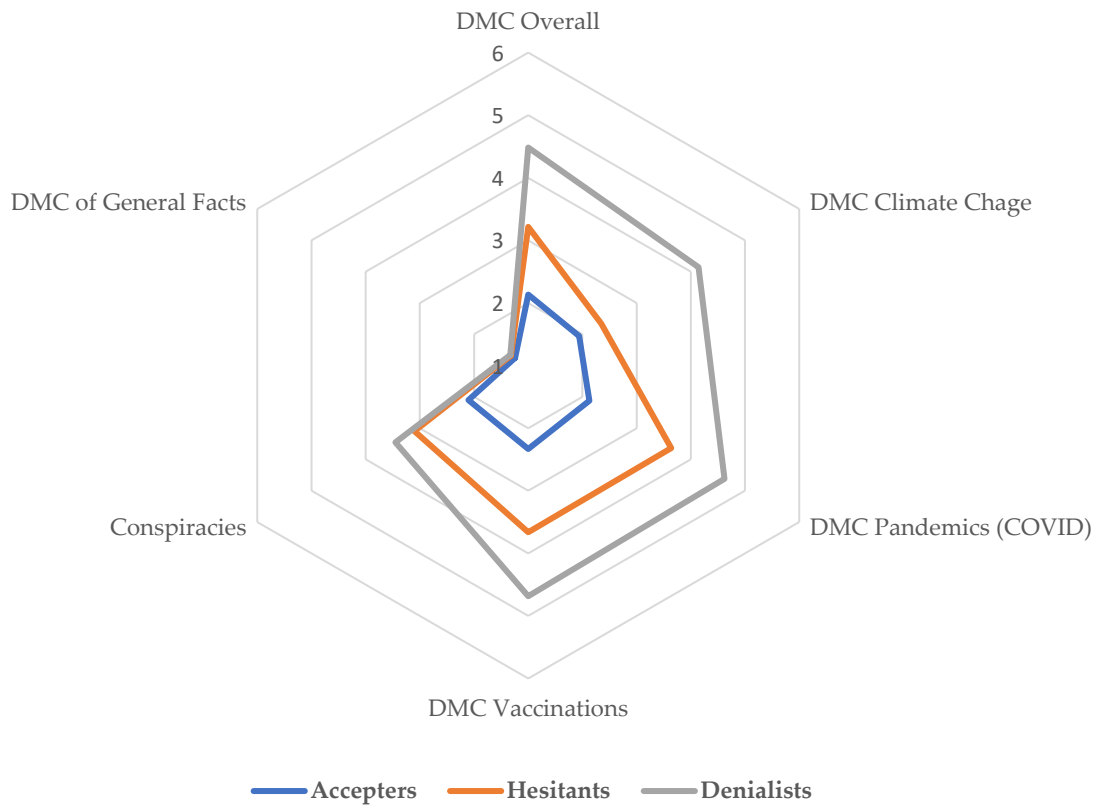
Figure 9.22: Cluster Averages Visualised – Denial of the Mainstream Consensus (DMC)

In terms of cluster distributions, the *Accepters* constituted the majority of the sample at 43%, the *Hesitants* 36%, and the *Denialists* 21% (see Figure 9.23).
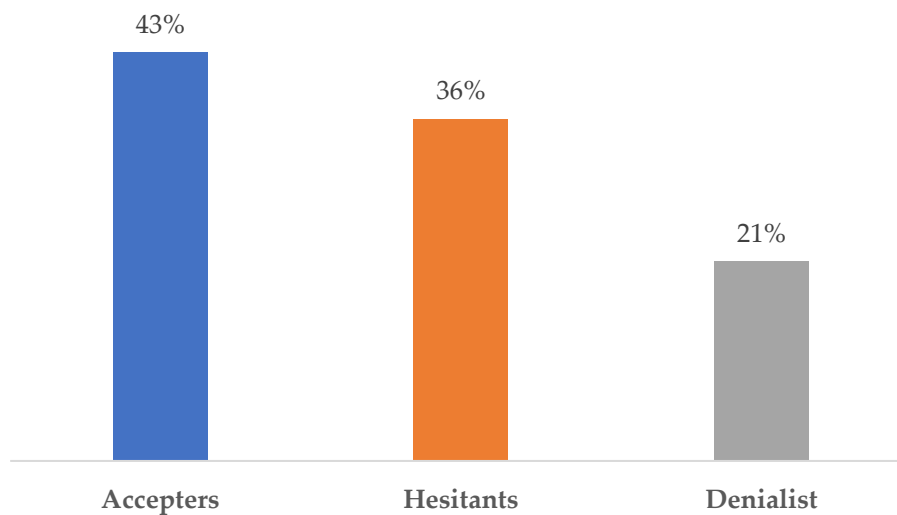
Figure 9.23: Distribution of the Three Clusters identified in the sample

So while the those classified as *Denialists* constitute only about one fifth of those sampled, this is still a significant proportion when projected onto the general population[132].

9.3.2.2. Clusters vis-à-vis Trust

As per Figure 9.24, in relation to the trust dimensions, *Denialists* demonstrated well-below average mainstream institutional trust, below average epistemic trust, below average epistemic credulity and slightly below average levels of generalised trust. Surprisingly, they also showed below average levels of epistemic mistrust. *Hesitants* on the other hand, demonstrated above average institutional trust, above average epistemic trust, but also above average levels of epistemic mistrust, way above average levels of epistemic credulity, and slightly below average generalised trust.
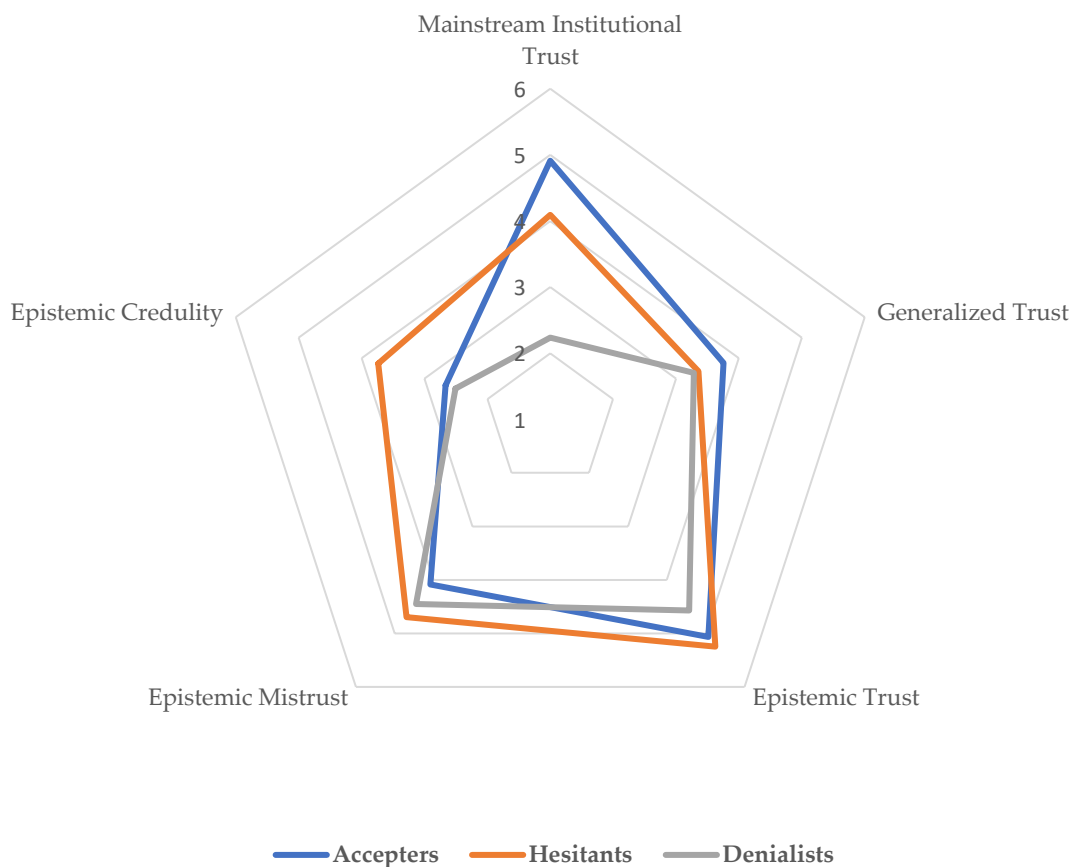
Figure 9.24: Cluster Averages Visualised by Trust Dimensions

Accepters demonstrated the highest levels of mainstream institutional trust overall. On epistemic trust, levels similar to the *Hesitants* were observed, but levels were greater than

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[132] 20% of 8 billion is 2 billion!

those observed in the *Denialists*. *Accepters* had below average epistemic mistrust, and levels of epistemic credulity comparable to those reported by the *Denialists*. *Accepters* displayed the highest levels of generalised trust of the three groups.

9.3.2.3. Clusters vis-à-vis Attachment, Reactance & General Life Satisfaction

As per Figure 9.25, with a partial focus on attachment, while it may appear as if the *Accepters* have higher secure attachment, in fact, the difference observed between *Accepters* and *Hesitants* was not statistically significant (see Table 9.4). However, *Denialists* had below average levels of secure attachment, a difference that was significant relative to those observed in *Accepters* and *Hesitants*. However, on avoidant attachment, only *Hesitants* recorded higher average scores relative to their *Accepter* counterparts. While *Denialists* appear to have higher than average levels of avoidant attachment, this was found to not be statistically significant.
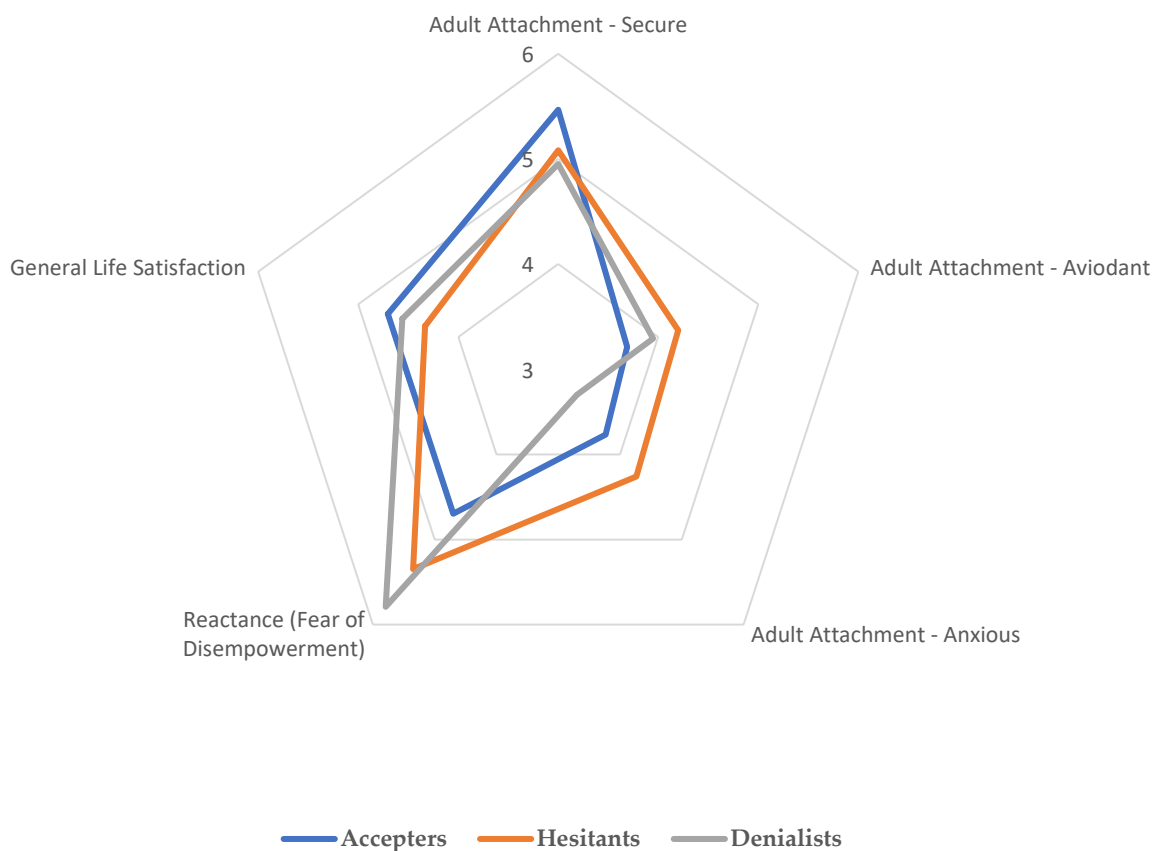
Figure 9.25: Cluster Average Visualised by Attachment, Reactance, and General Life Satisfaction

However, it was the anxious attachment orientation that set the clusters apart, with *Hesitants* demonstrating the highest levels of anxious attachment, the *Denialists* the lowest, and the *Accepters* falling in the middle of these two. On reactance, as speculated, *Denialists* reported significantly higher levels and *Accepters* the lowest. Both *Hesitants* and *Denialists* reported above average levels of reactance with *Denialists* and *Accepters* at the extreme ends. All observed differences on reactance were statistically and practically significant (see Table 9.4). On general life satisfaction, only the *Accepters* and *Hesitants* had a significant difference in reported scores with *Hesitants* reporting somewhat lower scores compared to the *Accepters*. The amount of variance in this dimension for *Denialists* meant that no differences were observed here.

9.3.2.4. Clusters vis-à-vis Core Beliefs

As per Figure 9.26, *Accepters*, on average, demonstrated significantly higher affinity for a hierarchist orientation when it came to beliefs about global risk management though this relationship appeared less clear on the general orientation scale
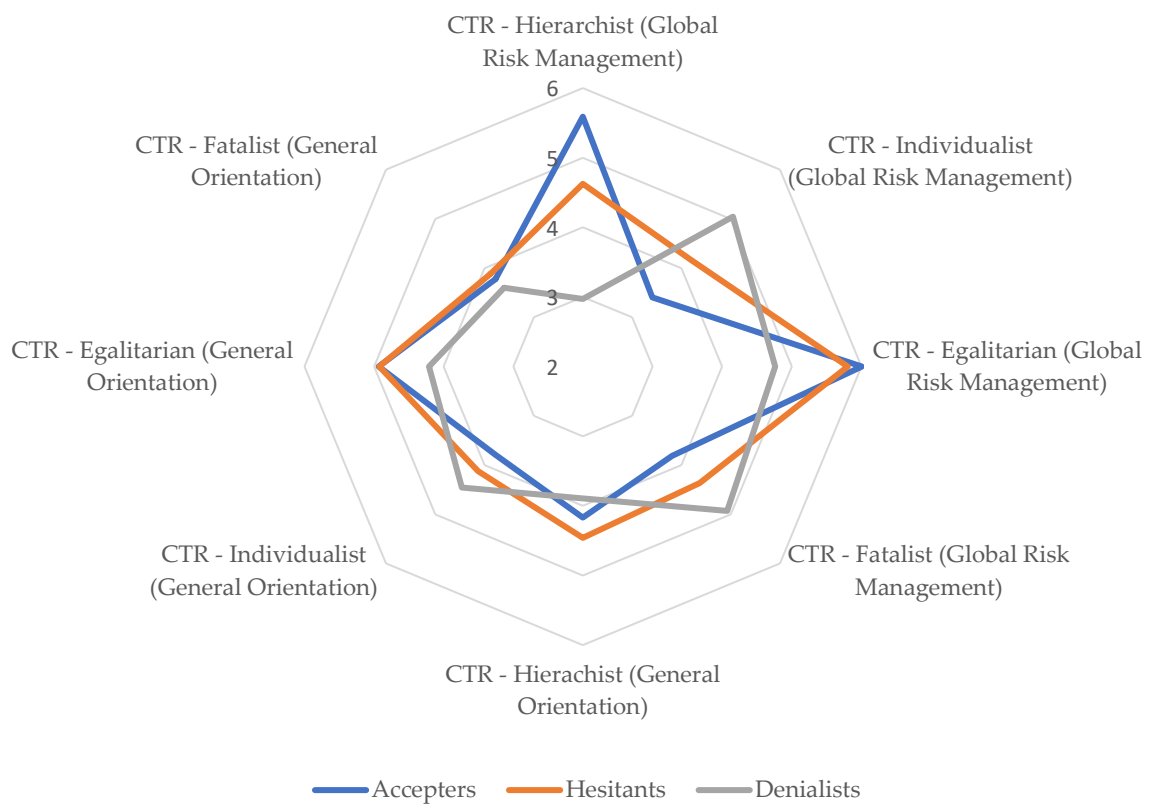
Figure 9.26: Cluster Averages Visualised by Core Beliefs Orientation

They also reported a higher egalitarian belief orientation on par with the levels observed in *Hesitants*. On both measures of core beliefs, *Accepters* were less likely to endorse an individualist or a fatalistic belief orientation compared to the other two clusters. *Hesitants* on the other hand were mixed. They had an above average hierarchist orientation as assessed through both measures and a higher affinity for an egalitarian orientation on par with their *Accepter* counterparts. *Denialists*, however, appeared to have a rather distinct set of core belief orientations. They demonstrated a significantly lower affinity for a hierarchist and an egalitarian orientation. This cluster, as predicted, also reported significantly higher individualist convictions than *Accepters*. *Denialists* also tended to report a more fatalistic orientation when it came to global risk management, preferring self-reliant risk mitigation strategies. On the general orientation measure on fatalism, no significant differences were observed between any of the clusters. In sum then, it would appear that when it comes to belief orientations, the *Accepters* stand in stark contrast to the *Denialists* with the former resonating more with the *Hesitants*.

9.3.2.5. Clusters vis-à-vis Personal Values

When it came to Schwartz' 10 personal values, while significant differences between clusters were observed, these were less dramatic than reported on for the other components of our model. *Accepters* recorded a slightly below average affinity for tradition, and while statistically significant, the reliability of this dimension is questionable.
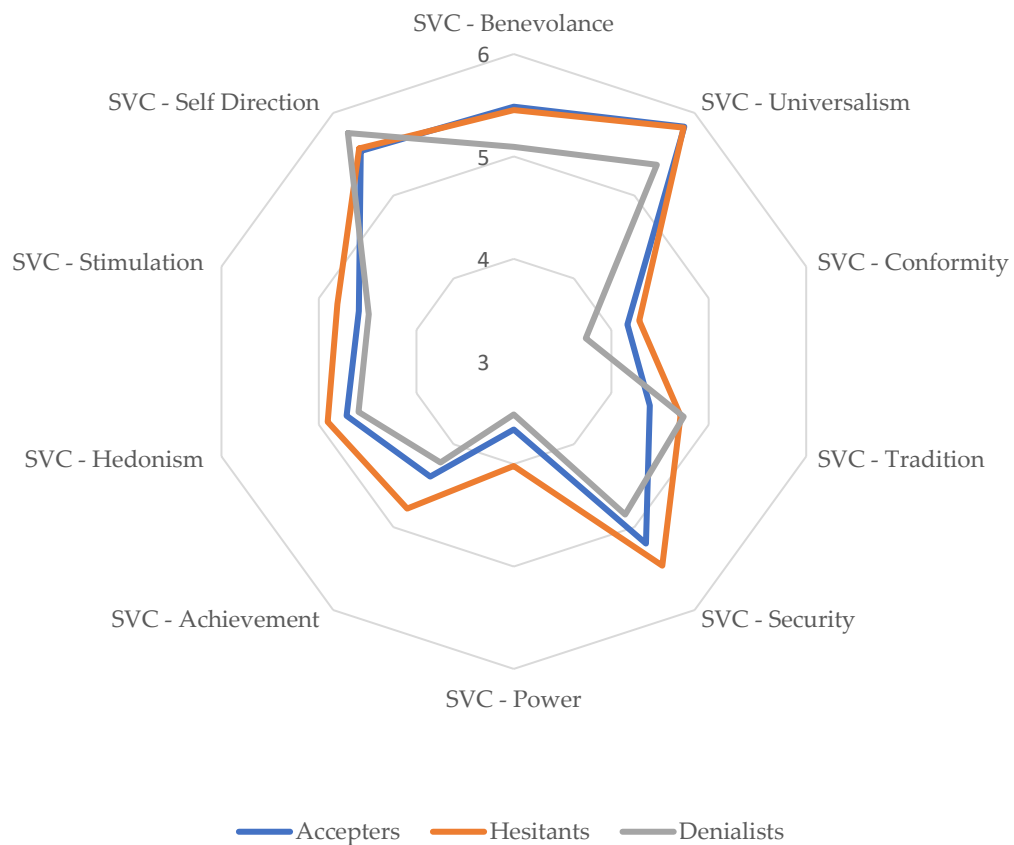
Figure 9.27: Cluster Averages Visualised by Schwartz' Ten Personal Values

However, *Denialists* recorded statistically significant below average scores on benevolence, universalism, conformity (largest difference), and security. *Hesitants* on the other hand, recorded above average levels on power and achievement. On the values of hedonism, stimulation, and self-direction no statistically significant differences were observed amongst the three clusters.

On Schwartz' personal values amalgams, *Denialists* where significantly below average on self-transcendence, social orientation, and a growth-anxiety-free alignment. *Hesitants* tended to favour self-enhancement, conservation, a personal orientation, and recorded above average scores on both the growth-anxiety-free and the self-protection-anxiety avoidance amalgam.
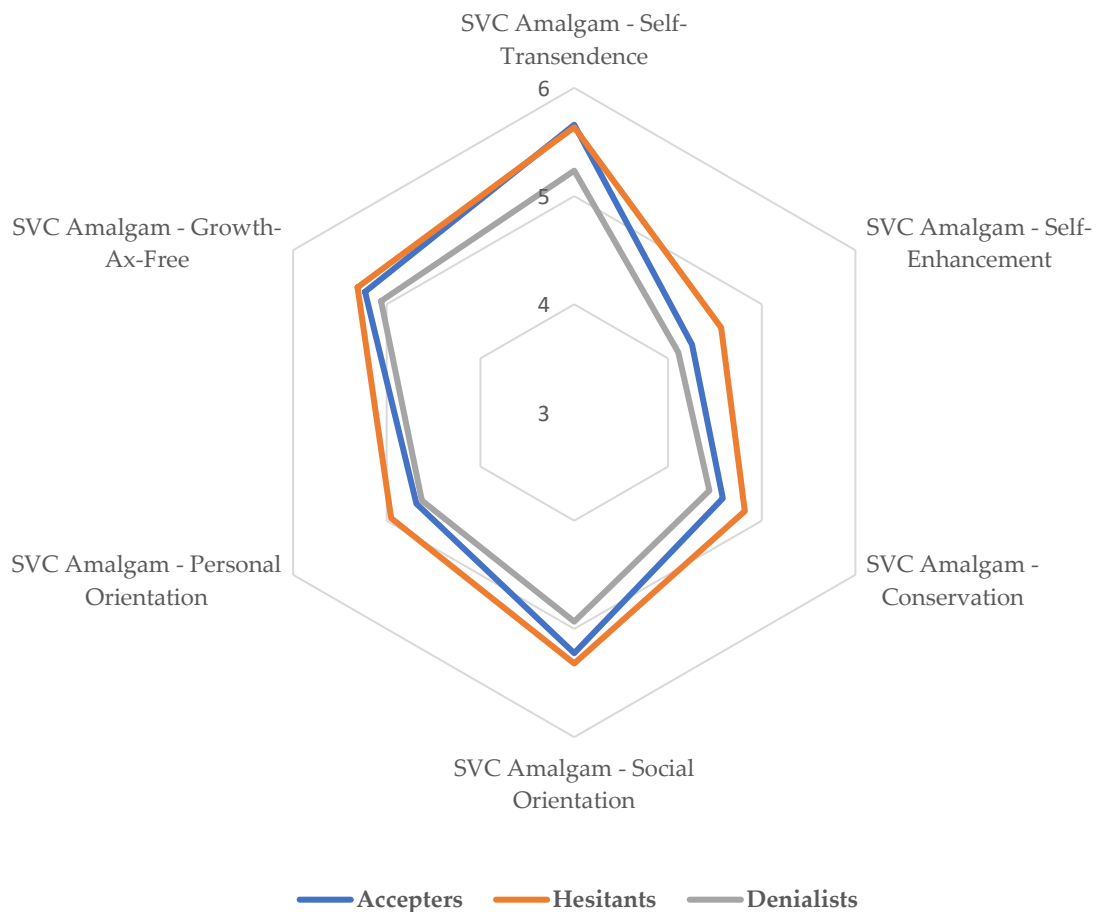
Figure 9.28: Cluster Averages Visualised by Schwartz's Values Amalgams

Contrary to what we anticipated in line with Schwartz's Circumplex, it does not appear as if *Denialists* are necessarily more focused on self-enhancement at the expense of self-transcendence, but rather it would seem that they just generally place less stock in self-transcendence.

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9.3.2.6. Clusters vis-à-vis Political & Religious Orientation as well as Societal Tension

When it came to more traditional sociological measures, *Accepters* were below average on self-assessed political orientation. This signified that they were more left leaning or liberal. *Hesitants* fell more towards the middle placing them more towards the political centre while *Denialists* tended to gravitate more towards the political right.
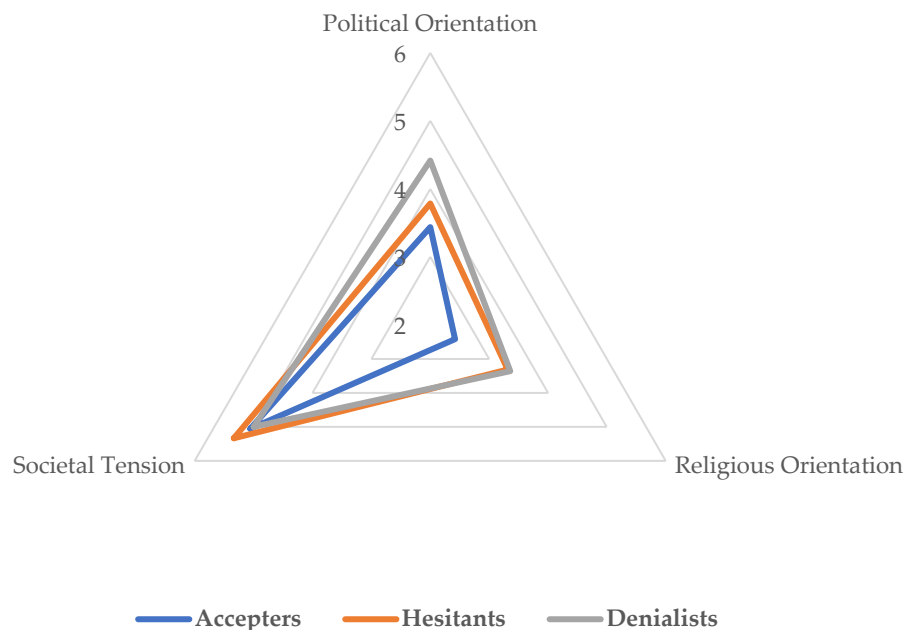
Figure 9.29: Cluster Averages - Political, Religious, Social Tension

In terms of religious orientation, a similar pattern holds. *Accepters* tended to report religiosity as being significantly less of a guiding force in their lives as opposed to both *Hesitants* and *Denialists* where this appeared to be far more of a factor. No difference was observed between the latter two clusters on this dimension, as such, only *Accepters* were significantly lower on religiosity. In terms of societal tension, only *Hesitants* reported above average and statistically significant higher levels, however, the practical significance of this differences is questionable.

Table 9.4 on the next page summarises all the findings presented in Section 9.2.3, along with a one-way ANOVA F-test value and the outcomes of Bonferroni Post-Hoc analysis at <.001 significance level. As can be observed from these, almost all the variables assessed as part of this model demonstrated statistically significant differences among at least two of the clusters barring a few (see greyed out).

The highest F-values were recorded in the dimensions of denial and trust which should come as no surprise as these were the primary variables used to create our clusters. Other dimensions where F-test scores were above 100 were conspiratorial believes, epistemic credulity, a hierarchist and an individualist core belief orientation (98.57 rounded). F-test statistics of above 50 were observed in epistemic mistrust, anxious attachment, reactance, and an egalitarian core belief orientation.

The magnitude of the differences observed in Table 9.4 is further illustrated in Figure 9.30. While Figure 9.30 uses bar graphs to show the differences amongst the means observed in each cluster, Table 9.5 reports the effect size observed between the various clusters on each dimension using Cohen's d. As per Cohen (1988)'s rule of thumb, values of between .2 & .5 are considered small, between .5 & .8 medium and greater than .8 large.

As can be seen from Figure 9.30 and Table 9.5, the greatest amount of variance among the *Accepters* and *Denialists* can be explained by the differences in their ability to trust institutions when it comes to issues of significant societal risk, which seems to be primarily driven by their respective core belief orientations. Smaller but significant differences between these two clusters were observed in attachment, epistemic (mis)trust and reactance while differences in sociological variables such as political and religious orientation were also detected. *Hesitants*, when compared with *Accepters*, had a somewhat different profile. Here, differences were observed only on institutional trust and on epistemic credulity, medium differences among epistemic mistrust, reactance, and the hierarchist core belief orientation (although, as we saw, *Hesitants* had levels around the sample average here). Values differences appeared most pronounced between the *Hesitants* and the *Denialists*, with small but significant effect sizes across the board.

Table 9.4: One-way ANOVA of the three Clusters with F-test & Post-Hoc Bonferroni Test Outcome

Dimensions	Ave.	Accepters Ave	Hesitants Ave	Denialists Ave	ANOVA F-test	Post-Hoc Bonferroni
DMC Overall	**3.00**	2.13	3.21	4.48	1283.81	1 & 2 & 3
DMC Climate Change	**2.54**	1.94	2.34	4.14	314.17	1 & 2 & 3
DMC Pandemics (COVID)	**3.18**	2.13	3.64	4.62	660.03	1 & 2 & 3
DMC Vaccinations	**3.29**	2.33	3.66	4.69	528.70	1 & 2 & 3
DMC Conspiracies	**2.74**	2.10	3.10	3.45	199.10	1 & 2 & 3
DMC General Facts	**1.29**	1.24	1.32	1.33	6.04	ND
Institutional Trust (Mainstream)	**4.07**	4.91	4.09	2.24	600.38	1 & 2 & 3
Generalised Trust	**3.51**	3.76	3.35	3.28	9.65	Only 1
Epistemic Trust	**5.03**	5.07	5.25	4.57	36.03	Only 3
Epistemic Mistrust	**4.38**	4.08	4.70	4.45	50.66	Only 1
Epistemic Credulity	**3.02**	2.66	3.74	2.51	167.48	Only 2
Adult Attachment - Secure	**5.22**	5.47	5.08	4.95	21.75	Only 3
Adult Attachment - Avoidant	**3.93**	3.69	4.20	3.95	23.71	Only 1 & 2
Adult Attachment - Anxious	**3.85**	3.77	4.26	3.30	50.77	1 & 2 & 3
Reactance (FoD)	**5.16**	4.70	5.35	5.79	79.18	1 & 2 & 3
Political Orientation	**3.76**	3.44	3.79	4.42	41.05	1 & 2 & 3
Religious Orientation	**2.94**	2.42	3.32	3.36	27.81	Only 1
General Life Satisfaction	**4.54**	4.70	4.33	4.56	7.44	Only 1 & 2
Societal Tension	**5.14**	5.06	5.34	5.00	16.36	Only 2
CTR - Hierarchist (GRM)	**4.71**	5.59	4.62	2.97	248.25	1 & 2 & 3
CTR - Individualist (GRM)	**4.02**	3.41	4.18	5.04	98.57	1 & 2 & 3
CTR - Egalitarian (GRM)	**5.68**	6.01	5.80	4.76	74.15	Only 1
CTR - Fatalist (GRM)	**4.24**	3.81	4.37	4.93	35.87	1 & 2 & 3
CTR - Hierarchist (GO)	**4.22**	4.17	4.46	3.89	14.92	Only 2 & 3
CTR - Individualist (GO)	**4.04**	3.78	4.13	4.46	27.46	Only 1
CTR - Egalitarian (GO)	**4.78**	4.93	4.93	4.21	28.78	Only 3
CTR - Fatalist (GO)	3.78	3.78	3.88	3.60	3.81	ND
SVC - Benevolence	**5.39**	5.49	5.45	5.10	11.51	Only 3
SVC - Universalism	**5.73**	5.83	5.82	5.37	18.54	Only 3
SVC - Conformity	**4.12**	4.16	4.29	3.74	24.61	Only 3
SVC - Tradition	**4.58**	4.39	4.71	4.74	10.37	Only 1
SVC - Security	**5.22**	5.20	5.46	4.85	18.52	Only 3
SVC - Power	**3.76**	3.66	4.02	3.52	12.47	Only 2
SVC - Achievement	**4.49**	4.39	4.77	4.22	14.48	Only 2
SVC - Hedonism	4.76	4.72	4.91	4.60	5.26	ND
SVC - Stimulation	4.65	4.59	4.81	4.49	4.90	ND
SVC - Self Direction	5.59	5.54	5.57	5.76	3.94	ND
SVC Amalgam – Open. to Chg.	5.00	4.95	5.10	4.95	3.23	ND
SVC Amalgam - Self-Trans.	**5.56**	5.66	5.64	5.23	21.71	Only 3
SVC Amalgam - Self-Enhance.	**4.34**	4.26	4.57	4.11	16.87	Only 2
SVC Amalgam - Conservation	**4.64**	4.59	4.82	4.44	11.78	Only 2
SVC Amalgam - Social Orien.	**5.20**	5.22	5.32	4.93	18.19	Only 3
SVC Amalgam - Personal Orien.	**4.77**	4.69	4.95	4.63	17.14	Only 2
SVC Amalgam - Growth-Ax-Fr.	**5.23**	5.23	5.31	5.06	8.10	Only 2 & 3
SVC Amalgam - Self-Pro.-Ax-Av	**4.43**	4.36	4.65	4.21	21.73	Only 2

* CTR – Cultural Theory of Risk; * GRM – Global Risk Management

* GO – General Orientation; * SVC – Schwartz's Values Circumplex
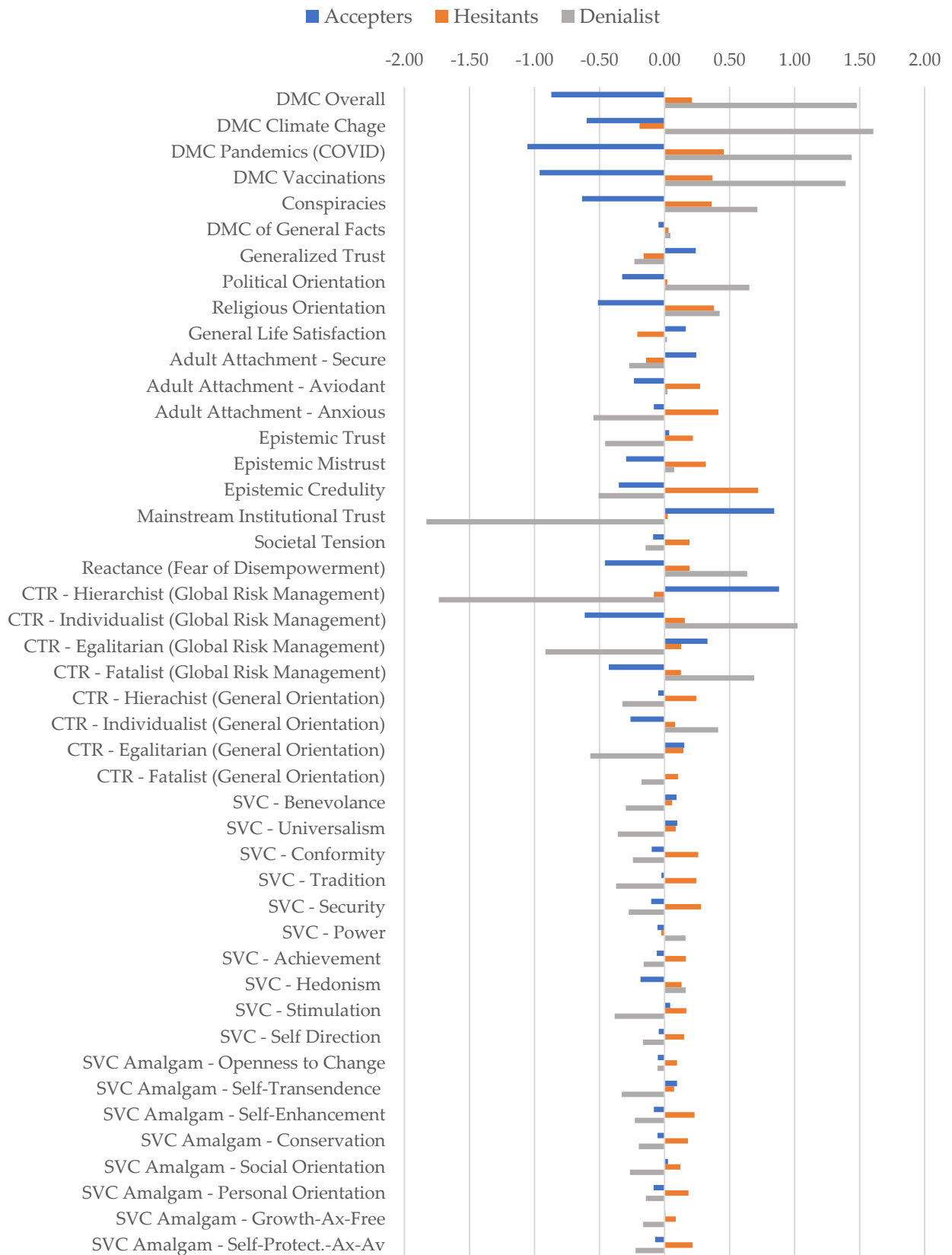
Figure 9.30: Mean Difference between Clusters

Table 9.5: Strength of Cluster Average Differences (Effect Sizes according to Cohens' d)

Dimensions	Accepters vs. Denialist	Accepters vs. Hesitants	Hesitants vs. Denialist
DMC Overall	**1.84 (L)**	**1.40 (L)**	**1.44 (L)**
DMC Climate Change	**1.39 (L)**	*0.40 (S)*	**1.15 (L)**
DMC Pandemics (COVID)	**1.68 (L)**	**1.31 (L)**	**0.85 (L)**
DMC Vaccinations	**1.57 (L)**	**1.22 (L)**	**0.86 (L)**
Conspiracies	**1.17 (L)**	**0.95 (L)**	*0.31 (S)*
DMC of General Facts	*0.22 (S)*	*0.20 (S)*	0.03
Generalised Trust	*0.28 (S)*	*0.24 (S)*	0.04
Political Orientation	***0.64 (M)***	*0.24 (S)*	*0.42 (S)*
Religious Orientation	*0.43 (S)*	*0.43 (S)*	0.02
General Life Satisfaction	0.09	*0.24 (S)*	0.14
Adult Attachment - Secure	*0.42 (S)*	*0.35 (S)*	0.11
Adult Attachment - Avoidant	*0.21 (S)*	*0.45 (S)*	*0.23 (S)*
Adult Attachment - Anxious	*0.36 (S)*	*0.40 (S)*	***0.76 (M)***
Epistemic Trust	*0.45 (S)*	0.19	***0.66 (M)***
Epistemic Mistrust	*0.37 (S)*	***0.63 (M)***	*0.26 (S)*
Epistemic Credulity	0.15	**0.93 (L)**	**1.03 (L)**
Mainstream Institutional Trust	**1.73 (L)**	**0.80 (L)**	**1.40 (L)**
Societal Tension	0.06	*0.33 (S)*	*0.37 (S)*
Reactance (Fear of Disempowerment)	**0.82 (L)**	***0.52 (M)***	*0.39 (S)*
CTR - Hierarchist (Global Risk Management)	**1.37 (L)**	***0.63 (M)***	**0.89 (L)**
CTR - Individualist (Global Risk Management)	**0.95 (L)**	*0.49 (S)*	***0.54 (M)***
CTR - Egalitarian (Global Risk Management)	**0.80 (L)**	0.16	***0.66 (M)***
CTR - Fatalist (Global Risk Management)	***0.59 (M)***	*0.31 (S)*	*0.32 (S)*
CTR - Hierarchist (General Orientation)	*0.21 (S)*	*0.22 (S)*	*0.41 (S)*
CTR - Individualist (General Orientation)	***0.53 (M)***	*0.29 (S)*	*0.27 (S)*
CTR - Egalitarian (General Orientation)	***0.50 (M)***	0.01	***0.51 (M)***
CTR - Fatalist (General Orientation)	0.14	0.08	*0.21 (S)*
SVC - Benevolence	*0.34 (S)*	0.03	*0.32 (S)*
SVC - Universalism	*0.41 (S)*	0.01	*0.40 (S)*
SVC - Conformity	0.10	*0.26 (S)*	*0.36 (S)*
SVC - Tradition	*0.26 (S)*	*0.22 (S)*	*0.47 (S)*
SVC - Security	0.12	*0.28 (S)*	*0.39 (S)*
SVC - Power	*0.21 (S)*	0.03	0.17
SVC - Achievement	0.07	0.16	*0.23 (S)*
SVC - Hedonism	*0.27 (S)*	*0.26 (S)*	0.03
SVC - Stimulation	*0.28 (S)*	0.08	*0.37 (S)*
SVC - Self Direction	0.09	0.15	*0.25 (S)*
SVC Amalgam - Openness to Change	0.00	0.15	0.16
SVC Amalgam - Self-Transcendence	*0.45 (S)*	0.03	*0.43 (S)*
SVC Amalgam - Self-Enhancement	0.13	*0.29 (S)*	*0.43 (S)*
SVC Amalgam - Conservation	0.13	*0.23 (S)*	*0.37 (S)*
SVC Amalgam - Social Orientation	*0.34 (S)*	0.12	*0.45 (S)*
SVC Amalgam - Personal Orientation	0.07	*0.33 (S)*	*0.39 (S)*
SVC Amalgam - Growth-Anxiety-Free	*0.21 (S)*	0.11	*0.32 (S)*
SVC Amalgam - Self-Protection-Anxiety-Avoidance	0.16	*0.32 (S)*	*0.49 (S)*

L = Large, M = Medium, S = Small Effect Size

9.3.2.8. Cluster Differences Observed by Demographics

Hesitants had a significantly lower (*F=28.53*) average age (*M=33.9, SD=9.0*) than *Accepters* (*M=38.7, SD=12.2*) or *Denialists* (*M=39.1, SD=11.0*). No difference in average age was observed among *Accepters* and *Denialists* in this sample. Any subsequent interpretations of the results should be approached with an understanding of the relatively young sample as well as the age disparity between the *Hesitants* and the other clusters which could be a potential confounding factor influencing attitudes and responses. See figure 9.31.
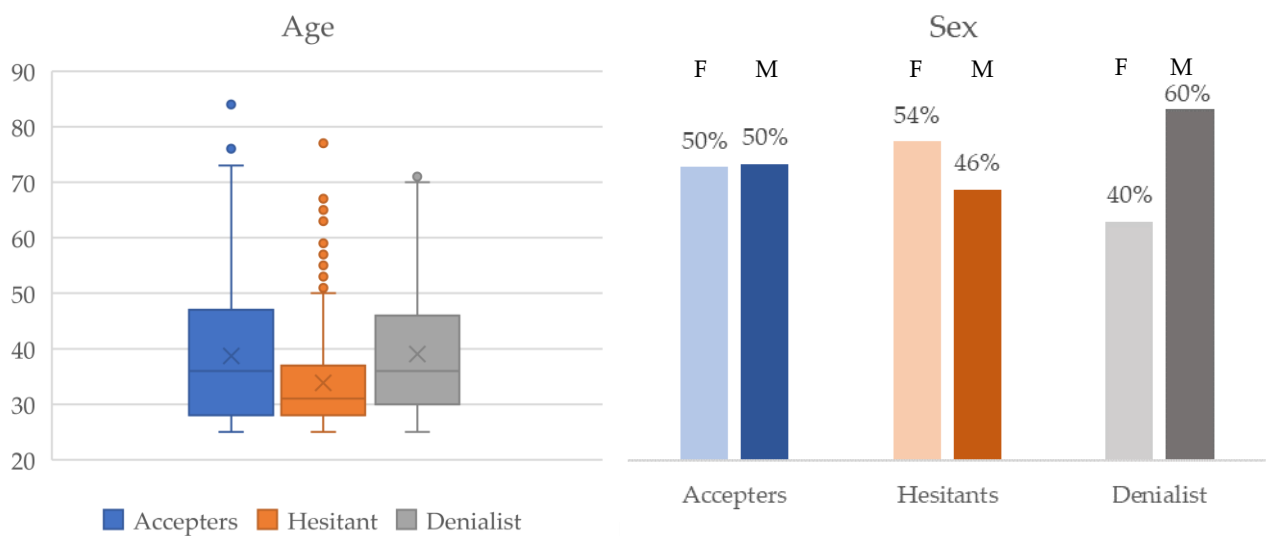
Figure 9.31: Cluster by Age Distribution
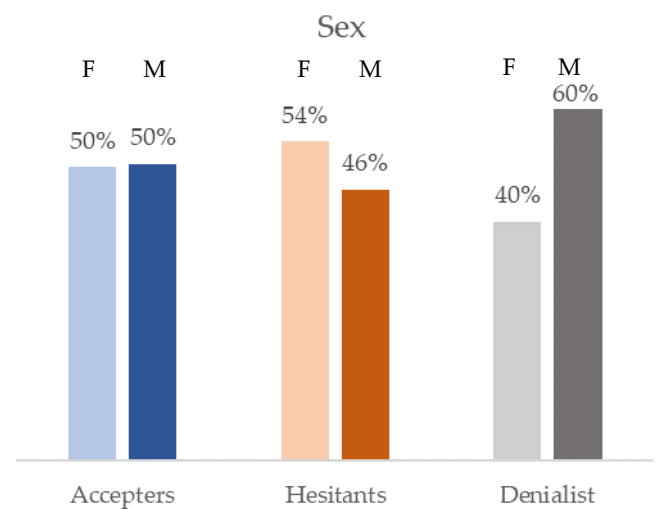
Figure 9.32: Cluster Distribution by Sex

In terms of sex distribution, the overall sample had a virtually perfect 50/50 distribution of female and male participants. Post clustering, the *Accepters* maintained this ratio, however, the same could not be said for the *Hesitants* and the *Denialist*. Here significant sex differences appear to have manifested. More females appeared in the *Hesitant* cluster while more males appeared in the *Denialist* cluster. While the sex difference among *Hesitants* was smaller, at around 8%, among *Denialists,* males were approximately 1.5 times more likely to appear in this cluster.

In terms of socio-economic status, which was self-assessed on a 10-point ladder scale, no statistically significant differences were observed (see figure 9.33). The same held for education level, where the seven categories of the ascending qualifications were converted into scalar data. No average differences of significance were observed between the clusters (see Figure 9.34).
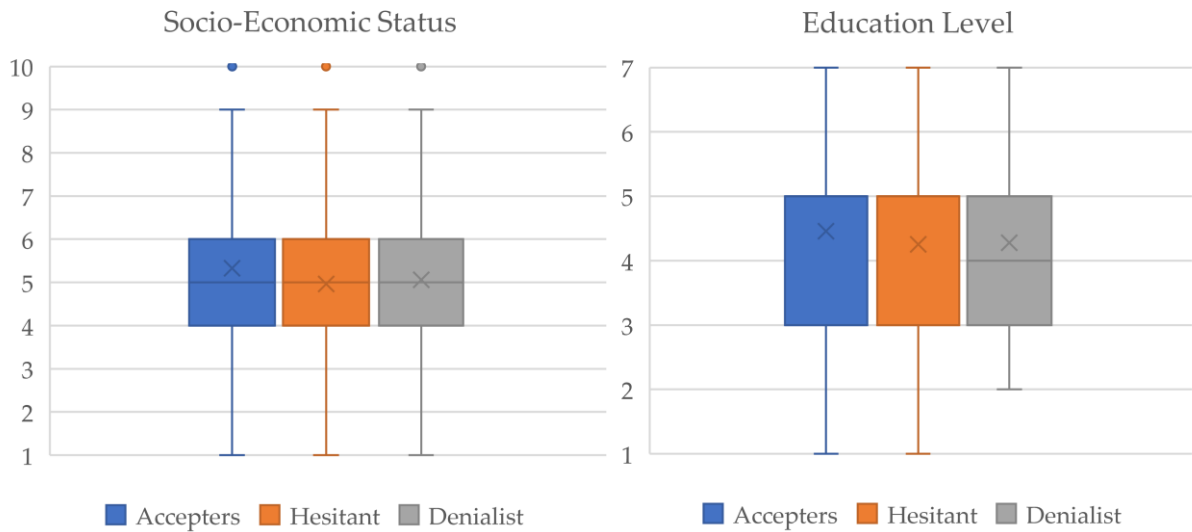
Figure 9.33: Cluster by Socio-Economic Status

Figure 9.34: Cluster by Education Level

Therefore, socioeconomics and education level appear to have no real impact on whether you accept, are hesitant towards, or deny the mainstream consensus of issues of significant societal risk.
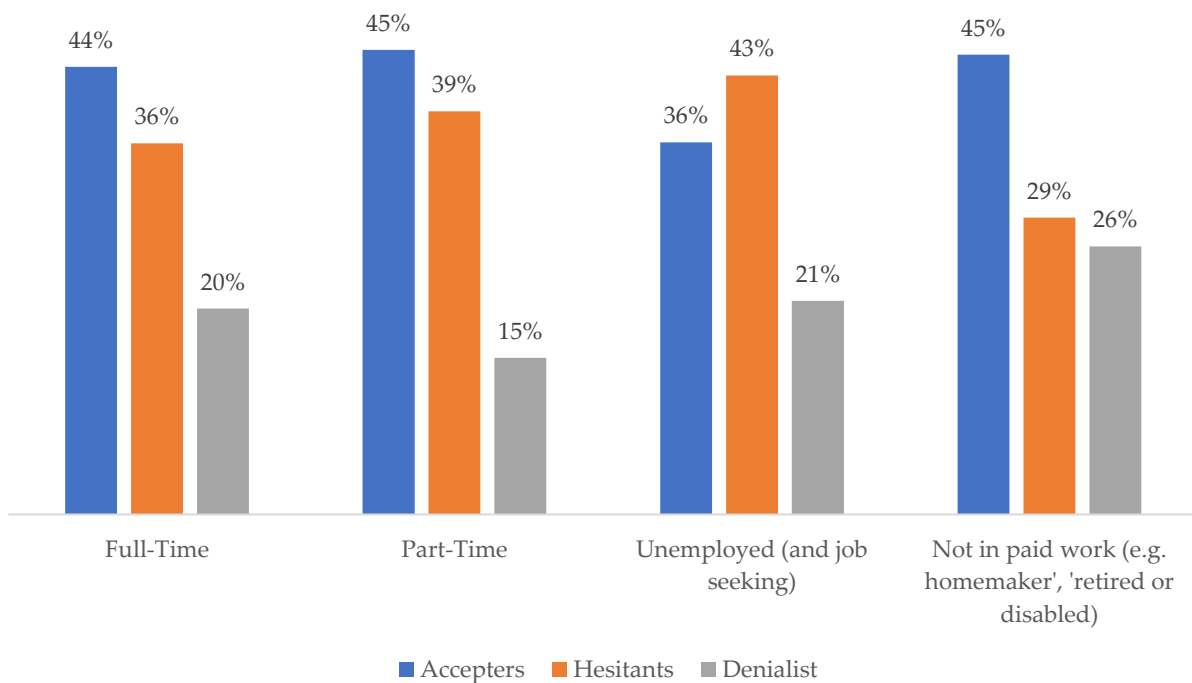
Figure 9.35: Clusters by Employment Status (n=1,035)

Figure 9.35 shows the difference in reported employment status by cluster. Of those that responded, 48% indicated '*full-time employment*', 15% '*part-time*', 14% '*unemployed*', 9% '*Not in paid work*', and for the remaining 14% no employment data was available. *Hesitants* reported the highest levels of unemployment at 43% while the "*Not in paid work*" had the highest rates of *Denialist* membership at 26% compared to 15% of those that reported having part-time work.

However, it is when our clusters are viewed through the lens of geographical region and sex/gender, as per figure 9.36, that some of the most interesting and noteworthy differences emerge.
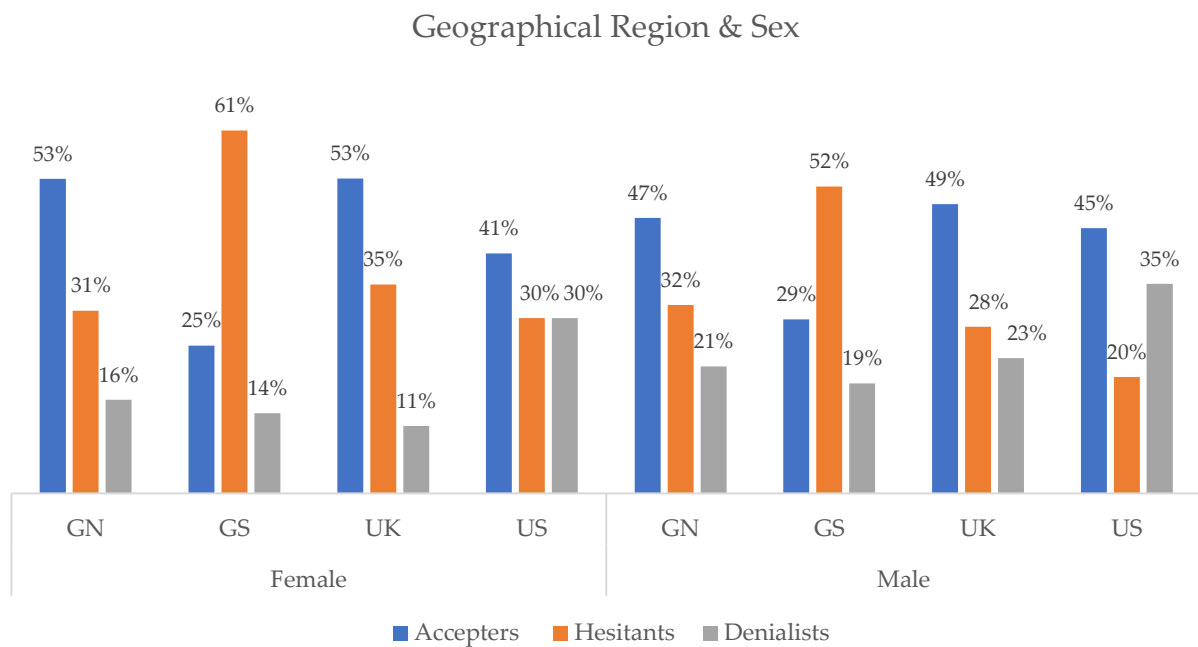
Figure 9.36: Clusters by Geographical Region & Sex

Figure 9.36 offers a detailed portrayal of attitudes and beliefs across different geographical regions, further delineated by sex. It becomes evident that females from the Global North (GN) and the United Kingdom (UK) showcase a dominant tendency towards acceptance, with 53% and 61% of females in these regions identified as *Accepters*, respectively. This high inclination towards acceptance within these demographics may underscore the sociocultural and educational influences that potentially shape their perspectives on significant societal risks.

Conversely, the Global South (GS) paints a different picture. The region holds the smallest fraction of *Accepters*. Intriguingly, it also records the highest proportion of *Hesitants*. This might hint at factors unique to the Global South—perhaps economic disparities, cultural nuances, or differential access to education—that foster hesitancy rather than outright denial or full acceptance.

The United States (US) presents its own set of dynamics. US males emerge as the group with the highest percentage of *Denialists*, closely followed by US females. This trend might be reflective of the political and social discourse prevalent in the US, which sometimes polarizes opinions on issues of significant societal risk. In stark contrast, the lowest levels of denial are witnessed amongst UK females and GN females. The noticeable gap in denial between these groups and their US counterparts underscores the differing regional narratives and possibly, trust in authoritative sources.

However, the graph's most salient revelation, lies in the universality of cluster membership. No single region or gender group is wholly characterized as *Accepters*, *Hesitants*, or *Denialists*. Every category is represented in every demographic, emphasizing that the spectrum of beliefs is not isolated to specific pockets but is spread globally. This distribution underscores the intricate web of psychological and sociological factors that influence individual and collective perceptions of societal risks. It's a testament to the complexities at play when individuals navigate and formulate their stances on pressing global issues.

The clusters were further broken down by country of residence as per Table 9.6.

In only 14 countries were *n* sizes of greater than 10 obtained, while not necessarily statistically significant, the observations gleamed by focusing on national level data point to interesting future research avenues.

Table 9.6: Clusters by Country of Residence & Fully COVID Vaccination Rates

Country of Residence	Geo	Accepters	%	Hesitants	%	Denialists	%	Total	COVID Vax'ed
United Kingdom	UK	190	51.1%	118	31.7%	64	17.2%	372	76%
United States	US	109	42.7%	63	24.7%	83	32.5%	255	**68%**
South Africa	GS	48	21.6%	138	62.2%	36	16.2%	222	36%
Poland	GN	16	37.2%	17	39.5%	10	23.3%	43	60%
Portugal	GN	25	61.0%	14	34.1%	2	4.9%	41	**87%**
Italy	GN	17	43.6%	9	23.1%	13	33.3%	39	80%
Mexico	GS	23	60.5%	11	28.9%	4	10.5%	38	65%
Canada	GN	15	42.9%	12	34.3%	8	22.9%	35	84%
Spain	GN	14	60.9%	7	30.4%	2	8.7%	23	**87%**
Greece	GN	11	50.0%	8	36.4%	3	13.6%	22	69%
Netherlands	GN	8	50.0%	4	25.0%	4	25.0%	16	69%
Ireland	GN	8	53.3%	5	33.3%	2	13.3%	15	82%
France	GN	9	64.3%	4	28.6%	1	7.1%	14	79%
Germany	GN	6	42.9%	4	28.6%	4	28.6%	14	76%
New Zealand	GN	1	16.7%	2	33.3%	3	50.0%	6	-
Sweden	GN	5	100.0%	0	0.0%	0	0.0%	5	-
Australia	GN	3	75.0%	1	25.0%	0	0.0%	4	-
Chile	GS	2	50.0%	1	25.0%	1	25.0%	4	-
Czech Republic	GN	0	0.0%	3	75.0%	1	25.0%	4	-
Finland	GN	2	50.0%	2	50.0%	0	0.0%	4	-
Latvia	GN	1	25.0%	1	25.0%	2	50.0%	4	-
Estonia	GN	1	33.3%	0	0.0%	2	66.7%	3	-
Slovenia	GN	1	33.3%	2	66.7%	0	0.0%	3	-
Austria	GN	2	100.0%	0	0.0%	0	0.0%	2	-
Belgium	GN	1	50.0%	1	50.0%	0	0.0%	2	-
Denmark	GN	2	100.0%	0	0.0%	0	0.0%	2	-
Hungary	GN	0	0.0%	1	50.0%	1	50.0%	2	-
Japan	GN	1	50.0%	1	50.0%	0	0.0%	2	-
Korea	GN	0	0.0%	0	0.0%	1	100.0%	1	-
Norway	GN	1	100.0%	0	0.0%	0	0.0%	1	-
Switzerland	GN	1	100.0%	0	0.0%	0	0.0%	1	-
Total / %		**523**	**43.6%**	**429**	**35.8%**	**247**	**20.6%**	**1199**	**-**

Spain, Portugal, and Mexico had the highest proportion of *Accepters* while South Africa and Poland had the lowest. South Africa had by far the highest proportion of *Hesitants* at 62% followed by Poland (39.5%) and Greece (36.4%). Italy and the US had the highest proportion of *Denialists* at around 33% each. The lowest proportion of denialists was observed in Portugal, France, and Spain.

As an added data point, and mostly for interest's sake, I included the COVID vaccination rates of the top 14 countries to see how these corresponded with their respective hesitancy and denialism rates. When correlated with the proportion of *Accepters* in each country, the result is .72, when correlated with *Hesitancy*, the result is -.71, when correlated with *Denialists*, the result is -.16. Of course, 14 respondents '*maketh not a nation*'. However, while this may be a coincidence, it may be worth looking into further.

Of the developed countries with the highest denialism, rates the US and Italy stand out. The US had among the lowest vaccination rates of the developed world at 68% while Italy had 87%. However, the latter also had among the strictest vaccine mandates in Europe. For example, all those over 50 years of age were required to be vaccinated by law in Italy (Giuffrida 2022). While in the US, some states and some employers introduced vaccine mandates, few such directives were enacted there. The same appears to have been the case for Canada and Germany, where hesitancy and denialism were relatively high but nationals of these countries were subjected to strict vaccines mandates. While Canada persevered with these plans, Germany eventually backed down (Connolly 2022). This could perhaps explain the differences observed here. However, because of the small n sizes observed at a national level, firm conclusions are not possible. Yet, the relatively weak correlation observed among denial and vaccination rates, it seems, can be explained by the authoritative measures taken by national governments to push up their overall country-wide vaccination rates. In cases like South Africa and the US, where no such national mandate was ever issued, vaccination rates remained relatively low. Potential reasons for these differences will be discussed in the next chapter.

9.4. Findings Chapter Summary

Our sample was predominately millennial, well-educated, hailed from average socio-economic backgrounds, and presented a balanced sex distribution. As per the sampling strategy, most of the participants were from the UK, US, GN, and the GS. The instruments chosen for data collection proved largely reliable, though there were reservations regarding the reliability of some of the PVQ's dimensions. The overarching relationship between the dimensions of our model was substantiated by our findings, demonstrating robust correlations among denial of mainstream consensus, trust, and core beliefs. Additionally,

multiple indirect relationships were identified, suggesting a dense interconnectedness among our model's variables. Our case-based computational modelling techniques elucidated a tri-cluster solution, which we have termed: *Accepters*, *Hesitants*, and *Denialists*. Noteworthy differences surfaced among these clusters in terms of denial, trust, core beliefs, personal values, and attachment styles. While *Accepters* and *Denialists* exhibited polarised stances on trust and core beliefs, *Hesitants* displayed a unique profile, predominantly defined by epistemic (mis)trust and credulity. Delving into these cluster solutions, demographic discrepancies in age, gender, and employment were discerned. Nonetheless, the interplay between geography and gender presented the most captivating insights. In essence, our final set of results projected a higher prevalence of *Denialists* in the US, with COMPLEX-IT predicting this solely based on respondents' denial levels and their trust inclination. Of further interest is the fact that *Denialists* and *Hesitants* were found to varying degrees in all of the demographics of interest, suggesting that there are complex psychological and sociological dynamics at play.

In the succeeding chapter, we will explore these findings further, reflect on their broader implications, address inherent limitations, suggest prospective directions for future inquiries, and provide a conclusion to our investigation.

Chapter 10 – Discussion, Limitations, Summary & Conclusions

"It is one of the triumphs of the human that he can know a thing and still not believe

it."

— John Steinbeck

In our final chapter, we first revisit our empirical objectives and our specific research questions and marry these to our research findings. Simply put, the goal is to assess the real-world merits of our theorical model of denial, and if established, what can be done to strengthen it going forward. The latter being addressed by considering the limitations of the current research along with what could be done to both strengthen and expand future inquiry. We then consider the implication of our findings on public policy and wrap up this chapter with a summary and a set of conclusions.

10.1. Discussion

As set out in the first chapter, our main research question was to establish why some of us hold denialist views that appear to run contrary to their own self-interests, on issues of significant societal risk, like climate change, pandemics, and vaccinations. To address this question, we started looking at the mechanism that allows denial to manifest as if it were a rational independently researched and derived conclusion. Here we found that affectively triggered motivated reasoning, and its associated cognitive biases, were a key mechanism involved in this outcome. However, the literature on motivated reasoning said little about what triggered this affective state to start with. We then set off on a journey to build a model centred around trust, to understand what some of these affective triggers might be. This led to a refined and reformulated research question to determine how psychological (attachment, reactance, values, beliefs,) and sociological factors (nationality, gender, employment status, education level, SES) interact with institutional and epistemic trust to form multiple pathways leading to distrust and denial on issues of significant societal risk.

10.1.1. Answers to the Research Questions

For the purposes of this discussion, our research questions were broken down into more manageable facets starting with:

a. **Have multiple pathways to denial been identified based on varying levels of attachment orientation, individual values, beliefs, and trust (institutional and epistemic)?**

In a nutshell, yes. The data suggests that there are at least two different pathways to an outcome of denial on issues of significant societal risk. The pathways have been defined as profiles, the first of which we called the *Denialists* because of their broad-spectrum denial on issues ranging from climate change to vaccinations. The second group identified were labelled the *Hesitants* because, while they did not seem to be as triggered by climate change, they appeared less convinced about the mainstream consensus around pandemics and vaccinations. These two profiles were compared and contrasted with the group of respondents that by and large accepted the mainstream consensus on these issues. The latter group was labelled the *Accepters*. All three resulting clusters appear to have different psychological and sociological profiles.

b. **Are the different forms of denial in a profile related?**

Yes, although the profiles appear to differ here. For the *Denialists*, the answer seems to be yes. When only comparing the *Accepters* and the *Denialists*, denial of climate change was highly correlated with denial of pandemics (.49*) and vaccines (.43*). Pandemic and vaccine denial, perhaps unsurprisingly, had an even stronger relationship at .74*. However, when comparing the *Accepters* to the *Hesitants*, the relationship between climate change denial and pandemic and vaccine denial diminishes to .13 and .11 respectively. Meaning, that if the *Denialists* rejected the mainstream consensus, on say, vaccinations, they were also likely to deny pandemics and climate change, and vice versa. However, for the *Hesitants*, only pandemic and vaccination hesitancy appear related (.51*). Unlike the *Denialists*, this group showed more denial when it came to pandemics and vaccinations, but accepted climate change as more or less true.

c. Is there is a relationship between conspiratorial thinking and denial in a cluster?

Yes, this relationship was stronger in the *Denialists* cluster when compared with the *Accepters* on our meta construct of denial of the mainstream consensus (DMC), which correlated with our conspiratorial dimensions at .60*. The relationship between the *Hesitants* and the *Accepters* was slightly less at .52*. However, all clusters had averages below the midpoint which were lower than those observed on the DMC dimensions, suggesting that even the *Denialists* weren't as convinced by conspiracy theories as they were about their conclusions on the issues of significant societal risk. Our prior hypothesis that most conspiracy theorists are denialists, but not all denialists are conspiracy theorists is thus largely supported.

d. Does denial on complex issues of significant societal risk extend to other forms of public guidance provided by mainstream authoritative institutions.

No, this appears not to be the case. All three clusters had low averages on our control dimension (*m < 1.5*). This indicates that none of these groups significantly distrusted the communicated knowledge around general public health issues such as the dangers of smoking, unhealthy eating, or poor sleep. This control dimension was also only weakly correlated with the different forms of denial assessed ranging from .05 (pandemics) to .17 (climate change).

e. What were the relationships within each profile between the various forms of trust—generalised, epistemic, and institutional.

For the *Denialists*, there was a significant lack of mainstream institutional trust (*m=2.24*) and epistemic trust (*m=4.57*), but no significant differences detected in epistemic mistrust, credulity, or generalised trust. The *Hesitants* had slightly lower levels of mainstream institutional trust relative to the *Accepters* (*m=4.09 vs. 4.91*) but this difference is nowhere near that observed between the *Denialist* and *Accepters* (*m=2.24 vs. 4.91*). However, there was a minor difference in the levels of trust demonstrated towards specific institutions with *Hesitants* being somewhat less trusting of the World Health Organisation than the *Accepters* (*m=3.90 vs. 4.84*) were. However, *Hesitants* reported significantly higher levels of epistemic credulity relative to the *Accepters* and the *Denialists* (*m.=3.74 vs. 2.66 & 2.51*). The *Accepters* on

the other hand stood out with above average levels of mainstream institutional trust (*m=4.91*), overall higher levels of generalised trust (*m=3.76*) and lower overall levels of epistemic mistrust (*m=4.08*) relative to the two other groups.

f. Were there attachment orientation differences among the profiles?

Yes, but the effect sizes of the differences, while significant, were small. *Denialists* had the lowest secure attachment average (*m=4.95*) and the lowest anxious attachment average (*m=3.30*). While this might suggest above average levels of avoidant attachment, there was no statistically significant difference detected here between the *Denialists* and the other two clusters. However, *Hesitants* did have significantly higher levels of avoidant attachment relative to the *Accepters (m= 4.20 vs. 3.69)*, but not relative to the *Denialists (m. 4.20 vs. 3.95)*. The *Hesitants* also had significantly higher levels of anxious attachment (*m=4.26*) relative to both the *Accepters* (*m=3.77*) and the *Denialists* (*m=3.30*). As already alluded to, *Accepters* had a statistically significantly lower average on the avoidant attachment dimension relative to the *Hesitants* (*m 3.69 vs. 4.20*) but not the *Denialists*. In addition, when compared with *Denialists* only, *Accepters* have statistically significantly higher averages of secure attachment (*F=12.1, <.001*).

g. Were there core belief orientation differences among the profiles?

Yes, on the dimensions of the Cultural Theory of Risk, some of the largest effect sizes were observed between the different clusters, specifically between the *Denialists* and the *Accepters*. *Denialists* had the lowest overall averages on the hierarchist belief orientation (*m 2.97*), a lower egalitarian belief orientation (*m 4.67*), a significantly higher individualist orientation (*m 5.04*) and a moderately higher fatalistic orientation (*m 4.93*). The opposite seemed to be the case for the *Accepters*, with the highest hierarchist (*m 5.59*) and egalitarian (*m 6.01*) averages, and significantly lower individualist (*m 3.41*) and fatalistic (*m 3.81*) dimensional level averages. However, results for the *Hesitants* were mixed, with averages somewhere between the *Accepters* and *Denialists* on all belief orientations. Unlike with the *Denialists* and *Accepters*, which appear diametrically opposed to each other, no clear pattern emerged for the *Hesitants* though they appeared to be generally more aligned with the *Accepters* than with the *Denialists*.

h. Were there personal values orientation differences among the profiles?

Yes, but the differences observed had small effect sizes. This could be down to the somewhat poor performance of the measure used, rather than an absence of more significant differences on personal values among our clusters. However, even with this somewhat compromised instrument, some statistically significant differences were detected. *Denialists* reported valuing benevolence, universalism, conformity, and security[133] less. They also had lower average scores on the value amalgams of self-transcendence and less of a social values orientation. *Hesitants* on the other hand, had higher averages on the values of power and achievement and higher averages on the value amalgams of self-enhancement, conservation, a personal values orientation as well as a self-protection anxiety avoidance orientation. The only values dimension where *Accepters* differed with any significance relative to the other two clusters was tradition. *Accepters* score below average on this value.

i. Were there differences among the profiles on reactance, perceived societal tension, general life satisfaction, political orientation, and religious orientation?

Again, yes, with effect sizes ranging from small to large. The differences observed were most pronounced on the psychological dimension of reactance (aka fear of disempowerment). *Denialists* had the highest levels of reactance (*m. 5.79*) while *Accepters* had the lowest (*m. 4.70*). *Hesitants* again fell somewhere between these two clusters (*m. 5.35*). On perceived societal tension, only *Hesitants* reported averages (*m. 5.34*) significantly above those observed in both the *Accepters* (*m. 5.06*) and the *Denialists* (*m. 5.00*), though this difference is likely due to the fact that *Hesitants* were disproportionately made up of respondents from developing countries with greater socio-economic inequality and less stable social fabrics. When it came to general life satisfaction, again *Hesitants* had significantly lower satisfaction relative to the *Accepters* probably for similar reasons, but due to the degree of variance observed among *Denialists* on this dimension, no differences were detected between this cluster and the others. In terms of political orientation, *Denialists* reported the highest averages (*m. 4.42*) of conservativism (political right) while the *Accepters* reported the highest averages (*m. 3.44*) of liberalism (political left). Again, the *Hesitants* fell more towards the

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[133] Although the difference on this security value might be down to the fact that one of the two security items referred to having the state take responsibility for one's safety and security which significantly lowered the overall scores on this dimension.

middle (*m. 3.79*), though they were closer in average to the *Accepters* than the *Denialists*. On religious orientation, only *Accepters* reported that their religious faith is less of an orientating force in their lives. Though it should be noted that among both the *Denialist* and *Hesitant* clusters, a significant degree of variance was detected on this dimension.

j. Did the clusters differ on demographics?

Again, yes, but not on all those assessed. There appeared to be no differences of significance when it came to self-assessed socio-economic status or educational attainted. While there appeared to be some differences in group membership of the clusters when it came to employment status, the categories were too uneven in size to make any firm conclusions (e.g., only 9% reported being unemployed vs 48% full-time employment). When it came to age, *Hesitants* were significantly younger (*m. 33.87*) than the *Accepters* (*38.72*) and *Denialists* (*39.05*) - though no significant difference was observed between these latter two. This difference may likely also be because developing countries, which made up the bulk of the *Hesitants*, enjoy lower average ages among their nationals. In terms of sex, the *Denialist* cluster tended to have a higher proportion of males (*D 60% vs. A 50% & H 46%*) while *Hesitants* had a higher proportion of females (*H 54% vs. A 50% & D 40%*).

The most noteworthy differences in demographics were reserved for geographical regions assessed when intersected with sex. While profile membership was present in all geographical regions among both men and women, the proportions of those memberships did vary significantly (*min. 11% max. 61%*). More US men and women formed part of the *Denialist* cluster than any other geographical region, *35% & 30%* respectively. Those from the Global South tended to disproportionally fall in the *Hesitant* profile, though this appeared truer for females (*61%*) than males (*52%*). The highest *Accepters* membership was observed in Global North females (*53%*) and UK females (*53%*), followed by UK males (*49%*), Global North males (*47%*), and then US males (*45%*). So, while among the highest rates of denialism were observed in US males, their rate of acceptance was also high thereby demonstrating the complexities at play here.

10.1.2. Description of the Resulting Psycho-Social Profiles – Pathways

Taken together, what kind of picture does this paint for each of the clusters?

10.1.2.1. *The Denialist*

As the name suggests, *Denialists* are more likely to reject the mainstream consensus on issues of significant societal risk across the board. They are also more likely to flirt with conspiratorial thinking. They tend to have a significant mainstream institutional trust deficit, less generalised trust and epistemic trust, and somewhat more epistemic mistrust relative to the *Accepters*. They are also unlikely to be epistemically credulous, rather treating communicated knowledge from others with suspicion across the board. This suggests a profile where trust generally, but especially trust of mainstream institutions, is treated with extreme caution.

In turn, it appears that their distrust of institutions may be partially rooted in their personal values and core belief orientations. *Denialists* tend to value benevolence, universalism, conformity, and self-transcendence less. They also have less of a social values orientation. However, it appears that it might be their core beliefs that set them apart. *Denialists* tend to have individualist core belief orientations, but perhaps more importantly, they tend to strongly reject the beliefs associated with a hierarchist and the egalitarian orientation. Taken together, this means that this group just has a much lower group orientation and feels less bound by collective ties and obligations. When it comes to dealing with collective risk, they tend to reject collective efforts, especially if those efforts come at what feels like a cost to individual liberties[134]. They maintain that collective risks are best managed through personal strategies and bottom-up approaches. For them, these issues should be dealt with in way that does not limit their autonomy and allows one to make one's own risk assessment. *Denialists* desire a future where there is no top-down mandate for self-transcendence (*forced self-sacrifice*). Furthermore, they appear to fundamentally believe that top-down efforts to deal with collective risk are doomed to fail exactly because they come at the expense of their desired future state - a world free of obligations mandated by authorities.

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[134] Even if those collective efforts don't directly impact their individual liberties, it is often seen as the t*hin edge of the wedge* which will open a path for increasingly encroaching policies later on.

As a result, the rejection of the mainstream consensus by *Denialists* is better explained, not so much as the rejection of the facts, but rather as a response to top-down policy solutions being proposed and supported by mainstream institutions that run contrary to their values and core beliefs. As such, any policy solutions that demand universal compliance, restricts personal autonomy, and fails to recognise individual difference, is likely to result in a backlash effect where the legitimacy of these policies is undermined by attacking the evidence that they are based on, i.e. '*climate change isn't man-made*', '*the lethality of the COVID-19 pandemic is vastly overstated*', etc. They are also likely to try and undermine the legitimacy of mainstream institutions by emphasising that they are run by people that were "*unelected*", "*incompetent*", etc.

There values and beliefs, in turn, appear to be at least in part psychologically and sociologically influenced. Psychologically speaking, reactance may be a significant contributor to *Denialists'* values and beliefs. *Denialists* tended to report well above average levels of reactance. Reactance in turn appears to be related to avoidant attachment (.24*) and partially inversely related to secure attachment (-.17*). *Denialists* recorded the lowest levels of secure attachment and anxious attachment. As you will recall from Chapter 5, a secure attachment style implies higher trust in self and other, while an anxious attachment style implies a low trust in self and a high trust in other. Lower scores on these two styles suggest that *Denialists* may have lower trust in others, at least in part, due to their attachment orientation.

Sociologically speaking, it seems that the values and beliefs held by *Denialists* are contextually influenced, as theorised in Chapter 6. Unsurprisingly, the highest proportion of *Denialists* originated from national contexts where strong and sizable sub-cultures exist that embrace an individualist orientation, i.e. the US. Although *Denialists* often downplay the value of conformity, they likely face social pressure and pushback in contexts outside the US. As such, while this profile exists in every region and sex investigated to varying degrees, even among UK females, who had the lowest representation in this group, there was still a small but significant proportion fitting this profile. This again underscores the complexities at play here.

What are we then left to conclude about the *Denialist*? This is a person that is generally a bit less trusting of others, but not necessarily incapable of trust on an individual level if that person or institution shares their values and beliefs. This trust deficit may have genetic and developmental origins. Because of this, they tend to develop a strong sense of self-reliance or a focus on a small in-group or alternative institutions that strongly reflect their values and beliefs. They are particularly sensitive to what they consider to be illegitimate authorities that have power over their lives (International institutions, the Federal Government, the EU, etc.). Simply put, they don't trust these institutions and expect them to act only in a manner that seeks to extend their influence and control while remaining unaccountable. Their rebellion against these mainstream institutions takes the form of denial, driven through motivated reasoning, of the facts used to base top-down policy decisions on.

10.1.2.2. The Hesitant

Hesitants walk a fine line, with tendencies to occasionally align with the mainstream consensus, while still harbouring scepticism on certain societal risk issues. Their varied stance could reflect an internal struggle to reconcile contrasting information sources because of conflicts with their intrinsic values. These individuals are notably more receptive to conspiracy theories than the *Accepters*, hinting at an underlying openness or vulnerability to alternative narratives.

Trust is a complex matter for *Hesitants*. While they seem more trusting than the *Denialists*, they still hold reservations. *Hesitants* display less institutional trust than *Accepters* but haven't discarded it entirely like *Denialists*. This intermediate trust can be influenced by their more pronounced epistemic mistrust.

Diving deeper into their values, *Hesitants* seem more focused on self-enhancement and self-protection, valuing power and achievement, while not going as far as *Denialists* in their pursuit of individualism. They also lean slightly towards a social orientation, suggesting they value social connections but perhaps feel a need to guard themselves within those connections.

Core beliefs further differentiate *Hesitants*. Their slight leaning towards individualist beliefs is counterbalanced by their regard for egalitarianism, which means that while they prioritise

personal autonomy, they may also recognise the importance of equality and community welfare. Their balance between these core beliefs makes them complex and harder to predict, especially in the context of societal risks.

From a psychological perspective, *Hesitants* have a somewhat higher tendency towards reactance, revealing a sensitivity to perceived threats to their autonomy or freedom. Their adult attachment styles indicate a greater emphasis on anxious attachment, suggesting they might experience frequent concerns about the reliability and intentions of others. They may also be less confident in their own abilities to make sense of these issues which may make them vulnerable to alternative narratives.

Sociologically, *Hesitants* represent a diverse group spread across different contexts. Their hesitancy may be influenced by regional factors, exposure to contrasting narratives, or localised social pressures. While not as predominant in individualistic societies as the *Denialists*, *Hesitants* still form a noticeable presence with their views perhaps shaped by a mixture of local and global influences.

In essence, *Hesitants* appear to be individuals in flux, negotiating their place amidst a whirlwind of information, societal pressures, and intrinsic values. Their hesitancy is not just doubt; it's a complex web of trust and mistrust in themselves and others while searching for autonomy in a rapidly evolving world.

10.1.2.3. *The Accepter*

The *Accepters* are the group most inclined to acknowledge and align with the mainstream consensus regarding significant societal risks. Their trust in overarching systems and institutions is not merely a by-product of naivety or passivity, rather it stems from a deep-rooted belief in established processes, hierarchies, and the greater good.

Their trust extends not only to institutions but also to the very fabric of societal organisation. Epistemically, they exhibit high levels of trust and minimal credulity. This demonstrates a profile of *Accepters* as individuals who, more than just relying on proven and vetted knowledge sources, believe in the sanctity of established order and rules.

Probing deeper into their values, *Accepters* are characterised by their prioritisation of benevolence, universalism, and self-transcendence. Their strong hierarchist orientation is

evident in their unwavering belief in the importance of order, structure, and roles within society. They see these systems as essential for maintaining harmony and managing collective risks.

Their core beliefs, enriched by their hierarchist leanings, push them further away from the individualist orientation. While they also resonate with egalitarian beliefs emphasising equality and shared responsibility, it is their hierarchist tendencies, and their rejection of individualist beliefs, that makes them distinct. They tend to believe in the necessity of societal order, valuing the role of authority, experts, compliance, and established structures to guide and protect society from risks.

From a psychological perspective, *Accepters'* attachment style is predominantly secure. They trust not only in others but also in themselves and the roles they play within societal hierarchies. This sense of belonging and purpose within a structured environment shapes their trust in external institutions and the mainstream consensus.

Sociologically, *Accepters* are found across diverse contexts, especially in regions where societal order and structure are emphasised. Even in individualistic societies, *Accepters* are influenced by sub-cultures that advocate for unity, collective action, and respect for hierarchies.

In summary, the *Accepter* is a grounded individual, firmly believing in the merits of structured society and the guiding hand of established authorities. For them, the world operates best when everyone respects the hierarchy, trusts the process, and contributes to the collective good.

10.1.2.4. *Denialist, Hesitants, and Accepters, is that all?*

While these typologies might appear to neatly categorize individuals, they are best viewed as an initial effort, perhaps even a crude simplification, of the intricate psycho-social web of factors at play. Just as the standard model in physics was iteratively refined and the Diagnostic and Statistical Manual of Mental Disorders (DSM) underwent multiple evolutions, our understanding of these profiles will likely become more nuanced as more diverse data is collected. It is very plausible that as we delve deeper, further clusters or sub-categories could emerge, adding layers to our existing comprehension. The ever-evolving

nature of societal risks, combined with the dynamism of human psychology, warrants continuous refinement of these classifications. Drawing parallels with how major scientific theories or models evolved, the present typologies serve as starting points, vital for initial understanding but destined to be built upon, revised, and enriched as new evidence unfolds.

10.1.3. Discussion of the Results vis-à-vis the Literature

The findings of our study largely support the five criticisms levelled against the denial literature.

Our study diverges from the research done by Kellstedt, Zahran et al. (2008), Ranney and Velautham (2021), Jylhä, Tam et al. (2020), Brunhuber (2015), Abdulmoneim, Aboelsaad et al. (2021). These studies stood in as paradigm examples of research which confined denial to a single domain. However, our data suggests that different forms of denial, even in seemingly unrelated domains, may in fact be connected. This suggests that future denial research may bare more fruit if viewed as an interrelated set of phenomena.

In terms of the second criticism, that there is some silver bullet, be it sociological or psychological, that can be used to explain denial, our findings do not support such a conclusion. If anything, our research has shown that this may be a dead end for future research seeking explanatory and predictive powers beyond current levels. Additionally, in line with complex realism and case-based modelling, our findings suggest that there are multiple configurations of causal conditions that coalesce. So, contrary to a purely statistical approach that seeks singular causative factors, we find a more nuanced interplay of variables at work. Progress in our understanding of denial will likely be driven by research that further refines the resolution at which clustering takes place while enriching the facets covered by models like the one proposed in this study. I, therefore, concur with the approach taken by Rothmund, Farkhari et al. (2022) Ranney and Velautham (2021), and Murphy, Vallières et al. (2021) which views denial as the results of equifinality.

That being said, our research affirmed some of the findings of these 'silver bullet' studies, however, when viewed through the lens of our proposed theory, their conclusions can be reinterpreted as forming part of a larger model of interrelated behavioural facets. Yet, in

other instances, our findings appeared to contradict or at the very least, not support the findings of other studies.

For example, unlike Zintel, Flock et al. (2021) our data did not support the notion that women were more vaccine hesitant. There was no significant effect for sex found in terms of vaccination hesitancy, $t(1197) = -.813$, $p = .416$, despite women ($M = 3.32$, $SD = 1.35$) attaining higher average scores than men ($M = 3.26$, $SD = 1.35$). Similarly, the finding by Kleitman, Fullerton et al. (2021) that men were less likely to adhere to COVID regulations wasn't substantiated in our findings. There was no significant effect for sex found in terms of COVID compliance/denial, $t(1197) = -.368$, $p = .713$, despite women ($M = 3.19$, $SD = 1.40$) attaining higher average scores than men ($M = 3.17$, $SD = 1.34$).

There was also an inconclusive link between higher education leading to more denial. However, this may be due to group size constraints in our study. Therefore, there was insufficient evidence to comment on the findings of Drummond and Fischhoff (2017) in this regard. However, as hypothesised in Chapter 4, women ($M = 4.19$, SD 1.3) did demonstrate marginally, but significantly, $t(1197) = -3.19$, higher levels of institutional trust than men ($M = 3.94$, SD 1.4). Though no differences were observed on generalised trust, societal tension, or the dimensions of epistemic trust.

Lübke (2022)'s research has suggested that those feeling economically vulnerable were inclined towards denying anthropogenic climate change. In contrast, Krishnan (2021) posited that in the US, individuals with higher socio-economic standing were connected to opposing public health mandates. We observed no substantial connection between socio-economic status (SES) and denial, though this might be due to the limitations in nature of self-reported SES.

The research by Sallam, Al-Sanafi et al. (2022) and Solis Arce, Warren et al. (2021) was largely supported. Our data to showed significant national and geographical differences in the rates of denial. Our model demonstrated, while the rates of denial do vary by region, they were nonetheless present in every region assessed. In addition, it seems that while nationality is a useful dimension to include when investigating denial, it is by no means the only player in town. Our findings point to sufficient intranational variance to warrant looking deeper. Our findings suggests that Sallam, Al-Sanafi et al. (2022), who found high

vaccine acceptance in countries like China and lower acceptance rates in countries like Italy, the US, and France can be trusted. In addition, Arce Solis Arce, Warren et al. (2021) discerned a stark contrast between vaccine willingness in low and middle-income countries compared to the US and Russia. Our study somewhat mirrored these trends, although our research span was confined to a limited set of countries. Their observation of heightened denial in the US was consistent with our findings.

In terms of psychological dimensions, our study did not directly assess cognitive ability, cognitive styles, disgust sensitivity, and mood disorders. However, there is some third-party research to suggest that our attachment style informs our dominant personality traits and locus of control.

For example, the studies by Patty, Van Dijk et al. (2017) and Kleitman, Fullerton et al. (2021) which found a connection between conscientiousness and reduced hesitancy was partially supported by our study if one takes into account the connection between attachment and personality. This is because, as Noftle and Shaver (2006) demonstrated, securely attached individuals tended to be more conscientiousness. Therefore, our data that securely attached individuals were more likely to demonstrate epistemic trust and institutional trust helps add additional explanatory value to this relationship. It may be more reasonable to assume that people higher on conscientiousness are not necessary more likely to follow public health guidance because they prioritise future rewards over immediate ones, but because they are also more likely to be securely attached leading to greater levels of epistemic and institutional trust.

Similarly, Amit Aharon, Nehama et al. (2018) study which made a connection between external locus of control, vaccine hesitancy, and denial could further be explained when one considers the findings of Hexel (2003) who demonstrated that an internal locus of control is associated with secure attachment. Again, the findings observed by Amit Aharon, Nehama et al. (2018) could also be re-examined through the prism of our model which articulates this relationship, not primarily as one driven by one's locus of control, but rather because of the relationship between secure attachment – which promotes locus of control- and epistemic and institutional trust.

Furthermore, Gavaruzzi, Caserotti et al. (2021) study that demonstrated a link between intrapersonal emotional competence and vaccines denial could also be reinterpreted in terms of attachment when considering that secure attachment predicts greater competence in detecting one's own and others' emotions while the opposite appears to be true for the insecurely attachment (Kamel Abbasi, Tabatabaei et al. 2016). Therefore, once more, these findings can be re-examined through the lens of attachment and trust rather than placing interpersonal emotional competence as the primary causal factor.

In terms of third criticism of denial being equated to conspiratorial thinking as per the research of Lewandowsky, Cook et al. (2015), Islam, Kamal et al. (2021) and Miller (2020), as covered in section 10.1.1.c, while our data appeared to affirm a relationship between denial and conspiratorial thinking, on average, most individuals surveyed in our study appeared to be less inclined to endorse conspiracies as true. As such, I largely stand by my original empirically supported (albeit tentatively) theoretical advance. Future research should be careful to equate denial with conspiracy. This is because, as already mentioned, it is likely that while most conspiracist are denialist, not all denialists are conspiracy theorists. Some hold denialist views on subjects like climate change, COVID, and vaccinations, for reasons better explained through trust, core values, and belief differences.

The final two criticisms that I levelled against current denial research of geographically ringfencing and assumptions of homogeneity in denial, also still largely stand. As demonstrated by my research, we should be considering equifinality as a foundational principle when considering the root causes of denial. The simple truth is people come to these same conclusions for different reasons. As such, research built on the assumptions of unifinality is unlikely to advance this field further. In contrast, as already alluded to there does appear to be value in looking at national level data. But this should only be considered a part of the equation and not the whole answer. International level data allows for rough comparisons across groups of people (in so far as a nation represent by a board set of value and beliefs), however, as we saw, even among nations that would otherwise be considered homogeneous, there are significant variations when it comes to denialist views. This branch of research, while useful, needs to be better integrated with individual level psychological and sociological data to help advance the field.

In addition, there are some more areas from the literature covered in our theoretical chapters that warrant revisiting in light of our observations.

For example, our study firmly underpins the findings of Cook and Gronke (2001), Sønderskov and Dinesen (2015), Shockley and Shepherd (2016) that emphasised institutional trust as a pivotal factor in accepting the mainstream consensus on significant societal risk issues, reinforcing the positive correlation between trust and support for such consensuses. Furthermore, our findings largely support Cook and Gronke (2001) in that our data demonstrated a relationship between general trust and institutional trust (.15 <.001) while societal tension was negatively correlated with general trust (-.23 <.001).

Our result also largely managed to reproduced the findings of Campbell, Tanzer et al. (2021) as per their observed correlations between epistemic trust and insecure attachment orientations. In their study, avoidant attachment was correlated with trust -.39*, mistrust .45*, and credulity .22* while our results produced -.30*, .60*, .23* respectively. Anxious attachment in the Campbell, Tanzer et al. (2021) study was reported as correlated with trust -.14*, mistrust .40*, and credulity .32* while our results indicated .30*, 21*, .47*. While the relationships observed for mistrust and credulity remained consistent for the most part across the studies, the relationship with epistemic trust did not. Our data suggested a significant positive relationship between epistemic trust and anxious attachment.

Reflecting upon denial, particularly regarding vaccines, our findings are in harmony with the international findings of Robinson, Jones et al. (2021). They discovered that approximately 1 in 5 or 20% of the population exhibited vaccine-related apprehensions. Our data seemingly corroborates this, showcasing 20.6% of respondents in a denial cluster. Though the percentage does fluctuate from one country to another, it appears to serve as a reasonable global estimate.

Finally, Fonagy, Luyten et al. (2019), Fonagy, Allison et al. (2021) argument that economic inequality erodes epistemic trust, which leads to hypermentalization, which leads to denial and conspiratorial thinking is also somewhat challenged by the findings of our study on two grounds. Firstly, motivated reasoning may provide a better theoretical frame through which to explain denial and secondly, economic inequality may not be the trigger of this mental process.

Hypermentalization, as conceptualized by Fonagy, Luyten et al. (2019), Fonagy, Allison et al. (2021), appears to be primarily defined as mental process which deal with the over-interpretation of social cues and the mental states of individuals, rather than broader societal or systemic issues. It's about attributing complex intentions, emotions, or thoughts to others in interpersonal contexts, often inaccurately or excessively. This concept is more relevant in the field of social cognition and is often discussed in relation to individual psychological states or disorders. On the other hand, denial in the context of climate change and pandemics, especially when rooted in distrust towards institutions, appears to involve a different set of psychological and sociological dynamics. This kind of denial can be more aptly explained by concepts like motivated reasoning which involves processing information in a way that aligns with one's desires or beliefs. Here variations in belief orientations appear to play an outsized role and while one's socio-economic status can influence one's beliefs it is too blunt an instrument to explain individual variations.

In summary, while hypermentalization involves misattributions in social and interpersonal contexts, the kind of denial seen in responses to climate change and pandemics, especially when based on institutional distrust, is more aligned with sociopolitical and group dynamics informed by values and belief differences. Understanding these phenomena requires a broader look at social psychology, values & beliefs, group identity, etc. rather than hypermentalization.

In addition, our data suggests that a person's socioeconomic status has no measurable role to play in the likelihood of them appearing in any of our three identified clusters. Therefore, those faced with economic and social inequality were no more or less likely to doubt or accept the mainstream consensus of issues of significant societal risk. Rather our data suggests that personal belief orientation, as per the Douglas's Cultural Theory of Risk, may provide a better explanation of the trigger of denial. It appears not to be a case of economic inequality leading to epistemic injustice leading to hypermentalization, but rather the undermining of core belief orientations regarding how collective risk should be managed that is triggering motivated reasonings to align the interpretation of evidence to pre-existing, largely unconscious, beliefs. An interesting example, of this at work would be the socio-economically affluent population of Southern California, many of whom reject the

conclusions of mainstream epidemiology on vaccinations (Hiltzik 2014). Here large group of extremely wealthy people are engaging in denial which is difficult to explain via the inequality-hypermentalization hypothesis alone.

In conclusion, our study contributes valuable insights into the complex and multifaceted nature of denial. We observed that denial cannot be neatly attributed to singular causes or confined within specific domains, challenging previous research that sought to find a 'silver bullet' explanation. Instead, our findings advocate for a more nuanced approach that considers the interplay of various factors, including institutional trust, socio-economic status, and personal belief orientations. This approach aligns with the broader understanding of denial as a multi-causal and contextually variable phenomenon, underscoring the need for future research to embrace complexity and variability in exploring the roots of denial.

10.1.4. The Neurobiology of Denial

As we've journeyed through the preceding chapters, and in line with our 3rd secondary research objective, attentive readers will have noticed extended sections referencing the neurobiological mechanisms underlying the various elements of our model. Recognising that our fervent beliefs and convictions are underpinned by intricate and largely unconscious processes resulting from our unique neurobiological makeup encourages humility in our perceptions of '*facts*'. Understanding the triggers and influences of our affect in the context of issues of significant societal risk, which in turn appears to significantly influence our reasoning, is thus a crucial insight worthy of exploration.

Even our rather superficial overview of the available evidence in neurobiological suggests, that on a biological level, our trust, attachment, personal values and core beliefs are connected through a golden thread: that our brains' inherent predisposition for motivated reasoning seemingly underpinned by deeply entrenched neural circuits activated by mistrust, is informed by both our unique attachment-orientation and value-laden beliefs. This cognitive machinery appears to facilitate adaptive responses to the world by producing consistent interpretations and actions aligned with our existing knowledge structures. However, these same structures can also stimulate denial when we are faced with

information that might destabilize these structures. The latter appears to be exacerbated by our social media saturated environments.

Attachment theory postulates that early caregiving experiences shape neural circuits that influence later social behaviour and emotion regulation. The anterior cingulate cortex (ACC) and orbitofrontal cortex (OFC), for instance, play roles in attachment security and the regulation of social information. These regions help determine the "*safety*" of our environments and govern how we respond to threats, both real and perceived.

Personal values and core beliefs appear to be largely processed in neural circuits involving the medial prefrontal cortex (mPFC) and dorsal striatum, areas associated with self-referential thinking and reward processing. These neural pathways highlight the intimate relationship between one's sense of self and values/beliefs. When these values/beliefs are challenged, regions like the insula, related to negative emotion and risk, become hyperactive, reflecting the deep emotional resonance of our core beliefs.

In turn, trust can be seen as the bridge between attachment and values/beliefs. Neural regions like the ACC and OFC, implicated in attachment processes, are also engaged when evaluating trustworthiness. Moreover, the mPFC's involvement in processing values and beliefs suggests that trust is, at its core, a deeply self-referential process. When trust is betrayed, or when core values/beliefs are threatened, the brain perceives these as fundamental threats to the self, leading to heightened emotional responses.

As a result, attachment patterns might influence how one responds to information that challenges core beliefs. For instance, those with secure attachments might be more open to contradictory evidence, while insecure attachment orientations may create the conditions for the adoption of values/beliefs more likely to lead to denial.

Trust, as influenced by both attachment and values, affects the standard of evidence we require to accept or refute a claim. If we trust a source that aligns with our values/beliefs, we may accept evidence with less scrutiny (lowered bar). Conversely, we may require irrefutable evidence from sources we distrust or that challenge our core beliefs.

While perhaps superficial given the complexities involved, this tantalising evidence suggests that the brain's value/belief computational mechanism could be intrinsically tied to these

attachment patterns and our ability to trust. For example, those whose values/beliefs resonate with universalism, benevolence, and a hierarchist/egalitarian orientation, will assign evidence supporting factual conclusion in line with these values and beliefs a higher '*neuroeconomic weight*'. Conversely, evidence that threatens these values/beliefs might evoke strong neural responses in emotion and conflict-related areas.

In essence, the brain is wired to prioritise consistency and stability in its world view over *truth,* especially in the face of existentially threatening information. This is a cognitive efficiency mechanism, enabling quicker, more seamless navigation of the world. However, this very mechanism appears to also drive denial and motivated reasoning when faced with contradicting evidence, as accepting such evidence might necessitate a comprehensive overhaul of one's neural cognitive frameworks. For what is denial if not an unwillingness to acknowledge a threating reality? The neurobiology of attachment, trust, and values/beliefs collectively underpins this delicate balance between cognitive efficiency and adaptability.

Equipped with the knowledge obtained from our findings, the literature, and the insights gained from neurobiology, what then are some speculative policy implications suggested by our research findings?

10.2.   Policy Implications

While there are multiple policy areas that our research points to, I have highlighted two tentative areas where I belief most utility could potentially be derived below.

10.2.1. Recommendations for Mainstream Institutions

Mainstream institutions, spanning from international governmental bodies to mainstream media, scientific fraternities, and pharmaceutical sectors, wield significant power in framing public outlooks on issues of significant societal risk. Some mainstream institutions, like the United Nations supported by mainstream philanthropic funds like the Rockefeller and the IKEA Foundations, have recognised the dangers of denial and have developed initiatives designed to curate and provide unambiguous information around global crises, thus, supposedly countering misinformation (see #Verfied campaign). However, the insights gleaned from our research would suggest that such programmes may have the unintended

consequence of only further entrenching views around these issues, rather than changing attitudes.

Instead of a predominant focus on combating, banning, and blocking misinformation, the findings of this study emphasise that these resources may be better spent cultivating broad-based public trust and confidence. Achieving this requires a multi-faceted approach. To begin with, there's an urgent need for mainstream institutions to truly immerse themselves in understanding the worldviews of '*Denialists*' and '*Hesitants*'. This means not just cataloguing their beliefs but genuinely striving to comprehend their deep-seated concerns, motivations, and values. It also means that these institutions need to self-reflect on their intrinsic values and beliefs which should be accompanied by an acknowledgement that their orientation may not necessary be morally superior (as is often the case).

Empathetic engagement emerges as a crucial next step. Communication strategies must be recalibrated to resonate with a diverse range of personal values and core beliefs. A conversation with the *Denialists*, characterised by understanding and respect, can yield more positive outcomes than a paternalistic discourse which assumes ignorance or stupidity. Moreover, when it comes to influencing behaviour, providing options, rather than hard-set mandates may be more effective by empowering individuals, making them more amenable to accepting certain viewpoints. By providing choices, rather than hard and fast rules, a backfire-effect is less likely to occur.

The significance of transparency and consistency in messaging cannot be overstated. Institutions must adopt a forthright approach, which includes admitting to oversights when they occur. Consistency in messaging not only conveys reliability but also prevents the erosion of hard-earned trust. In instances where mainstream institutions are viewed with suspicion, collaboration with leaders or influencers who have the trust of *Denialist* and *Hesitant* communities might enhance the acceptance of crucial messages.

Furthermore, addressing the historical shadows that often cloud current interactions is imperative. By acknowledging past mistakes and addressing systemic failures, institutions can pave the way for a trust-filled future. Alongside this, there's value in clearly communicating the limits of their institutional power. By highlighting checks and balances,

institutions can alleviate concerns regarding unchecked dominance thereby helping to lessen some of the fear of disempowerment observed in these profiles.

The potential of the emerging field of Behavioural Insights and nudging should also be harnessed. This domain can offer innovative methodologies and strategies, underscoring the theme of mutual respect, understanding, and choice rather than overt cohesion and conversion.

10.2.2. Recommendations for the Broader Public

The subsequent recommendation centres on endowing the general populace with a better understanding of their intrinsic neurobiological responses related to existentially threatening information. Understanding how our neural intricacies shape our responses to presented evidence can be enlightening. By promoting this awareness through narrative, the visual, as well as the performing arts, we might find that we approach contentious topics with a heightened level of humility. This can be achieved through methods that explains rather than directly challenges our core beliefs. Instead, the idea is to weave in these beliefs, offering a balanced perspective on pressing societal issues by removing the focus from the scientific evidence, in favour of reflection on why the policies these findings suggest are so contentions and divisive to begin with.

The recommendations provided above are broad, general, and require far more detailed consideration, however, they do provide a roadmap for where this research could take us in the future. Any policy implication emanating from this study needs to be carefully considered, tailored to local conditions, piloted, and monitored for impact. Ultimately, the goal of any intervention should be improved understanding of self and others, based on finding common ground, rather than convincing or converting.

10.3.   Limitations

Every research endeavour comes with its own unique set of limitations. Our approach is no exception, and we outline its potential shortcomings below.

10.3.1. Limitation of the Research Design

The analytical cross-sectional survey design, though effective in examining variable relationships at a certain point in time, has its drawbacks. Most notably, it can't establish causality (correlation does not imply causation). The data, being a snapshot, may miss temporal dynamics or reciprocal relationships and may be susceptible to biases concerning case selection or timing. Complex systems' evolving interactions might not be fully represented, which impacts the interpretation of our findings.

10.3.2. Limitation of the Sampling Method

Our quota sampling method, despite ensuring representation across gender, location, and age, has limitations. As a non-probability technique, not every population member has an equal selection chance, leading to potential biases and sample representativeness issues. Adhering strictly to quotas may also omit essential demographics or force the inclusion or exclusion of certain participants, affecting the study's generalisability.

10.3.3. Limitations of the Measures Used

The measures employed present challenges, notably from self-reporting biases such as social desirability. Memory lapses and misunderstandings further threaten self-reported data accuracy. Newly introduced measures may lack extensive validation. Additionally, while Likert scales are popular for gauging opinions, they might introduce response biases and interpretation inconsistencies among respondents.

Related to this is a potential limitation which arises from a linguistic perspective. The measures were provided exclusively in English, yet around 40% of the respondents come from contexts where English may not be their first language. While proficiency in English was a prerequisite for participation and the sample countries chosen where for the most part in the UK, US, EU, and South African where English proficiency is of a high level, nonetheless, amongst a minority of respondents, there were some geographical regions targeted where English is likely not a first language or even a strong second language. To safeguard against potential linguistic bias that could arise from such respondents, a number of steps were taken. The first was in the development/selection of the measures. This was done in line with the Common European Framework of Reference for Languages (CEFR)

where the aim was to use language appropriate for a B1, or intermediate level of language proficient readers. Care was taken to avoid using language in items that would be linguistically or contextually inappropriate for non-native English speakers. In addition, all measures were subject to extensively piloting using respondents from across multiple regions (six pilot studies were run in total across 40+ countries). Each pilot help to simplify, shorten, and clarify items. A measure was only considered suitable when it demonstrated that it was sufficiently internal coherent (reliable) and robust. High Cronbach's Alphas across all constructs assessed in each measure meant that there is little to no evidence of a strong systematic linguistic bias.

However, there will still no doubt be a handful of cases where the odd respondents misinterpreted an item. In these cases the large sample size drawn (n=1,199) would have helped to wash out the effects of such cases. In the few instances where an individual's linguistic competency was not sufficient to grasp the meaning of the items in the measures, the following outcome were likely: first, respondents may have misunderstood such as "climate change", "contrails", etc. leading to inaccurate interpretations of questions and, consequently, responses that do not accurately reflect their views. Second, subtle differences in connotations of words, which might be clear to a native speaker, could lead to differential emphasis in understanding and responding to items, potentially skewing results toward certain attitudes or beliefs. Third, cultural differences in communication styles may result in varying degrees of agreement or disagreement expressed by non-native speakers, known as acquiescence or extreme response style bias, which can affect the reliability of Likert-scale measures. Fourth, the complexity of certain technical terms or domain-specific language, even if a respondent is proficient in English, could introduce a comprehension gap, affecting their ability to provide informed responses. These biases, while mitigated to some extent by the high internal consistency of the measures, highlight the importance of linguistic considerations in the interpretation of the study's findings.

It is recommended that future studies considered translating the measures used into the target languages of regions sampled so as to minimize the potential impact outlined above.

10.3.4. Limitations of the Data Collection Method Used

Our online survey method, while efficient, might be inherently biased towards internet-savvy participants and miss nuances inherent in traditional data collection methods. The English-only requirement, along with global events affecting responses collected over a prolonged period, introduces variability and potential bias.

10.3.5. Limitations of the Approach to Data Analysis

Case-based computational modelling via COMPLEX-IT, though robust, is not without limitations. It involves assumptions that might oversimplify real-world complexities. Misclassification risks, software intricacies, potential overfitting, and sensitivity to data noise can all affect the study's validity and reliability.

Our research's inherent limitations stem largely from its self-reporting measures. Respondents might portray themselves in a manner consistent with societal expectations, introducing biases. Reflective questions can lead to memory biases, and the English-only survey might introduce comprehension variations. However, these self-reporting measures remain invaluable due to their scalability and insights. The online recruitment method, with its compensation, might slant results towards younger, internet-savvy demographics and introduce biases from those seeking just monetary gain. To counteract, we've ensured rigorous participant verification and ethical compensation.

In conclusion, while our study offers valuable insights, acknowledging its limitations is essential. The potential for biases, memory inaccuracies, and inherent challenges with our data collection and analysis methods must be recognised. However, our stringent measures, both ethical and methodological, aim to bolster the study's reliability and validity.

10.4.   Avenues for Future Research

The unanimity observed across our profiles in consensus on public health issues such as sugar and smoking insinuate that concerns of significant societal risk are distinct in nature. Perhaps it is the uniquely existentially threatening character of these issues that differentiates them, stimulating our attachment system and prompting a default to deeply ingrained values and beliefs. A promising avenue for research lies in the conduct of studies designed to observe this affective activation while subjects evaluate evidence on matters that

carry significant societal risk. Researchers could incorporate controls where evidence is presented with and without attachment activation, devoid of any policy recommendations and, in contrast, where the data comes accompanied by policy recommendations that stand in opposition to a subject's established values and beliefs. This methodology would allow for a comparative study of different policy recommendations – some of which lean more towards a universalism/hierarchist/egalitarian perspective, while others cater to a less socially focused individualist/fatalistic outlook.

Moreover, to further develop our model, there's a pressing need for a broader and more representative sample spanning more distinct countries. Given that some nations lean heavily towards Hierarchist policies, and others exhibit a tendency towards Individualist strategies, a comprehensive evaluation of how these policies resonate with people possessing corresponding belief orientations in these countries would be of significant value. Tied to this is a need to obtain data from samples with an age distribution more representative of the general population.

Furthermore, existing research tools and measures warrant an upgrade. The methodologies employed to gauge attachment, values, beliefs, and cultural theories of risk should be revisited and enhanced. New measures should focus on getting subjects to reveal the notions they disagree with or find objectionable. Our findings suggest that respondents might have better awareness of the things they find abject. This is further supported by the findings in the neuroscience, which suggest that there are different brain centres at play when getting people to reflect on what they stand for rather than against. Such an approach might be more revealing than traditional methods that emphasise a largely affirmative approach. However, attention will need to be paid to minimising the impact of social desirability in this new generation of measures.

Future studies that wish to further explore the role of attachment in denial should retain the disorganized category when assessing individual attachment orientations. While dropped from this study for the sake of brevity, data from this category may likely provide additional incremental explanatory power provided a sufficiently large sample is gathered.

While this study looked at global regional groupings, exploring country-level data promises to be a fertile avenue for cross national comparative research in understanding the

intricacies of societal risk perceptions and responses. Every nation carries with it a unique tapestry of historical events, cultural norms, economic and sociopolitical dynamics that have profound implications on its populace's beliefs and behaviours. Disaggregating data at the country level (Gini Coefficient, Subjective Well-Being Index, etc.), will add additional context, that while alluded to by our data, will bring further insight. Therefore, any country-specific analysis should be approached with a comprehensive and sensitive lens, ensuring that interpretations are not only grounded in data but also respectful and cognizant of each nation's unique journey and ethos.

In addition, due to the limitations of our data, no conclusive insights could be gained regarding the relationship between employment status and denial. However, it would be reasonable to hypothesise that employment is likely to result in institutional integration and a feeling of acceptance, which could lead to increased trust in mainstream institutions. This is something worthy of exploration once a larger and more robust dataset has been obtained.

Finally, as the inner workings of denial become clearer, the emerging understanding presents profound neuroethical dilemmas. If advancements in neuroscience provide insights allowing for the identification, and potential modulation, of neural circuits associated with denial, the pressing ethical question remains: should we tread this path? We must diligently consider the ethical frontiers of such interventions.

10.5.   Summary

The personal narrative about my friendship with John shared at the start of our journey together provides an intimate lens through which the broader societal divisions and deliberations about science, trust, and truth are examined. Our debates over climate change, pandemics, vaccinations, and other issues underscore the critical quandary at the heart of this thesis: *How can individuals, equipped with seemingly equal capacities for intelligence and reasoning, arrive at strikingly divergent views on matters of significant societal concern?* Here I must confess, that while I embarked with objectivity as my goal, in my heart I felt that John's views on these issues are probably wrong and, more notably, that I was right.

To understand what was afoot I first turned to the previous research that had delved into denialism, trying to pinpoint its roots. Whether it is attributed to sociological constructs like

gender and education or psychological ones like cognitive reflection and personality dimensions, researchers have, in many instances, been in pursuit of a singular explanation. But reality, as is more often the case than not, is multifaceted, intertwined, nuanced, and complex. To equate denial solely to conspiracy theories or confine it to linear causality is to undermine the intricacy of this phenomenon. Moreover, the restricted geographical scopes of many studies meant that overarching conclusions are challenging to draw. With these limitations in mind, I set off on my own research journey to see if I could come up with a better answer.

A few years later, armed with the insights from our findings, I have concluded that neither John nor I have access to morally superior epistemic positions on issues of significant societal risk because of the complexity they embody. Not me as an *Accepter* nor John as a *Denialist*. This of course does not to imply a relativistic position on these issues either, as complex critical realism posits, there likely is a truth regarding these issues. However, exactly because of their complexity, scale, interdisciplinary nature, and the voluminous information out there, no individual, even individual experts, have access to definitive answers.

Rather ordinary people like John and I have to trust a constellation of mainstream institutions to share reliable and valid information on these issues. As such, for me to *know* that climate change is real, that vaccines are effective, that COVID is a serious threat, requires of me to trust the communicated knowledge shared by these authoritative institutions that span the media, science, medical establishment, and the global public sector. The rest, as we saw in Chapter 3, boils down to cognitive biases and post-hoc rationalisations driven primarily by motivated reasoning. The concerning thing is, even for relatively enlightened and well-educated people like John and me, all of this appears to be occurring below our levels of awareness so that we tend to believe that our conclusions on these issues were reached thanks to our superior intellect or because we invested more time and effort doing '*research*'. However, what is truly at play here is our ability to trust the communicated knowledge of mainstream institutions on these issues or not.

As we continued our research expedition, we learned that our ability to trust was predicated on both dispositional and situational antecedents. We then saw that it was possible for

people like John and me to vary significantly when it came to these attributes. For example, variations in dispositional trust can come about for psychological reasons such as a person's attachment orientation, epistemic trust orientation, reactance, personal values, and core beliefs. However, our social environments, as we saw, also heavily influence the way in which our individual disposition manifests.

Ultimately, our genes, and their subsequent environmental expression through our experiences, culture, and learning are all involved in determining our propensity for risk, our betrayal sensitivity, and whether we believe the world generally to be a trustworthy place or not. We also saw that the situational antecedents of trust were largely socio-historical and significantly sociologically influences the relationship between the trustor and trustee, the nature of the object of trust, and the environmental backdrop within which trust is meant to occur. However, how one experiences and processes these situational antecedents is also psychologically influenced. Consequently, when it comes to our ability to trust, there is a complex feedback loop of psycho-social-historical factors at play that creates the conditions for significant individual differences to emerge.

The remainder of our research journey was focused on exploring how and why our dispositional trust varies. We saw that our attachment/reactance influenced personal values and core beliefs resulted in delicate cognitive schemas that we tend to default to make sense of the world in times of uncertainty. We rely heavily on these schemas when we are confronted with complex collective existential threats because easy explanations and clear-cut solutions do not exist. Instead, we have to rely on our default schemas to deal with these complex risks. However, when mainstream institutions communicate knowledge on these risks along with policy recommendations on how to address them, the latter can often run contrary to our values and beliefs about how we innately feel complex collective risk should be managed. For those of us, like John, who strongly favour an individualist approach, this leads to an affective response resulting in a backlash effect. John is then motivated to protect his cognitive schemas, and his resulting aversion for mainstream policy proposals, by undermining (denying) the evidence on which these policies are based as well as the legitimacy of the institutions proposing them. I, because of my very different values and beliefs orientation, find myself largely resonating with the policy solutions put forth by

mainstream institutions because they cohere with my values and beliefs. John's rejection of these seemingly sensible solutions, in turn, activates my affect which then brings us into epistemic conflict. This sees me advocating for the mainstream consensus because I largely believe in the hierarchist/egalitarian way of managing risk while John argues the opposite because he fundamentally believes my approach will lead to a dystopic outcome. Our orientations here are largely the by-product of arbitrary psycho-social-historical conditions that we are not even fully aware of.

However, armed with more information about our backgrounds these differences may seem less unlikely. You see, John grew up in Glasgow, Scotland in the 1970s when this was an economically depressed area. His mother was diagnosed with schizophrenia which meant that John didn't have the most consistent nor nurturing childhood experience. From an early age, John learnt that he was better off if he relied on himself. This idea was further reinforced by John's father who was unemployed for large periods of his adolescent and teen years. Over much of John's development, his family subsisted on the dole in public housing- to his embarrassment. John begrudged his father who he saw as a freeloader for being unwilling to fend for his family, relying on state welfare instead. In turn, John learned to resent the state for creating the conditions that he believed disincentivised his father from making his own way in the world. Later, when John was at university much of what Britain's newly elected PM, Margaret Thatcher had to say, resonated strongly with him, and set him up as a devout Tory and economic neoliberal. As a result, the belief that collective risk is best managed through an individualist approach is ingrained in John. But perhaps more powerful, is his aversion to policies that require collective mandates and limits on liberties like those often favoured by the hierarchist and the egalitarian.

I on the other hand, originated from a very different socio-economic, cultural, and historical background. I grew up in the 80's and 90's in South Africa, my mother was an attentive stay-at-home mom and provided a secure base from which to explore the world. My father was a scientist with his own consulting company doing research for the government. Both of my parents were present and attentive. There were times when we were more socio-economically affluent than others, but we never experienced true economic hardship. I also lived through the peaceful resolution of Apartheid which, to me at least, led to increased

trust in authoritative institutions. Perhaps my familial experience and my socio-historical experiences conspired with my genes to result in someone with a greater disposition for institutional trust. My values and beliefs are also personally rooted in a rejection of the isolationism of Apartheid. I am a firm believer in universalism, the benevolence of others, a rules-based world order, and that complex societal risks are best dealt with collectively, even if it requires a degree of personal sacrifice.

Our stories demonstrate just how complex this phenomenon is. Institutional and epistemic trust, and the resulting acceptance or denial of issues of significant societal risk, stem from a confluence of psychological and sociological factors that are richly interwoven. Our psychological make-up, for the most part creates a foundation from which our values and beliefs evolve, however, our social environments then influence, modify, nurture, or inhibit the emergence of our proto-orientations. Therefore, for most of us, our genes and conditioning conspire to create individual differences in values and belief orientations that are subsequently moulded by our identities as shaped through our genders, nationalities, etc.

This is why *Accepters*, *Hesitants*, and *Denialists* exist across all genders and nationalities no matter where we look. However, the proportions of these groups differ because of the forces these intersectionalities exercise on the values, beliefs, and world views of the individual.

10.6. Conclusion

A foremost conclusion of our research is that denial on issues of significant societal risk cannot simply be written off as ignorance, stupidity, or some other cognitive or moral deficiency. This implies that trying to convince those that engage in denial or hesitancy on these issues with force of education, evidence, and fact alone is likely to fail. As we have discussed, the findings of our research suggest that many of existing efforts around science education and the combatting of online misinformation may unintentionally be leading to increased levels of denial because of where these efforts originate from. In fact, even labelling people with such orientations as *Denialists* may be counterproductive given that this term is value laden in-and-of itself.

We also need to acknowledge that all profiles have blind spots. *Accepters* have vulnerabilities just like *Hesitants* and *Denialists*. *Accepters*, like me, who more readily trust institutions are left vulnerable to real instances of opportunism, corruption, and abuse of power. While *Denialists* might be less so, they often have to perform feats of mental gymnastics to maintain their stance that these institutions cannot be trusted. For example, *big pharma* cannot be trusted, except for the *big pharma* that manufactures and profits from Ivermectin, etc.

While the discovery of at least three distinct profiles related to denial is a promising first step, because of the limits of our sample there will undoubtedly be more nuanced and accurate profiles that will emerge with the collection of additional data, and through the refinement and development of new measurement tools. Here we may be able to borrow from the work of consumer psychology and the methods of market segmentation to better describe the needs and motives of these profiles and how to nudge them towards acceptance.

Furthermore, our results suggest that the way we engage with mainstream institutions and their communicated knowledge is largely phenomenological. This means our constellation of authoritative institutions are perceived as a group of highly interrelated and coordinated institutions (i.e. the '*they*'), while in reality they operate autonomously from each other, have independent mandates, and their own motives. As we saw in the results, people's trust is highly correlated across a group of diverse mainstream institutions. This suggests that the emergence of a trust deficiency in say, the mainstream media, can create conditions that erode trust in global institutions like the United Nations and vice versa. Therefore, it might be necessary for mainstream institutions to consider mechanisms that publicly reinforce their independence from each other, while acknowledging that a trust injury to one is an injury to all.

In addition, we can conclude that the emergence of search algorithms and social media have likely made it easier for individuals with similar underlying personal values and core beliefs to find online information and communities that reinforce and further hone their world view to the point of extremism. While we can see from our data that those that fall within the *Denialist* profile constitute the minority, their engagement with what may appear as extremely big online communities, may provide them with a false impression that a larger

proportion of society endorses these views than in truth. Therefore, it may be worth social media platforms and search engines not only showing results, but the results relative to all others to provide perspective. For example, at present the group on Facebook that endorses flat earth theories has nearly half a million members, relative to Facebooks' almost 3 billion users. When looking at the group alone, this may seem like an impressively sized community, however, this is a view endorsed by less than 0.017% of the users on this platform.

10.7.   Final Thoughts

This study, at its core, was an odyssey of introspection, an exploration of the intricate dance between psychology and sociology, and a testament to the profound depth of human cognition. In discerning the roots of our differences, it has become evident that our behaviour, far from being a simplistic function of rational processing, is a sophisticated interplay of myriad factors influenced outside of our awareness and control. The sociological implications, nuanced by variations in gender and global context, further underscore that consistent psychological structures that appear universal are significantly modulated by cultural and gender nuances. From this research, I have concluded that while there appear to be universal psychological patterns, these are either amplified or dampened by our sociological surroundings.

Regrettably, many of the research and models of human behaviour out there, especially in the social sciences, often still assume rational actors and/or linear causality. What we learnt from our investigation reminds us that human cognition is influenced by multiple factors beyond mere rational processing and that linear models, no matter how sophisticated, cannot capture this complexity adequately. As this research hopefully showed, there are alternatives out there that allow researchers to embrace this complexity while maintaining scientific rigor. Complexity methods like intersectionality analysis, QCA, and case-based computational modelling are just some of the exciting new methods available to propel the social sciences into the future through the eye of complex critical realism. This, in turn, can lead to more accurate and holistic models of human behaviour.

~ The End~

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Annex A: Complete Set of Measures Used in Study

The Societal Risk Denial Scale		
	Inst.	*Read the next 24 statements and rate the likelihood of each being *TRUE'*.*
#	Dim.	*1 Extremely Unlikely – 7 Extremely Likely*
01	Cont.	Physical exercise has many positive health benefits. (R)
02	Vax.	Vaccinations are generally safe and effective. (R)
03	CliC.	Current global climate change is mostly human-made. (R)
04	Cons.	The Moon landings were faked.
05	Cov.	COVID-19 is *NO* more dangerous than the common flu.
06	Vax.	The risks associated with vaccinations outweigh any benefits.
07	Cov.	Herbal supplements can prevent/cure COVID-19.
08	Cont.	Getting enough good quality sleep is essential to our health. (R)
09	Cons.	5G Cellular towers cause cancer.
10	Cov.	Face masks help reduce the spread of COVID-19. (R)
11	CliC.	Human-made climate change is a myth.
12	Cons.	Mind control chemicals are being spread through aeroplane contrails also known as Chemtrails.
13	Cont.	Driving while under the influence of alcohol is dangerous. (R)
14	CliC.	Humans are the major cause of climate change right now. (R)
15	Cont.	Smoking can damage your health. (R)
16	Vax	Vaccines do more harm than good to the human body.
17	Cont.	Eating too much sugar is bad for your health (diabetes, obesity). (R)
18	Cons.	The Earth is flat/disk-shaped.
19	Cov.	Essential oils and other natural supplements can protect you from COVID-19.
20	Cons.	Governments are covering up that aliens have made contact.
21	Cons.	Bill Gates wants to secretly implant tracking microchips in people.
22	Cov.	There are known effective natural cures for COVID-19.
23	CliC.	Our ongoing climate crisis is caused by humans. (R)
24	Vax	Scheduled vaccinations are generally safe for children. (R)

CliC. – Climate Change; Cov. – COVID-19; Vax – Vaccinations; Cons. – Conspiracy Theories; Cont. – Control

The Adult Attachment Orientations Scale		
#	Inst. / Dim.	Rate the next 20 statements on the extent to which they *describe your feelings about your close personal relationships with others. Some of these statements may come across as personal, nevertheless, your honesty is greatly appreciated. Remember all responses are *anonymous*! To what extent is this statement characteristic of you?
01	SC	I feel I can comfortably talk things over with those close to me.
02	AV	I tend to minimize the importance of close relationships.
03	AX	I dislike being alone. It leaves me feeling abandoned and frustrated.
04	SC	I know that others will be there when I need them.
05	AX	I really need someone's emotional support.
06	AX	I worry a lot about my relationships.
07	AV	I find it hard to open myself up to others.
08	AX	I am nervous those close to me may abandon me.
09	SC	I feel like others care about me.
10	AV	I find it difficult to allow myself to depend on others.
11	AV	If someone tried to get close to me, I would try to keep my distance.
12	AX	I fear being excluded by those close to me.
13	SC	I feel I can trust the people who are close to me.
14	AV	I have mixed feelings about being close to other people.
15	SC	I know I can turn to those close to me in times of need.
16	AV	I tend *not *to show those close to me how I feel deep down.
17	SC	I feel secure and close to other people.
18	AV	I tend to prefer relationships with things or animals instead of people.
19	AX	I immediately get upset if I am excluded from things organised by those close to me.
20	AX	I need someone close to talk to about the things that worry me.

SC – Secure; AV = Avoidant; AX – Anxious

Institutional Trust Scale		
#	Inst. / Dim.	To what degree do you *trust *the information shared by the following *5 institutions*. Especially when it comes to issues of importance to your health and future. Do you trust that the information shared by this institution is generally *truthful *and in the *public interest*?
01	IT_1	WHO (World Health Organisation)
02	IT_2	UN (United Nations)
03	IT_3	Mainstream Media (New York Times, BBC, etc.)
04	IT_4	Established Science (Universities, Foundations, Labs, Journals, etc.)
05	IT_5	Medical Establishment (Hospitals, Doctors, Pharmaceuticals, etc.)

	Inst. / Dim.	Read the following *15 statements* and tell us to what degree each describes you.
#		
01	ET.T	I usually ask people for advice when I have a personal problem.
02	ET.C	I have too often taken advice from the wrong people.
03	ET.M	I often feel that people do *not* understand what I want and need.
04	ET.T	I find it very useful to learn from what people tell me about their experiences.
05	ET.T	If I don't know what to do, my first instinct is to ask someone whose opinion I value.
06	ET.M	I'd prefer to find things out for myself on the internet rather than asking people for information.
07	ET.C	When I speak to different people, I find myself easily persuaded by what they say even if this is different from what I believed before.
08	ET.C	People have told me that I am too easily influenced by others.
09	ET.M	If you put too much faith in what people tell you, you are likely to get hurt.
10	ET.M	When someone tells me something, my immediate reaction is to wonder why they are telling me this.
11	ET.T	Sometimes, having a conversation with people who have known me for a long time helps me develop new perspectives about myself.
12	ET.M	I don't usually act on the advice I get from others even when I think it's probably sound.
13	ET.T	I find information easier to trust and absorb when it comes from someone who knows me well.
14	ET.C	I am often considered naïve because I believe almost anything that people tell me.
15	ET.C	In the past, I have misjudged who to believe and been taken advantage of more than once.

ET.T – Epistemic Trust; ET.M – Epistemic Mistrust; ET.C – Epistemic Credulity

The Cultural Worldview Indices		
#	Inst. / Dim.	Rate the following 12 statements based on how much you personally agree. Remember all responses are *anonymous*!
01	CTR_E	It is our responsibility to reduce differences in income between the rich and the poor.
02	CTR_F	The most important things that take place in life happen by chance.
03	CRT_H	Society would be much better off if we imposed strict and swift punishment on those who break the rules.
04	CRT_I	We are all better off when we compete as individuals.
05	CTR_F	For the most part, succeeding in life is a matter of chance.
06	CRT_H	Society is in trouble because people do not obey those in authority.
07	CTR_F	No matter how hard we try, the course of our lives is largely determined by forces beyond our control.
08	CTR_E	Society works best if power is shared equally.
09	CRT_I	Even if some people are at a disadvantage, it is best for society to let people succeed or fail on their own.
10	CRT_H	The best way to get ahead in life is to work hard and do what you are told to do.
11	CRT_I	Even the disadvantaged should have to make their own way in the world.
12	CTR_E	What society needs is a fairness revolution to make the distribution of goods more equal.

The Global Risk Perception Measure (GRPM)		
#	Inst. / Dim.	Read the next 4 statements about how we as a society can best deal with collective risks. **Issues like *climate change* & *pandemics*...**
01	CTRM_H	**are best managed by listening to experts, like scientists, and organisations like the UN and following their advice.** They can help promote laws to protect us, and they can use science and technology to find solutions. We should all work together to make sure these plans keep everyone safe, and everything runs smoothly.
02	CTRM_I	**are best managed by letting each person figure out their own ways to help.** This can include coming up with new ideas, using new technology, and doing things on our own. The goal is to let everyone solve these problems in their own way, without too much control from the government or other big organisations like the UN.
03	CTRM_E	**are best managed when we work together as a global community.** This means everyone shares the responsibility, like helping to save the environment or following health guidelines. The goal is for everyone to have an equal part in making the world safer and healthier, without anyone being left out or having too much power.
04	CTRM_F	**are best managed when we accept that some things are simply out of our hands.** This means understanding that big problems like climate change or global diseases might happen no matter what we do. The goal isn't to try to control everything but rather to adapt and deal with things as they come.

Measure of Perceived Societal Tension (European Quality of Life Survey)		
#	Inst. / Dim.	**In all societies there sometimes exists *tension *between social groups. In your opinion, how much tension is there between each of the following 9 groups? 1 – No Tension; 7 – A lot of tension**
01	ST_01	*poor *and *rich *people"
02	ST_02	*locals *and *immigrants*
03	ST_03	*management *and *workers*
04	ST_04	*men *and *women*
05	ST_05	*older *and *younger *generations
06	ST_06	different *racial* and/or *ethnic* groups
07	ST_07	different *religious *groups
08	ST_08	different *gender/sexual identities*
09	ST_09	the political *left *and *right*

Generalized Trust Scale		
#	Inst. / Dim.	Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people? 1 – "Can't be too careful"; 7- "Most can be trusted"

Political Orientation Measure		
#	Inst. / Dim.	How would you describe your political orientation? 1 - "Completely Liberal"; 7 - "Completely Conservative"

Religious Orientation Measure		
#	Inst. / Dim.	My religious faith defines my orientation in life.1 - "Disagree Strongly"; 7 - "Agree Strongly"

Generalized Life Satisfaction		
#	**Inst. / Dim.**	All things considered, how satisfied would you say you are with your life these days? 1 - "Very Dissatisfied"; 7 - "Very Satisfied"

Fear of Disempowerment Scale (Reactance)		
#	**Inst. / Dim.**	**Read the following about 4 statements about '*those in charge*' Think authoritative institutions like governments, global institutions, the mainstream media, and established science.**
01	FoD_1	Generally speaking when those in charge make decisions there is some hidden agenda.
02	FoD_2	I often feel like I have been disempowered by those in charge.
03	FoD_3	Those in charge are always looking for opportunities to control us.
04	FoD_4	Given the opportunity, the people in charge would take steps to limit our freedom.

The Portrait Value Questionnaire (PVQ-21)		
#	Inst. / Dim.	Each statement describes someone different. Each name is gender-neutral and can be read as either male or female according to your own preference. How much is this person like you?
01	BV	It is important to Nicki to be loyal to their friends. Nicki wants to devote themself to people close to them.
02	UV	It is important to Sam to listen to people who are different. Even when Sam disagrees with them, Sam still wants to understand them.
03	PW	It is important to Frankie to be rich. Frankie wants to have a lot of money and expensive things.
04	SC	It is important to Ash that the government ensures one's safety against all threats. Ash wants the state to be strong so it can defend its citizens.
05	AC	It's important to Jo to show their abilities. Jo wants people to admire what they do.
06	PW	It is important to Casey to get respect from others. Casey wants people to do what he/she says.
07	SD	It is important to Toni to make their own decisions about what they do. Toni likes to be free and not depend on others.
08	ST	Reese likes surprises and is always looking for new things to do. Reese thinks it is important to do lots of different things in life.
09	TD	Tradition is important to Parker. Parker tries to follow the customs handed down by their religion or/and family.
10	UV	Jesse thinks it is important that every person in the world should be treated equally. They believe everyone should have equal opportunities in life.
11	BV	It's very important to Jordan to help the people around them. Jordan wants to care for their well-being.
12	SC	It is important to Morgan to live in secure surroundings. Morgan avoids anything that might endanger their safety.
13	ST	Camden looks for adventures and likes to take risks. Camden wants to have an exciting life.
14	SD	Thinking up new ideas and being creative is important to Alex. Alex likes to do things their own original way.
15	CF	It is important to Remy always to behave properly. Remy wants to avoid doing anything people would say is wrong.
16	CF	Robin believes that people should do what they're told. Robin thinks people should follow rules at all times, even when no-one is watching.
17	HD	Avery seeks every chance they can to have fun. It is important to Avery to do things that gives them

		pleasure.
18	AC	Being very successful is important to Andie. Andie hopes people will recognise their achievements.
19	HD	Having a good time is important to Taylor. Taylor likes to "spoil" themself.
20	TD	It is important to Sasha to be humble and modest. Sasha tries not to draw attention to themself.
21	UV	Leslie strongly believes that people should care for nature. Looking after the environment is important to them.

AC – Achievement; BV – Benevolence; CF- Conformity; HD – Hedonism; PW – Power; SC – Security; SD - Self-Direction; ST- Stimulation; TD – Tradition; UV - Universalism

Annex B: Factor Analysis of the Adult Attachment Orientations Scale (n = 2,004)

#	Item	Dimension	C1	C2	C3
Rotated Component Matrix						
Item 01	I know that others will be there when I need them.	Secure	**0.775**	-0.029	-0.036
Item 05	I am comfortable depending on others.	Secure	**0.192**	-0.442	**0.388**
Item 08	I feel I can trust the people who are close to me.	Secure	**0.723**	-0.131	-0.009
Item 09	I find it relatively easy to get close to others.	Secure	**0.377**	-0.455	0.043
Item 12	I feel secure and close to other people.	Secure	**0.771**	-0.323	0.077
Item 13	I feel like others care about me.	Secure	**0.792**	-0.255	0.008
Item 02	If someone tried to get close to me, I would try to keep my distance.	Avoidant	-0.018	**0.681**	-0.004
Item 03	I have mixed feelings about being close to other people.	Avoidant	-0.180	**0.698**	0.124
Item 06	I find it difficult to allow myself to depend on others.	Avoidant	-0.070	**0.609**	-0.158
Item 10	I feel alone and yet don't feel like getting close to others.	Avoidant	-0.444	**0.499**	**0.301**
Item 16	I find it difficult to trust others completely.	Avoidant	-0.392	**0.629**	0.189
Item 17	I find that being emotionally close to someone makes me nervous.	Avoidant	-0.323	**0.613**	0.248
Item 04	I really need someone's emotional support.	Anxious	0.019	-0.074	**0.746**
Item 07	I worry a lot about my relationships.	Anxious	-0.044	0.188	**0.669**
Item 11	I want to talk with someone who cares for me about things that are worrying me.	Anxious	0.052	-0.048	**0.680**
Item 14	I find others are reluctant to get as close as I would like.	Anxious	-0.234	0.088	**0.381**
Item 15	I often worry that the people close to me do not really care about me.	Anxious	-0.465	**0.357**	**0.400**
Item 18	I often feel like I cannot always depend on others to be there when I need them.	Anxious	-0.473	**0.464**	**0.249**

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization (converged in 4 iterations)

Annex C: Full Correlation Matrix

		Denial (DMC)						Trust					Attachment			Core Beliefs								SVC_BV
		DMC	CliC	Cov	Vax	Cons	Cont	IT	ET	ET_M	ET_C	GenT	AA_S	AA_Av	AA_Ax	CRTM_H	CRTM_I	CRTM_E	CRTM_F	CRT_H	CRT_I	CRT_E	CRT_F	SVC_BV
Denial (DMC)	DMC	1	,701**	,836**	,816**	,540**	,130**	-,638**	-,098**	,107**	0.001	-,077**	-,138**	0.042	-,093**	-,562**	,431**	-,328**	,266**	0.000	,265**	-,198**	-0.055	-,097**
	CliC	,701**	1	,331**	,291**	,140**	,173**	-,437**	-,124**	-0.033	-,082**	0.017	-,081**	-,060*	-,136**	-,467**	,284**	-,403**	,272**	0.008	,210**	-,301**	-0.041	-,107**
	Cov	,836**	,331**	1	,646**	,582**	0.051	-,512**	-0.024	,121**	0.054	-,079**	-,102**	,068*	-0.030	-,434**	,389**	-,176**	,193**	0.013	,219**	-,100**	-,066*	-0.031
	Vax	,816**	,291**	,646**	1	,559**	,077**	-,552**	-,080**	,170**	0.033	-,123**	-,144**	,097**	-0.050	-,416**	,342**	-,183**	,157**	-0.021	,194**	-0.056	-0.023	-,089**
	Cons	,540**	,140**	,582**	,559**	1	0.047	-,384**	0.056	,174**	,132**	-,140**	-,073*	,111**	,059*	-,251**	,264**	-0.017	,126**	,080**	,147**	,092**	0.022	0.056
	Cont	,130**	,173**	0.051	,077**	0.047	1	-0.025	-,179**	-0.015	,120**	,066*	-,192**	0.018	0.050	-0.018	-0.026	-,086**	0.006	-,067*	-0.011	-0.032	0.045	-,113**
Trust	IT	-,638**	-,437**	-,512**	-,552**	-,384**	-0.025	1	,206**	-,126**	,087**	,153**	,182**	-,087**	,209**	,577**	-,341**	,361**	-,209**	,099**	-,166**	,234**	0.051	,125**
	ET_T	-,098**	-,124**	-0.024	-,080**	0.056	-,179**	,206**	1	-,160**	,206**	,152**	,481**	-,297**	,305**	,137**	-0.018	,200**	0.003	,140**	0.014	,060*	-0.019	,340**
	ET_M	,107**	-0.033	,121**	,170**	,174**	-0.015	-,126**	-,160**	1	,271**	-,335**	-,436**	,595**	,211**	-0.018	,087**	0.011	,082**	,080**	,136**	,078**	,145**	-,071*
	ET_C	0.001	-,082**	0.054	0.033	,132**	,120**	,087**	,206**	,271**	1	0.035	-,146**	,227**	,474**	,082**	-0.004	,059*	,062*	,133**	,057*	,093**	,179**	,080**
	GenT	-,077**	0.017	-,079**	-,123**	-,140**	,066*	,153**	,152**	-,335**	0.035	1	,290**	-,261**	0.026	0.030	0.033	0.004	-0.016	-0.030	-,075**	-0.018	-0.043	,105**
Attach.	AA_S	-,138**	-,081**	-,102**	-,144**	-,073*	-,192**	,182**	,481**	-,436**	-,146**	,290**	1	-,560**	-,074*	,082**	-0.027	,098**	-0.005	,057*	-0.044	-0.016	-,142**	,224**
	AA_Av	0.042	-,060*	,068*	,097**	,111**	0.018	-,087**	-,297**	,595**	,227**	-,261**	-,560**	1	,134**	-0.015	0.029	-0.029	0.048	0.004	,058*	0.051	,167**	-,164**
	AA_Ax	-,093**	-,136**	-0.030	-0.050	,059*	0.050	,209**	,305**	,211**	,474**	0.026	-,074*	,134**	1	,188**	-,098**	,144**	-0.030	,117**	-0.003	,089**	,181**	,219**
Core Beliefs	CRTM_H	-,562**	-,467**	-,434**	-,416**	-,251**	-0.018	,577**	,137**	-0.018	,082**	0.030	,082**	-0.015	,188**	1	-,414**	,518**	-,224**	,143**	-,143**	,321**	0.048	,188**
	CRTM_I	,431**	,284**	,389**	,342**	,264**	-0.026	-,341**	-0.018	,087**	-0.004	0.033	-0.027	0.029	-,098**	-,414**	1	-,185**	,300**	0.016	,263**	-,090**	0.032	-0.018
	CRTM_E	-,328**	-,403**	-,176**	-,183**	-0.017	-,086**	,361**	,200**	0.011	,059*	0.004	,098**	-0.029	,144**	,518**	-,185**	1	-,183**	0.041	-,179**	,389**	-0.005	,221**
	CRTM_F	,266**	,272**	,193**	,157**	,126**	0.006	-,209**	0.003	,082**	,062*	-0.016	-0.005	0.048	-0.030	-,224**	,300**	-,183**	1	,134**	,264**	-,108**	,132**	-0.016
	CRT_H	0.000	0.008	0.013	-0.021	,080**	-,067*	,099**	,140**	,080**	,133**	-0.030	,057*	0.004	,117**	,143**	0.016	0.041	,134**	1	,350**	-0.021	,096**	,143**
	CRT_I	,265**	,210**	,219**	,194**	,147**	-0.011	-,166**	0.014	,136**	,057*	-,075**	-0.044	,058*	-0.003	-,143**	,263**	-,179**	,264**	,350**	1	-,255**	0.039	-0.028
	CRT_E	-,198**	-,301**	-,100**	-0.056	,092**	-0.032	,234**	,060*	,078**	,093**	-0.018	-0.016	0.051	,089**	,321**	-,090**	,389**	-,108**	-0.021	-,255**	1	,221**	,197**
	CRT_F	-0.055	-0.041	-,066*	-0.023	0.022	0.045	0.051	-0.019	,145**	,179**	-0.043	-,142**	,167**	,181**	0.048	0.032	-0.005	,132**	,096**	0.039	,221**	1	0.015
	SVC_BV	-,097**	-,107**	-0.031	-,089**	0.056	-,113**	,125**	,340**	-,071*	,080**	,105**	,224**	-,164**	,219**	,188**	-0.018	,221**	-0.016	,143**	-0.028	,197**	0.015	1
Values	SVC_UV	-,147**	-,223**	-0.051	-,065*	,076**	-,117**	,170**	,193**	0.021	-0.009	0.040	,144**	-,099**	0.053	,261**	0.007	,396**	-,067*	-0.020	-,143**	,461**	-0.025	,372**
	SVC_PW	0.014	-,067*	,077**	0.027	,151**	,090**	,059*	,150**	,119**	,210**	-,060*	-0.055	0.020	,253**	,106**	-0.027	,101**	-0.002	,245**	,212**	0.034	,089**	,165**
	SVC_SC	-0.045	-,158**	0.026	0.033	,144**	-,086**	,104**	,177**	,075**	,126**	-,105**	0.024	-0.021	,167**	,258**	-0.016	,300**	-0.025	,434**	,108**	,145**	0.015	,253**
	SVC_AC	0.016	-,075**	,097**	0.021	,164**	0.008	,107**	,212**	,118**	,189**	0.000	0.016	0.003	,247**	,158**	0.033	,158**	0.039	,280**	,213**	,089**	,064*	,186**
	SVC_SD	,103**	0.007	,116**	,121**	,174**	-,095**	-,085**	,067*	,117**	-,066*	-,070*	0.045	0.008	-,097**	0.040	,152**	,142**	0.056	-,074*	,139**	,151**	-,082**	,171**
	SVC_ST	0.023	-,082**	,118**	0.022	,149**	-0.029	,082**	,137**	,079**	,102**	0.008	,063*	-0.003	,071*	,137**	,088**	,196**	0.052	0.043	,123**	,164**	0.041	,202**
	SVC_TD	,145**	,111**	,137**	,091**	,135**	-,088**	-,071*	,131**	0.036	0.004	-0.040	,078**	-0.024	-0.008	-0.018	,105**	-0.023	,150**	,381**	,261**	-,058*	0.023	,224**
	SVC_CF	-,077**	-0.033	-,074*	-,075**	0.015	-0.033	,119**	,129**	-0.025	,145**	0.042	0.052	-,063*	,151**	,191**	-,082**	,088**	,091**	,538**	,160**	0.016	0.044	,217**
	SVC_HD	0.007	-,071*	,081**	0.009	,148**	-0.029	,100**	,196**	0.027	,117**	0.028	,082**	-0.003	,154**	,157**	0.052	,215**	0.047	,135**	,093**	,163**	,087**	,232**
	SVC_OCH	0.050	-,069*	,134**	,057*	,199**	-,060*	0.054	,177**	,091**	,078**	-0.008	,082**	0.000	,068*	,150**	,119**	,240**	,065*	0.055	,150**	,204**	0.029	,261**
	SVC_STR	-,147**	-,198**	-0.049	-,094**	,079**	-,139**	,177**	,324**	-0.031	0.044	,088**	,223**	-,160**	,166**	,270**	-0.008	,371**	-0.049	,077**	-,101**	,393**	-0.006	,838**
	SVC_SEH	0.016	-,090**	,107**	0.024	,196**	0.031	,112**	,235**	,114**	,219**	-0.015	0.016	0.009	,278**	,177**	0.023	,198**	0.035	,281**	,221**	,118**	,101**	,244**
	SVC_CON	0.003	-0.037	0.030	0.014	,121**	-,086**	,071*	,187**	0.033	,122**	-0.040	,066*	-0.048	,137**	,189**	-0.004	,156**	,093**	,586**	,225**	0.044	0.036	,296**
	SVC_SOC	-,076**	-,151**	0.012	-0.036	,135**	-,148**	,148**	,321**	0.016	,073**	0.008	,184**	-,115**	,149**	,277**	0.025	,339**	0.011	,390**	,100**	,252**	0.011	,661**
	SVC_PER	0.048	-,106**	,149**	,076**	,253**	-0.025	,081**	,234**	,146**	,192**	-,060*	0.028	0.008	,226**	,205**	,069*	,272**	0.049	,270**	,227**	,190**	,065*	,302**
	SVC_GAF	-0.029	-,141**	,077**	0.000	,184**	-,108**	,121**	,279**	0.054	,078**	0.034	,163**	-,073*	,127**	,235**	,085**	,347**	0.026	,076**	,065*	,331**	0.019	,575**
	SVC_SPA	0.011	-,069*	,075**	0.025	,181**	-0.029	,100**	,240**	,097**	,208**	-0.046	0.033	-0.026	,249**	,212**	-0.001	,188**	,075**	,564**	,286**	,069*	,072*	,312**
Other	Pol	,268**	,293**	,183**	,150**	,075**	-0.012	-,242**	-0.040	-0.013	-0.027	0.008	-0.029	-0.016	-,100**	-,247**	,188**	-,238**	,202**	,230**	,235**	-,346**	-,064*	-0.033
	Rel	,192**	,080**	,209**	,165**	,257**	-0.024	-,132**	,119**	0.023	0.054	-,062*	0.039	-,078**	0.05	-,090**	,080**	-0.033	0.057	,242**	,141**	-,067*	-,100**	,139**
	LS	-0.014	0.000	0.013	-0.048	-0.008	-,072*	,068*	,202**	-,310**	-,136**	,255**	,485**	-,374**	-,192**	0.014	0.048	0.023	0.040	,084**	,066*	-,088**	-,193**	,064*
	ST	-0.029	-,174**	0.055	,058*	,176**	-,128**	0.019	,079**	,284**	,095**	-,234**	-,086**	,169**	,117**	,095**	-0.026	,131**	0.040	,127**	0.029	,149**	,079**	0.045
	FoD	,306**	,096**	,302**	,328**	,348**	-,095**	-,384**	0.006	,340**	,060*	-,234**	-,169**	,239**	0.026	-,196**	,182**	-,082**	,098**	-0.039	,099**	0.039	,080**	-0.029
	SES	-,059*	-0.019	-0.049	-,072*	-,112**	-,066*	,099**	,074*	-,130**	-,114**	,103**	,165**	-,161**	-,106**	0.038	0.027	0.008	-0.008	0.056	,111**	-,093**	-,091**	0.020

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

	Personal Values																	Other					
SVC_UV	SVC_PW	SVC_SC	SVC_AC	SVC_SD	SVC_ST	SVC_TD	SVC_CF	SVC_HD	SVC_OCH	SVC_STR	SVC_SEH	SVC_CON	SVC_SOC	SVC_PER	SVC_GAF	SVC_SPA	Pol	Rel	LS	ST	FoD	SES
-,147**	0.014	-0.045	0.016	,103**	0.023	,145**	-,077**	0.007	0.050	-,147**	0.016	0.003	-,076**	0.048	-0.029	0.011	,268**	,192**	-0.014	-0.029	,306**	-,059*
-,223**	-,067*	-,158**	-,075**	0.007	-,082**	,111**	-0.033	-,071*	-,069*	-,198**	-,090**	-0.037	-,151**	-,106**	-,141**	-,069*	,293**	,080**	0.000	-,174**	,096**	-0.019
-0.051	,077**	0.026	,097**	,116**	,118**	,137**	-,074*	,081**	,134**	-0.049	,107**	0.030	0.012	,149**	,077**	,075**	,183**	,209**	0.013	0.055	,302**	-0.049
-,065*	0.027	0.033	0.021	,121**	0.022	,091**	-,075*	0.009	,057*	-,094**	0.024	0.014	-0.036	,076**	0.000	0.025	,150**	,165**	-0.048	,058*	,328**	-,072*
,076**	,151**	,144**	,164**	,174**	,149**	,135**	0.015	,148**	,199**	,079**	,196**	,121**	,135**	,253**	,184**	,181**	,075**	,257**	-0.008	,176**	,348**	-,112**
-,117**	,090**	-,086**	0.008	-,095**	-0.029	-,088**	-0.033	-0.029	-,060*	-,139**	0.031	-,086**	-,148**	-0.025	-,108**	-0.029	-0.012	-0.024	-,072*	-,128**	-,095**	-,066*
,170**	,059*	,104**	,107**	-,085**	,082**	-,071*	,119**	,100**	0.054	,177**	,112**	,071*	,148**	,081**	,121**	,100**	-,242**	-,132**	,068*	0.019	-,384**	,099**
,193**	,150**	,177**	,212**	,067*	,137**	,131**	,129**	,196**	,177**	,324**	,235**	,187**	,321**	,234**	,279**	,240**	-0.040	,119**	,202**	,079**	0.006	,074*
0.021	,119**	,075**	,118**	,117**	,079**	0.036	-0.025	0.027	,091**	-0.031	,114**	0.033	0.016	,146**	0.054	,097**	-0.013	0.023	-,310**	,284**	,340**	-,130**
-0.009	,210**	,126**	,189**	-,066*	,102**	0.004	,145**	,117**	,078**	0.044	,219**	,122**	,073*	,192**	,078**	,208**	-0.027	0.054	-,136**	,095**	,060*	-,114**
0.040	-,060*	-,105**	0.000	-,070*	0.008	-0.040	0.042	0.028	-0.008	,088**	-0.015	-0.040	0.008	-,060*	0.034	-0.046	0.008	-,062*	,255**	-,234**	-,234**	,103**
,144**	-0.055	0.024	0.016	0.045	,063*	,078**	0.052	,082**	,082**	,223**	0.016	,066*	,184**	0.028	,163**	0.033	-0.029	0.039	,485**	-,086**	-,169**	,165**
-,099**	0.020	-0.021	0.003	0.008	-0.003	-0.024	-,063*	-0.003	0.000	-,160**	0.009	-0.048	-,115**	0.008	-,073*	-0.026	-0.016	-,078**	-,374**	,169**	,239**	-,161**
0.053	,253**	,167**	,247**	-,097**	,071*	-0.008	,151**	,154**	,068*	,166**	,278**	,137**	,149**	,226**	,127**	,249**	-,100**	0.050	-,192**	,117**	0.026	-,106**
,261**	,106**	,258**	,158**	0.040	,137**	-0.018	,191**	,157**	,150**	,270**	,177**	,189**	,277**	,205**	,235**	,212**	-,247**	-,090**	0.014	,095**	-,196**	0.038
0.007	-0.027	-0.016	0.033	,152**	,088**	,105**	-,082**	0.052	,119**	-0.008	0.023	-0.004	0.025	,069*	,085**	-0.001	,188**	,080**	0.048	-0.026	,182**	0.027
,396**	,101**	,300**	,158**	,142**	,196**	-0.023	,088**	,215**	,240**	,371**	,198**	,156**	,339**	,272**	,347**	,188**	-,238**	-0.033	0.023	,131**	-,082**	0.008
-,067*	-0.002	-0.025	0.039	0.056	0.052	,150**	,091**	0.047	,065*	-0.049	0.035	,093**	0.011	0.049	0.026	,075**	,202**	0.057	0.040	0.040	,098**	-0.008
-0.020	,245**	,434**	,280**	-,074*	0.043	,381**	,538**	,135**	0.055	,077**	,281**	,586**	,390**	,270**	,076**	,564**	,230**	,242**	,084**	,127**	-0.039	0.056
-,143**	,212**	,108**	,213**	,139**	,123**	,261**	,160**	,093**	,150**	-,101**	,221**	,225**	,100**	,227**	,065*	,286**	,235**	,141**	0.066	0.029	,099**	,111**
,461**	0.034	,145**	,089**	,151**	,164**	-,058*	0.016	,163**	,204**	,393**	,118**	0.044	,252**	,190**	,331**	,069*	-,346**	-,067*	-,088**	,149**	0.039	-,093**
-0.025	,089**	0.015	,064*	-,082**	0.041	0.023	0.044	,087**	0.029	-0.006	,101**	0.036	0.011	,065*	0.019	,072*	-,064*	-,100**	-,193**	,079**	,080**	-,091**
,372**	,165**	,253**	,186**	,171**	,202**	,224**	,217**	,232**	,261**	,838**	,244**	,296**	,661**	,302**	,575**	,312**	-0.033	,139**	,064*	0.045	-0.029	0.020
1	-0.001	,243**	,129**	,322**	,258**	,092**	,059*	,213**	,333**	,819**	,140**	,166**	,588**	,286**	,620**	,154**	-,264**	0.021	0.037	,124**	0.018	-0.054
-0.001	1	,297**	,605**	,082**	,237**	,083**	,214**	,315**	,283**	,102**	,821**	,257**	,227**	,680**	,256**	,674**	0.033	,136**	-,057*	,159**	0.018	0.036
,243**	,297**	1	,296**	,061*	0.018	,327**	,445**	,211**	,123**	,300**	,341**	,754**	,699**	,484**	,228**	,701**	0.054	,225**	-0.001	,204**	0.052	-0.028
,129**	,605**	,296**	1	,191**	,349**	,089**	,218**	,377**	,403**	,191**	,848**	,261**	,283**	,747**	,386**	,679**	0.003	,122**	0.025	,205**	0.025	,071*
,322**	,082**	,061*	,191**	1	,442**	-0.019	-,125**	,282**	,691**	,295**	,231**	-0.041	,182**	,492**	,647**	,057*	-,119**	0.025	0.036	,125**	,163**	0.026
,258**	,237**	0.018	,349**	,442**	1	0.020	-0.047	,483**	,854**	,276**	,446**	-0.007	,196**	,648**	,760**	,178**	-,117**	0.012	,075**	,159**	0.014	,083**
,092**	,083**	,327**	,089**	-0.019	0.020	1	,436**	,066*	0.032	,194**	,101**	,741**	,617**	,149**	,112**	,561**	,232**	,332**	,083**	0.058	0.049	0.008
,059*	,214**	,445**	,218**	-,125**	-0.047	,436**	1	,102**	-0.021	,170**	,228**	,831**	,435**	,222**	,061*	,703**	,143**	,242**	,093**	,079**	-,092**	0.015
,213**	,315**	,211**	,377**	,282**	,483**	,066*	,102**	1	,776**	,270**	,696**	,162**	,257**	,701**	,698**	,326**	-,107**	-0.015	0.046	,161**	0.015	0.043
,333**	,283**	,123**	,403**	,691**	,854**	0.032	-0.021	,776**	1	,357**	,605**	0.054	,273**	,797**	,905**	,250**	-,146**	0.008	,069*	,192**	,071*	,068*
,819**	,102**	,300**	,191**	,295**	,276**	,194**	,170**	,270**	,357**	1	,234**	,281**	,755**	,355**	,721**	,284**	-,174**	,098**	,062*	,101**	-0.008	-0.020
,140**	,821**	,341**	,848**	,231**	,446**	,101**	,228**	,696**	,605**	,234**	1	,289**	,323**	,898**	,555**	,717**	-0.027	,106**	0.005	,222**	0.024	,064*
,166**	,257**	,754**	,261**	-0.041	-0.007	,741**	,831**	,162**	0.054	,281**	,289**	1	,741**	,364**	,168**	,846**	,183**	,340**	,077**	,145**	-0.003	-0.001
,588**	,227**	,699**	,283**	,182**	,196**	,617**	,435**	,257**	,273**	,755**	,323**	,741**	1	,430**	,546**	,666**	0.019	,265**	,072*	,157**	0.012	0.000
,286**	,680**	,484**	,747**	,492**	,648**	,149**	,222**	,701**	,797**	,355**	,898**	,364**	,430**	1	,753**	,694**	-,064*	,137**	0.027	,268**	,081**	0.050
,620**	,256**	,228**	,386**	,647**	,760**	,112**	,061*	,698**	,905**	,721**	,555**	,168**	,546**	,753**	1	,315**	-,189**	0.051	,079**	,189**	0.049	0.042
,154**	,674**	,701**	,679**	,057*	,178**	,561**	,703**	,326**	,250**	,284**	,717**	,846**	,666**	,694**	,315**	1	,136**	,313**	0.043	,213**	0.011	0.032
-,264**	0.033	0.054	0.003	-,119**	-,117**	,232**	,143**	-,107**	-,146**	-,174**	-0.027	,183**	0.019	-,064*	-,189**	,136**	1	,235**	,071*	-,059*	-0.002	0.024
0.021	,136**	,225**	,122**	0.025	0.012	,332**	,242**	-0.015	0.008	,098**	,106**	,340**	,265**	,137**	0.051	,313**	,235**	1	,125**	,108**	,121**	-0.025
0.037	-,057*	-0.001	0.025	0.036	,075**	,083**	,093**	0.046	,069*	,062*	0.005	,077**	,072*	0.027	,079**	0.043	,071*	,125**	1	-,092**	-,190**	,257**
,124**	,159**	,204**	,205**	,125**	,159**	0.058	,079**	,161**	,192**	,101**	,222**	,145**	,157**	,268**	,189**	,213**	-,059*	,108**	-,092**	1	,271**	-,064*
0.018	0.018	0.052	0.025	,163**	0.014	0.049	-,092**	0.015	,071*	-0.008	0.024	-0.003	0.012	,081**	0.049	0.011	-0.002	,121**	-,190**	,271**	1	-,110**
-0.054	0.036	-0.028	,071*	0.026	,083**	0.008	0.015	0.043	,068*	-0.020	,064*	-0.001	0.000	0.050	0.042	0.032	0.024	-0.025	,257**	-,064*	-,110**	1