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# The climate dissonance theory: Why we have not solved the climate crisis so far

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# The Climate Dissonance Theory:
# Why we have not solve the climate crisis so far

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## Summary

We know since decades that burning fossil fuels is causing an existential threat. This is what I call climate dissonance: an unbearable state of mind that tells us how inadequate our lifestyles are. Yet, we have changed very little, almost as if there was no dissonance between lifestyles and climate crisis; as if the threat was not real. How was it possible, for instance, that the majority of cars sold today are big SUVs that cause much more carbon pollution than necessary, despite regular news about climate catastrophes? The unpleasant answer to this question in one word is self-deception, and in one sentence it is "What must not be, cannot be". We have "solved" the climate dissonance psychologically through self-deception rather than physically through substantial pollution cuts, and the oil industry facilitated and exploited all this with a massive deception campaign.

How exactly did we manage to deceive ourselves with the help of Big Oil? We made use of defense mechanisms. We negated inconvenient facts (denial), we justified our indefensible status quo (rationalization), we pushed the climate crisis aside (repression), and we pretended to cut climate pollution adequately while we did not (tokenism). These defense mechanisms helped us to reduce the unbearable climate dissonance we did not resolve physically.

Climate denial is more widespread than it seems. While only a few are left denying the problem ("it's a hoax") or its human cause ("it's natural"), many deny its impacts today ("there have always been forest fires") or in the future ("it will affect others, not us"), their own responsibility ("China is to blame"), or the urgency of an effective response ("we have until 2050"). No matter what is denied and no matter how denial is supported with rationalization, the outcome is always the same: deniers protect themselves from facing and solving the problem.

Repression and tokenism are the defense mechanisms for those who acknowledge the problem and the need to act. Yet, instead of actually solving the problem, a majority represses it while buying from companies and supporting politicians who pretend to take climate action seriously. Although corporate greenwashing and symbolic policies hardly cut pollution, they have a huge psychological effect: they make us believe that we are doing everything we can to actually solve the problem while we don’t. The result is self-deception through pseudo-climate protection that hides the climate hypocrisy we are living in.

The theory introduced here shows how we have used defense mechanisms to reduce the climate dissonance psychologically instead of physically. It shows how we have created a climate illusion that allows us to maintain polluting economies and lifestyles in times of climate crisis, a dissonance we had to reduce one way or another. On this basis, I highlight how we can still come to adequate physical solutions. A key prerequisite is that we finally face the climate reality large parts of society learned to deny, repress or distort for too long.

# *1. Denial and hypocrisy as root causes of the climate crisis*

"Today I have a sense of déjà vu." For years "we have been told and told and told that there is a problem with the increasing carbon dioxide in the atmosphere. We all accept that fact, and we realize that the potential consequences are certainly major in their impact on mankind. How frequently must we confirm the evidence before taking remedial steps?" he asked. "Now is the time," he said. "The research is clear. It is up to us now to summon the political will." Before I reveal the origins of this quote, try to guess two things. First, who said it? A climate activist, the UN Secretary General, the President of the European Commission, or a Republican politician? Second, in what decade was it, between 1980 and 2020? Obviously, the potential "who" depends on the potential "when". It could have been a climate activist in the late 1980s, the UN Secretary General at the Rio World Summit in 1992, the President of the European Commission around 2007, but a Republican from the US … never. Well, things have changed quite a bit since Robert Smith Walker, a Republican Congressman from Pennsylvania, said this in a House hearing on "Carbon dioxide and climate: the greenhouse effect" with climate scientist James Hansen – on 25 March 1982.[1] In the same year, Michael Jackson released his groundbreaking album "Thriller" on vinyl, and the first CD players were sold in Japan. Six years later, the problem then called global warming became a mainstream issue for the general public around the world. In 1988, Hansen testified again in a congressional hearing that made headlines in the US, first cover stories on the topic have been published around the world, Time magazine announced "Planet of the Year: Endangered Earth" as their "Person of the year", and the first goal to reduce climate pollution has been adopted by several countries after a conference held in Toronto, Canada.[2]

The quote from Republican Robert Walker captures four aspects of the societal tragedy behind the climate crisis better than any other statement. First, the déjà vu of increasing carbon pollution turned into a groundhog day experience for most of the last 40 years. Second, by not reducing pollution we turned a manageable problem into an existential threat. Third, all this did not happen accidentally or unknowingly but because of more than 30 years of failed climate politics. Fourth, Republican Robert Walker is the personification for two facts that helped to turn global heating into a serious crisis. He impersonates that climate crisis denial has increased dramatically, and that partisan climate politics used to be a bipartisan issue. Let's have a closer look at these four acts of the societal and political climate tragedy we have performed for decades.

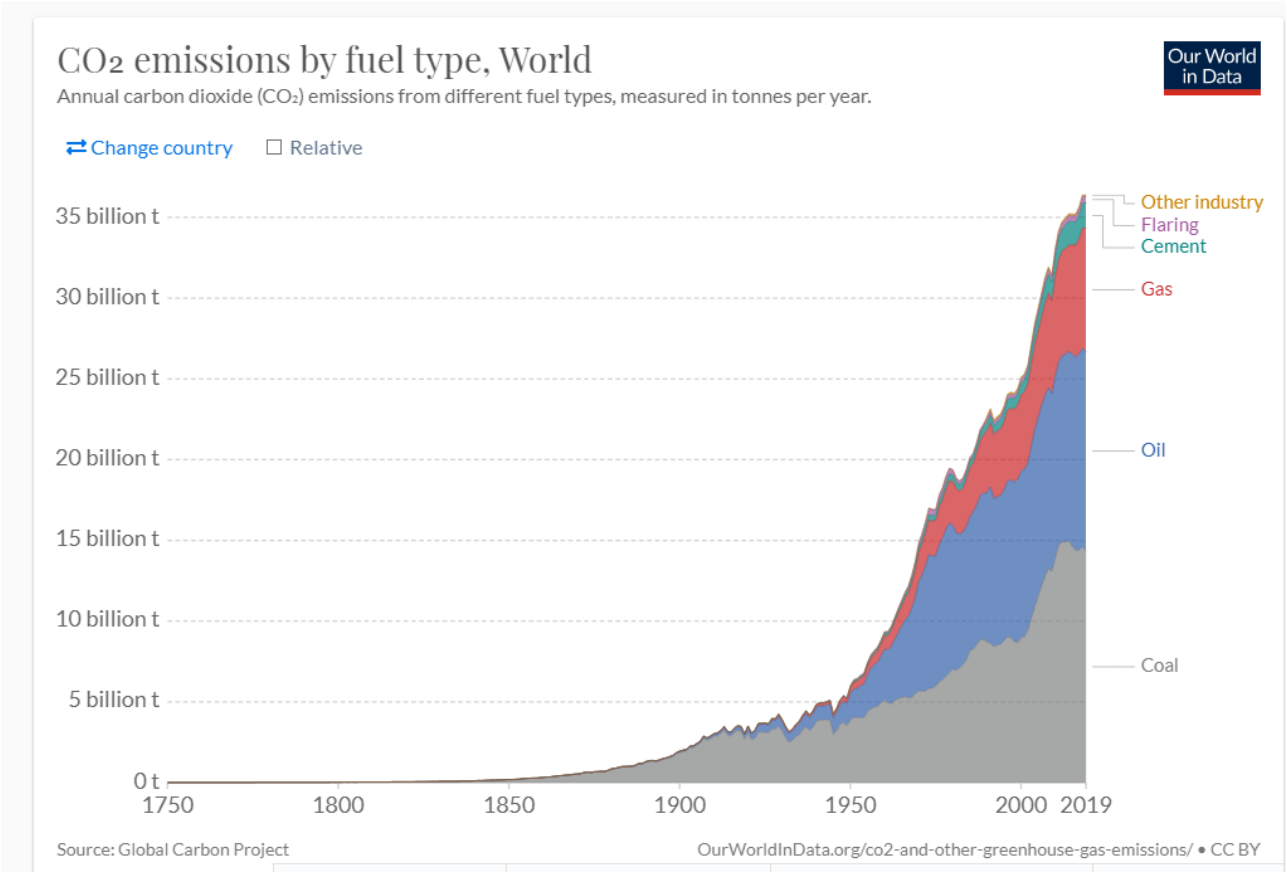
*1. The groundhog day of climate pollution.* In 2011, the moral philosopher Stephen Gardiner wrote, "we are neither slowing down nor stabilizing, let alone actually reducing, our collective input to the problem. Instead, we continue to add more fuel to the fire, faster and faster, producing an almost exponential rise in anthropogenic emissions of carbon. This, arguably, is the most striking fact of our time."[3] To be more precise: until 2010, global climate pollution did not grow almost exponentially but more than exponentially, with an increasing growth rate until 2010. Since then, it still grew, but at a slightly lower rate, at least until the COVID-19 pandemic hit in 2020.[4]

How the pandemic and the socio-economic dynamics ultimately fighting the climate crisis will shape our emission trajectory in the following years is too early to tell. What the pandemic has revealed, however, is how poor our understanding of exponential growth is, the kind of growth we saw not only during the pandemic but also with CO2 pollution since decades. The following story from India does the trick of communicating the inconceivable. If you start with one grain of rice on the first square of a chessboard and double the grains on each following square until all 64 are covered, how much rice do you need? A bucket, a wheelbarrow, a truckload, a train full of rice or more? As several YouTube videos illustrate vividly, the amount of rice needed to cover the 64 squares of the chessboard would cover a country like Germany about one meter thick. Since we also increased climate pollution exponentially for centuries until recently, more carbon has been emitted between 1990 and 2018 "than in the entire history of civilization preceding it".[5]

Regarding the recent flattening of the emissions curve, I have another remarkable quote, this time no guesswork needed: "Humanity is still driving towards hell, but we put our foot off the accelerator pedal". It was not a climate activist but Laszlo Varro, chief-economist at the International Energy Agency

(IEA) who wrote this in February 2020. To be fair, Varro edited his posting immediately, now reading "Global CO2 emissions stopped growing in 2019, a hopeful sign but there is still a long journey ahead."[6] As I will show here, this kind of self-censorship is a key part of our collective self-deception. Why is an economist at an energy agency afraid to say it as it is? He edited the posting not because it exaggerates our predicament. Even if we continue stabilizing or even decreasing climate pollution we still make the problem worse because additional emissions further increase the CO2 concentration in the atmosphere, which is already at a level last seen several million years ago. Varro edited his posting because his constituencies are not used to hearing harsh facts, and they would have (or have) let him know. This is only a small example of how we have perpetuated self-deception about the climate crisis, and many more will follow.

*Figure 1: The exponential growth of CO2 pollution from fossil fuel burning*[7]




*2. We turned manageable climate change into an existential crisis.* Unlike most other environmental problems, the climate crisis is not a local problem endangering small ecosystems that will recover sooner or later. It is a global problem that is more serious than anything we have seen so far in various respects. First, it will not go away, not even when we have eliminated climate pollution. If we do this in time we can stabilize the Earth climate but will suffer more extreme weather events. If we fail to do this in time we will turn the climate crisis into an irreversible climate catastrophe on a global scale. Second, the climate crisis is already a driving force of the sixth mass extinction in the history of our planet. Third, although the climate crisis is unlikely to threaten human existence anytime soon, it threatens our civilization as we know it. Why? It has evolved in a climate that has been stable for the last 10,000 years. As soon as the impacts of an irreversible climate catastrophe materialize, we will find ourselves on a different planet Earth our civilization is not accustomed to. This is why the World Economic Forum identifies global heating as the biggest threat in its Global Risk Reports since years.

*3. The climate crisis did not emerge accidentally but because of more than 30 years of failed climate politics.* The 40 years of unmitigated climate pollution and the existential threat this created imply in a simple conclusion: everything we have done so far to solve the problem has been completely inadequate, and it is not because we still have enough time to change this or we could not have done it differently. We usually take it for granted that governments solve (environmental) problems in time because that is what happened with "waldsterben" in the 1980s or with the ozone hole in the 1990s. Scientists sounded the alarm about serious threats, politicians woke up and put effective policies in place. "Had those scientists not sounded the alarm, we would have walked blindly off a cliff – literally, in many cases, as cataracts are one of the most common symptoms of being bathed in the ultraviolet radiation that the ozone layer blocks."[8] With these success stories in mind, most people and politicians assumed that we will solve the climate crisis in time. Meanwhile, it is certain that we did not because this would have required to bend the climate pollution curve until 2010 at the latest. Meanwhile, it is virtually impossible to keep global warming below 1.5 degrees, and even extremely ambitious to keep it well below 2 degrees.

*4. Republican Robert Walker is a personification for two facts that helped to turn manageable climate change into a serious crisis.* Like Walker, most conservative politicians used to be seriously concerned about global warming well into the 1990s. George Bush Senior, for example, campaigned in 1988 to "fight the greenhouse effect with the White House effect." Yet, once in office he and all of his successors did everything to turn the US into the country with the biggest fossil fuel production worldwide, which eventually happened during Barack Obama's Presidency in 2014.[9] While Democrats always emphasized the need for effective climate policies, an increasing number of Republicans deny the problem or its causes altogether, among them Donald Trump - and his senior campaign adviser Robert Smith Walker. As we know already, the latter said in 1982 that "the research is clear", and that it is time to take "remedial steps" because "potential consequences are certainly major in their impact on mankind". More than three decades later he sounded very different. In 2016, the same Robert Walker criticized NASA climate research as "heavily politicized, which has undermined a lot of the work that researchers have been doing", and that "Mr. Trump's decisions will be based upon solid science, not politicized science". Moreover, he claimed that doubt about "climate change" caused by humans "is a view shared by half the climatologists in the world. We need good science to tell us what the reality is and science could do that if politicians didn't interfere with it".[10] What looks like a hell of a mental and political ride in the 34 years between the two statements was a slow and tricky interplay of deception and unconscious self-deception the theory presented here will help to understand. It will show how deliberate deception by a few companies from the carbon pollution industry tapped into unconscious self-deception by the masses that goes far beyond the kind of denial expressed by Robert Walker. By doing so, it explains that deception would have been impossible for so long without collective self-deception.

To cut a long story short: For decades we knew that we have to reduce fossil fuel consumption and climate pollution. Instead, we have increased both quasi-exponentially until 2019. This turned manageable global warming into an existential climate crisis, or, as an increasing number of parliaments have declared, into a "climate emergency".[11] The climate policy failure behind this is baffling because the chances that we are about to turn the climate crisis into an irreversible climate catastrophe are mind-boggling.

No wonder, scientists as well as climate activists such as Greta Thunberg struggle with understanding what has been and still is going on. In one of her many powerful speeches, Thunberg said in March 2019 at a film gala: "We live in a strange world, where all the united science tells us that we are about eleven years away from setting off an irreversible chain reaction, way beyond human control, that will probably be the end of our civilization as we know it. […] Where some people seem to be more concerned about the presence in school of some children than the future of humankind. Where everyone can choose their own reality and buy their own truth. Where our survival is depending on a small, rapidly disappearing carbon budget. And hardly anyone even knows it exists. We live in a strange world, where

we think we can buy or build our way out of a crisis that has been created by buying and building things. Where a football game or a film gala gets more media attention than the biggest crisis humanity has ever faced."[12]

As soon as we take the dire warnings of climate scientists seriously we realize that a Swedish teenager, and with her millions of like-minded activists understand our predicament better than most people in power. This is another striking feature of the strange world we live in today: not the media or political leaders but striking schoolkids made climate science warnings heard by a wider audience, and they had to scold powerful adults, fully backed by science: "You are not mature enough to tell it like it is. Even that burden you leave to your children."[13]

If you think Greta Thunberg exaggerates, continue with the next section and come back later. Otherwise you will not understand the following introduction about how self-deception has prevented us from seeing and treating the climate crisis as what it is for decades: "the biggest crisis humanity has ever faced". Although the deception campaigns of the carbon pollution industry have played a role in all this, they would have been unsuccessful if they did not fall on the fertile ground of self-deception.

"The science informing us of the risks and possible technical solutions has run far ahead of our psychological state. We are not yet at the point emotionally of being able to clearly grasp the threat, and act accordingly. We need to ask why this issue, despite its current prominence, fails to ignite people's motivation for the major changes science tells us is necessary".[14] This is how psychoanalyst Joseph Dodds looks at the climate crisis. I asked myself the same question for decades, and many more. How is it possible that we have not solved but accelerated this crisis, closely monitored by the finest science we ever had? Why did we turn a manageable problem into an existential threat, not in the blink of an eye but steadily over a period of four decades? Why do we regulate so many aspects of our economies and lives meticulously to be safe, have insurances for residual risks but nevertheless alter the planet's climate in a way it threatens the future of our civilizations as we know it?

After struggling with these questions for a long time, I can give some profound answers. They go far beyond familiar explanations that never quite satisfied me. According to these familiar explanations we did not solve the climate crisis because of the denial campaigns of the carbon pollution industry, partisan political conflicts, short-term costs, and a lack of adequate technologies. While these explanations are all valid, they do not go to the bottom of the problem. Why did so many fall for corporate and political denial campaigns? Why did they prefer to believe in fabricated falsehoods rather than scientific consensus? Why were most others able to continue their polluting lifestyles even though they acknowledged the problem and the urgent need for action? Why did we finally turn a manageable problem into an existential threat we still discuss as if it was a partisan political issue about short-term costs? As the psychologist Per Espen Stoknes emphasizes, the answers to these questions are not about a lack of information: "For more than three decades a host of messages from well-meaning scientists, advocates, and others have tried to not only bring the facts about climate change home but also break through the wall that separates what we know from what we do and how we live. But the messages are not working, sometimes not even for the most receptive audiences. […] The more facts, the less concern."[15] We could have known that what we did was by far not enough to solve the climate crisis and we could have changed that - if we wanted to. But why didn't we?[16]

"Which must not, cannot be".[17] This is the quintessence of my climate dissonance theory in a single phrase, coined by the German author Christian Morgenstern in 1910. It highlights that we are capable of protecting us against inconvenient truths by deceiving ourselves. As Joseph Hallinan writes, we "engage in self-deception so seamlessly, across so many aspects of our lives, that it seems to be an inherent human quality – a built-in shock absorber that allows us to adjust to life's stresses and strains not by altering ourselves, but by altering our perceptions. Indeed, self-deception appears to be a universal quality, found not only in humans, but in animals as well."[18]

Sometimes, self-deception makes us more convincing because we believe the lie we want others to believe. As Dan Ariely puts it: "Self-deception is a useful strategy for believing the stories we tell, and if we are successful, it becomes less likely that we will flinch and accidentally signal that we're anything

other than what we pretend to be".[19] Yet, self-deception is often about lying to ourselves (and to others) about disturbing facts that would question our thinking or our lifestyles if we faced them as they are. We do this individually or collectively by altering our perceptions and interpretations of a problem, or by justifying our inadequate response. The aim is to make the disturbance go away, at least in the subjective eyes of the beholder.

In psychology, mental disturbances caused by inconsistent thoughts are known as cognitive dissonances. When we reduce cognitive dissonances deliberately, psychologists call it a coping strategy. When we do it unconsciously, it usually happens through protective psychological processes known as defense mechanisms. The latter are highly effective ways to protect us mentally against disturbing facts – by deceiving ourselves. As psychologist Phebe Cramer puts it in her book "Protecting the Self", "[d]efenses change the way in which we perceive 'reality' and think about ourselves. Particularly in our […] culture that values objectivity, rationality, and unbiased reporting – a culture that has produced an abundance of books on self-improvement through self-understanding – knowing about the ways in which we manage to deceive ourselves seems especially important. These self-deceptions are the work of defense mechanisms."[20]

Since self-deception through defense mechanisms is a normal feature of our everyday lives, we have many pertinent expressions in our everyday language. Sometimes we are 'turn a blind eye on something'. When our first daughter was born, the ENT physician said, 'she will hear everything she wants to hear'. Since then, she also 'saw what she wanted to see', sometimes by 'looking the other way'. When friends tell us 'stop kidding yourself', 'don't bury your head in the sand' or 'don't behave like an ostrich', we often dig deeper to protect ourselves from harsh reality. And when we get bad news we often 'don't want to know, hear or see any more of it' because 'ignorance is bliss'. In short, we regularly 'hide something in plain sight' or 'ignore the elephant in the room', simply by denying or repressing an 'inconvenient truth'.

To really understanding the key role self-deception plays in accelerating the climate crisis, we have to recognize the latter as a source of stressful cognitive dissonance. The two main conflicting cognitions can be summarized as follows. On the one hand, we have developed a fossil-fuel based civilization that still serves most of us well in terms of living standards. We had every reason to be proud of this accomplishment for centuries. On the other hand, climate science tells us that what we regarded as accomplishment is deeply flawed and has to be transformed, away from fossil fuels, the bounty that made our modern civilization possible. In this light, our deranged climate is not only a physical threat to our well-being in the distant future. When we no longer create a future to look forward to but one to be afraid of, this is first and foremost a serious psychological problem that has hurt us already in the late 1980s. It has rendered our civilization, and with it how we live and what we do, our identities as totally inadequate. Of course, the psychological pain triggered by this state of mind was too much to bear for decades. Of course, it has forced us into an excessive use of defense mechanisms decades ago.

To illustrate the importance of the psychological pain caused by global heating already decades ago, think about this analogy. Climate scientists are like the teachers telling us for years that what we regarded as our greatest achievement (be it an essay or a complex calculation) is deeply flawed. In combination with visible heating impacts, climate research findings are like math solution books telling us time and again that our calculations are all wrong and our scolding teachers are right. Those who get this kind of feedback for years do not experience it as harmful because of the implications it may have for their professional lives in the distant future. They experience it as harmful here and now because it questions them as a decent, intelligent person.

Since we got this kind of feedback on key issues of our lives not a few times but constantly for about four decades, the psychological pain this would have caused if left unchecked can hardly be overestimated. The cognitive dissonance between our fossil-fueled civilization on the one hand and global heating on the other, here referred to as an omnipresent climate dissonance, has quickly turned into one of the most stressful states of mind humankind has ever faced. This constant stress had to be reduced, not just recently but already in the 1990s, no matter how.

The rational way out of our omnipresent climate dissonance would have been to actually solve the problem physically by switching from fossil fuels to renewable sources of energy. Since we were not willing or not able to do this for the last four decades, we had to find alternative ways to resolve our stressful state of mind. Not resolving it otherwise would have been unbearable. Instead of resolving it physically we have developed "psychological solutions": self-deception through defense mechanisms. This psychological solution worked so well that we did not have to get serious with physical solutions, at least not until 2019 when self-deception got under attack by mass protests around the world.

The climate dissonance theory shows what our psychological solutions to the climate crisis look like: they are a combination of denial, rationalization, repression and tokenism – four powerful defense mechanisms that helped us to reduce our omnipresent climate dissonance mentally while not resolving it physically. If this claim is correct, isn't it strange that denial was the only defense mechanisms that got more attention than it deserved, overshadowing the other three? It is, yet this is exactly what defense mechanisms are about: they operate unconsciously in the dark because we can deceive ourselves only as long as we are not aware of what is going on. Let's have a first look at two of these defense mechanisms: denial and tokenism.

Dissonant states of mind that cannot be resolved through changing behavior are quite common. Therefore, our minds have created not one but several viable alternatives. A simple and honest mental solution is to change our attitudes so that we no longer see a problem that demands impossible behavioral change. When the cognitive dissonance is about personal preferences, it can be reduced with simple learning, no self-deception required. Learning occurs, for example, when someone critical of migrants changes his mind instead of fighting a friendly Muslim neighbor. However, when our attitude change is not about personal opinions but about facts, the same mental process is no longer about rational learning but about deceiving ourselves. Since global heating is not a matter of opinion but a physical fact, treating it as an opinion and denying its existence, cause, impacts or urgency is self-deception par excellence. As psychiatrist Neel Burton puts it, "denial, probably the most basic of ego defences, is the simple refusal to admit to certain unacceptable or unmanageable aspects of reality, even in the face of overwhelming evidence".[21] Because so many aspects of the climate crisis can be denied (even our responsibility or the feasibility to solve it) and denial offers the easiest way of defending our fossil-fueled lifestyles, it has become a very popular form of self-deception around the world – but by far not the only one.

Although denial is an extremely powerful defense mechanism everyone uses at least occasionally, it works not for all of us all the time because it is a comparatively primitive mental escape from reality. Thus, most variations of climate denial are so weird that others, in particular researchers, can easily recognize it as such. This is why climate denial has been scrutinized extensively in various disciplines. What I add to this research is the following important point. On the one hand, we have well-researched denial as a deliberate coping strategy of lying to and betraying others, mainly employed by big oil companies (here referred to as "Big Oil") and politicians to protect their interests. On the other hand, our mental ability to protect ourselves against inconvenient facts turned deliberate denial into unconscious self-deception. With this distinction in mind I show how deliberate climate denial by Big Oil has exploited denial as an unconscious defense mechanism. I show how unconscious denial by individuals has been cultivated collectively into what is known as denialism: an ideology-like culture of denial that is much more than the sum of its parts.

For now, the fact that denial is a psychological defense mechanism that blocks climate action is enough to appreciate the role self-deception plays in accelerating the climate crisis. This is the foundation onto which I build other, more sophisticated forms of self-deception. Since they are subtler than denial, they are the main way out of the stressful climate dissonance for most people, yet harder to see and much more difficult to research and unveil. This is perhaps why we saw a lot of research on denial but very little on the other defense mechanisms.

As shown above, climate denial helps individuals to continue their business as usual by honestly believing there is no problem to worry about. What about those who agree that the climate crisis is a

serious problem and that we have to mitigate it by switching from fossil fuels to renewable sources of energy? Are those endorsing climate action free from self-deception? Since countless polls show that the largest group of people in most countries falls into this category, the climate crisis would have been mitigated a long time ago, if this was the case. While only a few have really walked their talk (usually referred to as climate activists), most people, politicians and businesses have endorsed climate action verbally but usually failed to act. This failure has created another cognitive dissonance, this time between (proclaimed) attitudes and actions. Since this kind of dissonance is very common, it has its own name: hypocrisy. The psychodynamic processes triggered by the obvious gap between attitudes and actions on global heating (here referred to as climate hypocrisy) is very similar to how deniers have resolved the climate dissonance, except for one crucial difference: the mechanisms used. If we had been aware of our climate hypocrisy, it would have been another unbearable climate dissonance. Thus, the majority of people neither living in denial nor committed to effective climate action had to solve it with equally powerful yet subtler defense mechanisms. How exactly did we manage to live with an omnipresent climate hypocrisy without decarbonizing our lifestyles? Any guess what did the trick for people, politicians and businesses alike?

A key contribution of the climate dissonance theory is to highlight that we simply compensated the severe lack of difficult but adequate climate actions with much easier but inadequate actions – across all societal domains. This is known as tokenism or compensation. Tokenism reduces climate dissonances psychologically through pretending that we solve the problem physically while we don't. In addition, repressing the seriousness of the problem and its impacts helped to pretend that inadequate climate actions are somehow adequate. When we ban the problem to the margins of our awareness, a little bit of climate tokenism addresses it just fine.

If masking the climate hypocrisy between ambitions and actions with tokenism really is one of the main driving forces behind the worsening climate crisis, the evidence should be overwhelming. As I will show later in detail, symbolic climate actions are an omnipresent feature of the climate crisis. Individuals have many possibilities to compensate for driving dirty SUVs and for flying frequently. While some try to avoid plastic and take recycling very seriously, others buy organic food. Corporations such as BP have pretended to be "Beyond Petroleum" while increasing their oil and gas sales. Yet, the most striking examples of climate tokenism come from governments around the world.

With hindsight, the beginning of climate policy-making now appears as the beginning of climate hypocrisy that culminated in the Paris Accord adopted in 2015. In 1992, political leaders from around the world agreed to limit global warming to safe levels. The Paris Agreement from 2015 is more specific. It aims to "holding the increase in the global average temperature to well below 2°C […] and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change."[22] As climate policy analyst Oliver Geden points out, the agreement "is constructed to conceal disappointing negotiation outcomes and to keep hopes of more ambitious policies alive. In that sense, [the Paris] COP21 managed to adopt a 3°C agreement (if pledges are met) with a 1.5°C label".[23]

Since the beginning of international climate policies in 1992, CO2 pollution did not decrease but increased by 62 per cent until 2019. Even between 2015 (the year of the Paris Agreement) and 2019 (the year before the COVID-19 pandemic hit us globally) emissions did not decrease. If you think this was only because of emerging economies such as China, have a closer look at the US. Its fossil fuel consumption (not its carbon pollution) increased by about 10 per cent between 1992 and 2018, a trajectory that can hardly be explained by climate denial alone. The climate dissonance theory helps to see and understand the many defense mechanisms (in particular tokenism) we have applied and reinforced in all parts of society around the world that allowed us to live with the most threatening problem humans have ever created.

Compensating the lack of effective climate action with tokens worked well for decades, until Greta Thunberg and the Fridays for Future movement began to debunk it as what it is: self-deception at a societal scale. Yet, didn't this movement end climate hypocrisy and the repression of disturbing facts in 2019? Yes, but only for those few who really closed the gap between attitudes and actions on climate issues. Since becoming a climate activist is an effective way to end self-deception in times of climate

crisis, this is one of the reasons behind the movement's success. But, as Greta Thunberg notes critically time and again, it hardly mitigated global climate pollution so far.

As Stephen Gardiner points out, understanding why we have failed to mitigate the climate crisis in time is not an academic but an existential endeavor: "We need to understand what the problem is that we are trying to solve, and why it is so persistent. Until we do, attempts at solutions are likely to be shallow"[24], or worse: potentially misguided. A good example for a shallow social science analysis is the book "The New Climate War" by climate scientist Michael E. Mann. He identifies deliberate deception by the fossil fuel industry as the main cause of the problem and he claims without any empirical evidence: "The truth is, if we took the disinformation campaign funded by the fossil fuel industry out of the equation, the climate problem would have been solved decades ago."[25] Of course, the massive deception campaign by Big Oil plays a key role in explaining the climate crisis, but the roots of the problem go far deeper, in particular since scientific expertise and advice has been readily available to everyone since decades. Thus, my complementary claim, to be substantiated here, is this: we have been deceived by Big Oil, but a majority of people began to deceive themselves a long time ago because you cannot be deceived for decades if you don't want to while the science got increasingly clear and outspoken. While "The New Climate War" and similar books clearly show how deliberate deception through Big Oil prevented or delayed climate action, they usually lack a deeper understanding about why their efforts have been so successful for decades, despite clear and increasingly outspoken climate science. This is not my biased interpretation but a key point Naomi Oreskes has acknowledged for one of the influential books she has co-authored: "Merchants of Doubt tells the story of a particular group of people who sowed doubt about climate change (and several other issues), why they did, and how. But it left (mostly) unanswered the question of why selling doubt has been so effective".[26]

If we really want to solve the climate crisis, we need to understand what the Italian philosopher Niccolò Machiavelli noted already in the 16th century: "men are so simple, and so subject to present necessities, that he who seeks to deceive will always find someone who will allow himself to be deceived".[27] The only way to end the meanwhile advanced forms of deception by fossil fuel industries is to understand that their success depends essentially on people willing to deceive themselves despite overwhelming counter-evidence; that fossil fuel lobbyists told people exactly what many wanted to hear in the first place: there is no need for change.

Long after writing this, I discovered that climate psychologist Margaret Klein Salamon comes to the exact same conclusion: "The denial campaign has been successful because it aligns with our desires and defenses. The oil industry is telling a story we all wish was true."[28] Thus, self-deception is the tumor of our societal disease in times of climate crisis, and deliberate deception was one important pathogen among many. Meanwhile, the enduring success of deliberate deception is a key symptom of this disease, among others. As soon as we understand how deliberate deception tapped into unconscious self-deception and how the latter works (with or without deception), we will be in a far better position to finally overcome both.

Good examples for potentially misguided conclusions on how to solve the climate crisis are those claiming we have to abolish capitalism altogether, as some of Naomi Klein's works do. Replacing capitalism with eco-socialism might be an effective way to solve the climate crisis. Yet, claiming that it is the only or the most promising solution because anything else did not work is a risky conclusion at the edge of science (or beyond). If we had taken the climate crisis seriously and tried everything to solve the problem but failed, the empirical evidence would indeed support this conclusion. Yet, what I find here suggests quite the opposite. Obviously, we have never treated the climate crisis as a crisis, and, for that reason, never seriously tried to solve it within market economies. The fact that "regulation-hostile" neoliberalism emerged in parallel with the climate crisis certainly played a key role in this regard,[29] but it is only one aspect of the explanation I offer here. The storyline I add is mainly about how individuals and societies have been deceived by Big Oil interests and how they have turned this into collective self-deception. The capitalist system may have facilitated both, deception and self-deception, but most likely the same would have happened in a socialist economic system mainly dependent on fossil fuels. As the

Czech resistance fighter Vaclav Havel has written with fervor, deception and self-deception were much worse in communist countries where everyone had to "live within a lie".[30] Thus, the science-based exit strategy suggested here is making deliberate deception illegal and ending our omnipresent self-deception by finally facing climate reality. While I don't see why this would require ending capitalism, it certainly requires ending largely unregulated, neo-liberal capitalism as we know it today (at least when it comes to climate pollution).

"Climate change is a psychological crisis, whatever else it is",[31] yet one that has not been understood properly for too long, also because psychological insights have not been linked with social science insights. By combining a psychodynamic with a social science perspective, the climate dissonance theory presented here and my forthcoming work will provide a fresh look onto three major puzzles of our time. First, it provides a historical account of why and how we have turned manageable climate change into an existential threat since the 1980s. Second, it explains why most governments, businesses and individuals are still struggling with effectively mitigating the climate crisis. Third, it finally explores how we can turn the two vicious circles of climate denial and hypocrisy into a virtuous circle of climate action.

## 2. Cognitive dissonance in fossil-fueled comfort zones

Since the climate crisis really is an existential threat to our civilization as we know it, "we wouldn't be talking about anything else" – if we addressed it in rational ways. "As soon as you turned on the TV, everything would be about that. Headlines, radio, newspapers. You would never read or hear about anything else. As if there was a world war going on." However, the reality Greta Thunberg struggled with around 2011 when she was only eight years old was very different: "No one talked about it. Ever. If burning fossil fuels was so bad that it threatened our very existence, how could we just continue like before? Why were there no restrictions? Why wasn't it made illegal? To me, that did not add up. It was too unreal."[1] The unreal has been our reality for too long. Let me explain why.

Over the last 200 years, the richer parts of the human civilization became a historically unprecedented comfort zone, powered mainly by fossil fuels. Thus, I call it the fossil-fueled comfort zone, established in a fossil fuel age. Since the 1980s, we know that we have to end this age and reinvent our comfort zone to avert a climate catastrophe. Against this background we have talked a lot about sustainable development and energy transition. Yet, we still live in a fossil fuel age. We have expanded fossil fuel consumption in many rich and most poor countries, and we have increased global CO2 pollution quite steadily, at least until the COVID-19 pandemic hit in 2020 (see figure 1).

This did not happen because market economies are inevitably bad or because people are evil or stupid. It happened because we were confronted with stressful cognitive dissonances between our fossil-fueled lifestyles and the global heating they cause, between what we actually did and what we knew we should do. These inner conflicts, here referred to as "climate dissonances", were mentally unbearable not only in recent years but already in the 1990s and we had to resolve them somehow. Unfortunate for future generations, we failed to resolve them physically by actually solving the climate crisis for several reasons.

First, as I will show later in more detail, the fossil fuel industry financed a massive deception campaign that kick-started and nourished self-deception, in particular denial. Second, for a long time there were no cheap climate-friendly alternatives available we could have used to cut climate pollution on a grand scale. Third, up until the 2000s there was no urgent need to pay for expensive solutions because a climate catastrophe still seemed distant. Consequently, we have learned to resolve the climate dissonances we faced psychologically by deceiving ourselves early on, and we have never abandoned self-deception since. As I will show later in more detail, some people simply denied key aspects of the problem, and most others who acknowledged its seriousness made themselves believe that they were addressing it adequately while rationalizing or repressing the fact that they did not. These forms of self-deception rely on unconscious mental processes known as defense mechanisms.

To really grasp why humankind chose to solve the climate crisis psychologically with defense mechanisms instead of physically with low-emission lifestyles, we have to understand the eminent role fossil fuels have played in our recent civilizing process. To really understand climate dissonances, appreciating the benefits of the fossil fuel age is as important as knowing about its catastrophic consequences. Only when we recognize both as two equally important sides of an unbearable dissonance, we can really understand why we have preferred to solve the climate crisis psychologically instead of physically (at least until recently). Afterwards, I will briefly introduce a few basics about cognitive dissonances, self-deception and defense mechanisms.

### 2.1. Empathy for the fossil fuel age

"Nothing has shaped human history more than our use of energy. It was energy from the sun that provided the conditions for life on earth. It was the competition for food energy that determined the winners and losers of evolution. It was energy from fire that enabled early humans to cook, radically improving their diets and enabling their energy-hungry brains to grow even bigger. Bigger brains eventually led to agriculture – a systematic means of harnessing the sun's energy – which in turn freed

us from the constraints of nomadic existence and gave rise to permanent settlements. […] More energy, more technology, more people, more energy – this age-old feedback loop was the motor that enabled humankind to dominate the earth. From the earliest days, it brought environmental side effects. […] But for most of human history, the earth coped reasonably well".[2] This is how Mike Berners-Lee and Duncan Clark summarize the eminent importance of energy in human history in their book "The Burning Question".

Imagine a time when meeting the two basic material needs, having enough food to eat and keeping warm all year round, kept people busy for most of their days. The sources of energy they knew were food and feed, firewood, and a bit of wind and water power. Firewood was the main source of heating energy for millennia, not only in the huts of the poor but also in the castles of the rich. Muscles powered by food and feed were the main source of mechanical energy used for producing goods, most notably in the then predominant agricultural sector. Imagine that fields were neither ploughed nor harvested by heavy machinery but by animals and people. Those were also the days when farmhouses were built in the middle of a patch of land to minimize the hassle of transportation. Wind power was not used to produce electricity but to mill grains, pump water (in particular in the Netherlands), and move sailboats. Water wheels were also used to mill grains, lift water for irrigation, making wrought iron, and saw wood.

These "organic economies" that barely used fossil fuels dominated most of human history. Its main limitation was an unreliable and severely limited energy flow that restricted economic activities, in particular in areas with little wind and few rivers. "In organic economies", as the English historian Edward Wrigley puts it, "not only was the land the source of food, it was also the source directly or indirectly of all the material products of use to man. All industrial production depended upon vegetable or animal raw materials. […] Thus the production horizon for all organic economies was set by the annual cycle of plant growth. This set physical and biological limits to the possible scale of production."[3]

Against this background, classical economists such as Thomas Malthus emphasized land as a natural limit to economic growth. Paradoxically, this was at the end of the 18th century, around the time steam engines began to spread across Europe. What he did not see coming was the massive potential of tapping plant growth that happened millions of years ago, stored conveniently underground. Mike Berners-Lee and Duncan Clark again: "While burning wood had allowed us to release solar energy captured over years, decades or centuries, fossil fuels contained hundreds of millions of years' worth of sunlight. The energy was stored in carbon-based molecules formed when ancient plants decomposed anaerobically under layers of sediment to form incredibly energy-dense solids, liquids and gases: coal, crude oil and natural gas."[4]

As Edward Wrigley shows impressively, the Industrial Revolution was mainly a transition from energy-scarce organic to energy-rich industrial economies, thriving on the massive use of coal in steam engines. Within a few decades, this turned England from a relatively poor country into the powerhouse of the world, not only literally in terms of energy supply and demand but also economically. Although the abundance of coal was a necessary condition for this transition, it was not a sufficient one. Coal has been a source of heat energy used modestly since centuries in many countries, but its availability was severely limited because most of it is stored deep underground. Thus, the amount of "accessible coal reserves […] was a function of drainage technology since water accumulated in every mine and became an increasingly severe problem as the depth of working increased".[5]

Contrary to conventional wisdom, coal production was not increased to power the newly invented steam engines (the key invention that powered the Industrial Revolution), but the other way round: The first steam engines were built to solve the drainage problem in coal pits, and this let coal production explode within a few years. But isn't this a hen-egg problem? According to Wrigley, no. Without the drainage problem, steam engines would not have been invented (at least not at that point in time), and without their early use in coal mines it would have been difficult to improve their efficiency. Making coal production easier and steam engines more efficient were two intertwined issues that determined the fate of the Industrial Revolution. This sheds new light on the importance of coal for our civilization as we know it. While coal made the steam engine possible, the latter turned coal from a very limited source of heat energy into an abundant source of energy, readily available everywhere.[6] As Naomi Klein puts it,

"coal was the black ink in which the story of modern capitalism was written". Similarly, the British economist William Jevons wrote in 1865: "Coal, in truth, stands not beside but entirely above all other commodities. It is the material energy of the country - the universal aid - the factor in everything we do"[7], and for the time being he was correct. But since coal is an exhaustible resource, Jevons also warned that this will not go on forever. He predicted that the exhaustion of coal will become the new limit to economic growth in industrialized societies. What he did not foresee was the massive exploitation of other fossil fuels (first oil, then natural gas), which started slowly around that time.

The first oil well in the Western Hemisphere has been drilled by Edwin Drake near the town of Titusville, Pennsylvania, in 1859. As the climate crisis deniers Bjorn Lomborg and Michael Shellenberger like to point out, refined oil first replaced whale oil as lamp fuel in millions of homes around the world, for obvious reasons. "At its peak, whaling produced 600,000 barrels of whale oil annually. The petroleum industry achieved that level less than three years after Drake's oil strike. In a single day, one Pennsylvania well produced as much oil as it took a whaling voyage three or four years to obtain, a dramatic example of petroleum's high power density".[8] Even deniers get some facts right. Oil was soon referred to as "black gold" and an oil rush began, much bigger than the original gold rush in California a few years earlier.

Before anyone condemns this transition into the fossil fuel age as the root cause of the climate crisis, let's consider its significance for how we live today. Since coal became abundant and steam engines increasingly efficient, their use spread around the world, altering various aspects of our life's. First and foremost, inefficient handwork has been replaced by industrial mass production. This made all kinds of consumer goods cheaper, giving people more and more purchasing power that helped them to furnish their fossil-fueled comfort zones with all kinds of useful products that improved their lives. It did not take long until engineers installed massive steam engines in ships and on steel wheels that ran smoothly on rails (both milled with coal). Trains replaced horse carriages and canal ships, also to deliver massive amounts of coal across countries. Next, oil replaced coal as the main source of energy, and it led to the invention of cars and trucks with combustion engines. As the former oil field worker Michael Smith puts it eloquently, the first expedition to the American West Coast led by Lewis and Clark in the early 19th century has "traversed the new nation by navigating their way up the continent's many rivers; after 1956, Americans would negotiate the country on rivers of oil, experiencing its natural beauty through the windows of cars: cars powered by the petrochemical gasoline, over roads built by the petrochemical asphalt. Oil became the boat and the river"[9], not only for Americans but for people on every continent. Other machines fueled by petrochemical products soon followed as mass products, among them airplanes, bulldozers and diggers.

We don't think much about the significance of construction machines for our civilization because we take them for granted, but let's make a brief exception. How much would you charge to move the same amount of soil with your muscle power and a shovel as machines can move with one barrel (or 159 liters) of oil? Would you accept the job for 3,000 or for 5,000 Dollars? Of, course, it all depends on how long it takes to get the job done. According to Bill McKibben, one barrel of oil is equivalent to about 23,000 hours of human labor – that is fifteen years, normal working hours and vacations, free weekends included.[10] So, three cheers for the diggers. The comparison of oil with biomass is similarly staggering. In a study entitled "Burning Buried Sunshine", Jeff Dukes estimates that one liter of gasoline required 23.7 tons of "ancient plant matter as precursor material".[11] In short, fossil fuels are an incredibly dense and still abundant source of energy. No wonder it is so hard to stop burning them.

Yet, this is still not the end of the fossil fuel storyline. As Berners-Lee and Clark continue in "The Burning Question": "Global use of oil and coal kept rising as the third major fossil fuel – natural gas – started to scale up after the Second World War. Gas boosted energy supply directly, ramping up electricity production and fueling boilers and cookers. But it also drove up demand for every other kind of energy by enabling the continued expansion of the global population. As human numbers rose towards three billion in the 1950s, a catastrophic crunch in food production was avoided in large part thanks to huge quantities of nitrogen fertilizers produced from natural gas. As the population shot up, so did energy demand. More energy, more technology, more people, more energy. The feedback loop kept whirring throughout the twentieth century as holiday flights, cars, washing machines and central

heating became the norm in wealthy countries"[12] – and, of course, people in poorer countries now strive for the same lifestyle.

Overall, the "transition from an Organic Economy" to an "energy-rich economy" dominated by fossil fuels paved "The Path to Sustained Growth".[13] Again, before anyone reacts allergic to this phrase, pause for a moment and think about the following. According to Bill McKibben, the "great economist John Maynard Keynes once calculated that from 'two thousand years before Christ down to the beginning of the eighteenth century, there was really no great change in the standard of living of the average man in the civilized centers of the earth. Ups and downs, certainly visitations of plague, famine and war, golden intervals, but no progressive violent change.' What changed that was coal, and then oil and gas. All of a sudden, the standard of living was doubling every twenty or thirty years."[14]

Metaphorically speaking, cheap fossil fuels became the blood stream not only of rapidly expanding market economies but of our modern civilization around the world to varying degrees. In the industrialized world, fossil fuels turned our civilization into an increasingly luxurious fossil-fueled comfort zone, furnished with central heating, washing machines, dish washers, cars and frequent flying, not to mention all kinds of social and health-related improvements Hans Rosling has praised in his book "Factfulness". Yet, what he never understood was that most of these improvements would have been impossible without fossil fuels. Without coal, oil and gas, our (western) civilization would not be nearly as comfortable as it is today – yet it would not be endangered.

For a long time, it seemed that our civilizing process driven by fossil fuels was overwhelmingly good, with only local strings attached (such as Smog in cities). This changed dramatically once the "problem with the increasing carbon dioxide in the atmosphere" emerged in the late 1970s. The discovery of "the greenhouse effect" threatened a 200-year period of unprecedented economic and technological development. The threat boiled down to a very inconvenient but clear message: this fossil fuel party has to stop rather sooner than later in a planned way, or else climate disruptions will stop it in a catastrophic way. Although the Republican Congressman Robert Walker acknowledged "that fact, and we realize that the potential consequences are certainly major in their impact on mankind"[15], he and his contemporaries had no idea what they were up to when he said this, back in 1982 (that is why he and other Republicans used to take climate science seriously).

After such a long time of civilizing ascent thanks to coal, oil and gas, who could possibly suggest that we have to reinvent (let alone abandon) the fossil-fueled comfort zone we have furnished to perfection over centuries? At a time when flying became cheap and holidays in exotic places became affordable for the masses, who could possibly face the fact that these enjoyments are literally drowning some of the most beautiful holiday destinations? Since most people love their ever bigger, safer and cleaner cars with internal combustion engines, who could possible accept that their odorless carbon emissions have turned them into catalyzers of a global catastrophe, in particular since electric cars were not available as an affordable alternative until the late 2010s?

Once we acknowledge the significance fossil fuels had (and still have) for our everyday lives, we are able to see how inconvenient the truth about global heating always was and still is – for every one of us personally and for our entire civilization. Once we appreciate the civilizing progress that took place between travelling with horse carriages on bumpy dirt roads and flying in 11,000 meters' altitude with views of the Earth no human being has ever seen prior to the fossil fuel age, it is much easier to understand the disturbing dissonances global heating has triggered from the moment it found its way into public awareness. Against this background it suddenly makes sense why only a few environmentalists were able to fully embrace the downsides of our fossil-fueled comfort zone, while many others felt more like the US radio host Rush Limbaugh, who once gave the following remarkable testimony of climate denial: "I can't come to grips intellectually with the idea that the way we live our lives – and I don't have any doubt that the Western civilisation lifestyle provides the best opportunity, the best chance for humanity on this entire planet. And yet every day I'm pummeled with the charge, with the allegation that all of us who are simply trying to provide for ourselves and our families, we're

trying to better our communities, we are trying to improve the future for our children, I just can't accept that the process of doing all of that leads to the destruction of all that has been created for us. I don't think we have the power."[16]

What many people think is that we cannot have the power to cause global heating because we must not have it, or: "which must not, cannot be". More scientifically speaking: the climate crisis comes down to how we have reduced unbearable cognitive dissonances not through physical solutions but through psychological mechanisms.

## *2.2. Climate dissonances: impossible to live with*

When warnings about "the greenhouse effect" appeared in the mass media more frequently from the 1980s onwards, we became increasingly aware of the tensions between our fossil-fueled comfort zone on the one hand and our knowledge about its environmental impacts on the other, between our desire to continue with business as usual and the realization that this would lead us into a catastrophe. These deeply inconsistent cognitions have turned manageable climate change from a distant physical threat into an immediate mental problem we could not have lived with for long. The immediate mental problem is known as cognitive dissonance in psychology and as anxiety in psychoanalysis. Both are among the most important concepts science has ever discovered about humans, alongside the mechanisms we employ to reduce or resolve them. To reconcile the two overlapping concepts, I speak of dissonant cognitions that trigger anxiety.

Although theories of mental homeostasis and cognitive consistency are quite old, it was not before the mid-1950s that the social psychologist Leon Festinger made cognitive dissonances famous. What exactly are they about and why are we determined to reduce them? Cognitive dissonances are disturbing mental states created by our awareness of two inconsistent cognitions. As Festinger puts it, cognitions are "the things a person knows about himself, about his behavior, and about his surroundings".[17] They are anything that goes through our conscious mind, including emotions, expectations, values, beliefs, attitudes, judgements, factual knowledge, or any other kind of mental representation. A cognitive dissonance is caused by any combination of conflicting (or inconsistent) cognitions, such as the desire to smoke and the knowledge that smoking causes cancer, or actually smoking a cigarette despite one's resolution to quit smoking.

Thousands of experiments aimed to find out why exactly and under what circumstances inconsistent cognitions disturb us. This is hard to believe because the explanation they found is so simple and obvious. It turned out that any pair of inconsistent cognitions, even minor ones between how we expect a sentence to end and an erroneous ending (such as "She couldn't start her car without the right teeth"), can trigger a disturbing dissonance that made people pause. Why is that? Because this is a good way to constantly refine our modus operandi, to improve our lives by constantly aligning them with the reality around us. As the social psychologists Gawronski and Brannon put it in quite typical jargon for this research strand, a cognitive inconsistency "serves as a cue for potential errors in one's system of beliefs". Identifying them "is important, because erroneous beliefs can undermine context-appropriate behavior by suggesting inadequate courses of action […]. [T]he aversive feeling that is assumed to be elicited by inconsistent beliefs serves as a signal that the current system of beliefs has to be revised for the sake of context-appropriate action. […] After all, any organism requires an accurate representation of the world for context-appropriate action, and inconsistency serves as an important signal of inaccurate representations."[18] In short, cognitive dissonances are mental alarms, warning us that something is wrong, calling for our attention. While the alarms are good and necessary, of course we strive to silence them.

In times of climate crisis, several of these alarms are going off, calling for our attention. While researchers noted the importance of cognitive dissonances in times of climate crisis early on,[19] the concept was never as central as it should have been. Consequently, the following distinction of four climate dissonances is only implicitly covered by the psychological literature. It is about time to spell

them out systematically and, more importantly, to put them into our focus of attention when we try to understand and solve the climate crisis.

Once we learned about the human causes of global heating, we all faced not one but at least four cognitive dissonances (and there are more to come). The oldest one is the discrepancy between what science told us already in the 1980s and what we were able to experience personally (plus, what we wanted to believe). Since the climate crisis is a complex, time-lagged problem only scientists are able to measure and predict, it created a dissonance with our inability to sense warning signs on our own for decades.

*Table 1: Different types of cognitive dissonance about the climate crisis*

| Climate dissonances | Cognition 1 | Cognition 2 |
|---|---|---|
| Historic:<br>Science-senses | We hear scientific warnings … | … but personal experiences can be contradictory |
| 1) Cause-effects | Our lifestyles are based on fossil fuel consumption … | … that cause global heating with catastrophic impacts |
| 2) Intention-action | We intend to reduce climate pollution … | … but we keep burning fossil fuels |
| 3) Action-efficacy | Reducing climate pollution personally … | … has little or no physical effects globally |

Yet, unambiguous heating impacts (such as heat waves, droughts and unprecedented wildfires) have accumulated around the world in recent years, making it easier to reduce the dissonance between what science and our senses tell us – at least for those not already trapped in denial. Still, many people experience several obvious changes, such as mild winters or balmy summer evenings, as pleasant, extending the historic climate dissonance even among those who accept the science. Of course, the dissonance between what science tells us and what we experience personally most of the year has fertilized the soil for all sorts of doubt and denial: Maybe "global warming" is not that bad after all?

The dissonance between our lives in fossil-fueled comfort zones and the dangerous global heating this causes is one of the two omnipresent mental stressors in times of climate crisis. The science-senses dissonance would certainly be irritating but not seriously stressful, if it was not for the dissonance between cause and effects – if the science would not question our high-emission lifestyles. This alone is already a lot but far from all. In addition, those accepting that we have to reduce climate pollution struggle with a dissonance between what we intend to do (reduce or stop pollution) and what we actually do (keep burning fossil fuels). This kind of dissonance is so common throughout our lives that it has its own name, and that is hypocrisy.

Finally, those who align their actions with their intention by actually reducing pollution struggle with the dissonance that their efforts have little or no effect on the global climate as long as most others don't follow their example. The more tedious governmental or personal efforts with little to no climate effects are, the more disturbing the lack of efficacy and the respective dissonance becomes. As I will show later, the easiest way to resolve this and all the other climate dissonances is not through serious climate action but through self-deception.

Of course, not all cognitions are equally important and while all dissonances are somehow disturbing, not all of them are unbearable. More than three thousand experiments on cognitive dissonances have confirmed some simple rules of thumb over and over again. One of the most important rules formulated and confirmed by Festinger is this: "If two elements are dissonant with one another, the magnitude of the dissonance will be a function of the importance of the elements. The more these elements are important to, or valued by, the person, the greater will be the magnitude of a dissonant relation between them". Thus, cognitive dissonances are particularly disturbing when they turn against core aspects of what we believe or do, when they are about our identities, our selves. But there is something else Festinger predicted correctly: "the pressure to reduce dissonance will be a function of the magnitude of the dissonance".[20] In short, the more important inconsistent cognitions are, the more disturbing we find the dissonance between them, and the more we are determined to resolve it.

When it comes to climate dissonances, the stakes could not be higher: respective cognitions could neither be more dissonant nor more important, let alone harder to reconcile. Let's have a look at the cause-effects dissonance. As emphasized above, the cause-cognition is not only about our everyday use of fossil fuels we were not willing to terminate, but also about a core feature of our contemporary societies. Industrialization would not have been possible without fossil fuels, and our energy-rich lifestyles remind us of this simple cognition every day – unless we repress it into the corners of our awareness. The effects-cognition, on the other hand, is about an existential threat that is unprecedented in human history – and that began to materialize in catastrophic local impacts (such as more frequent and more intense heat waves, droughts, wildfires and floods). There are not many issues that are more important than short-term living conditions on the one hand, and long-term survival in a secure environment on the other. Even the risk of a nuclear war does not come close for a simple reason: a global climate catastrophe is not a risk but a near-certainty, unless we change our course.

To make it more tangible, the cause-effects dissonance we have faced already decades ago came down to a couple of very unpleasant choices: either we transform our fossil-fueled civilization in the short to medium term or we endanger it in the long term; either we replace our oil and gas heating systems that warm our homes around the clock, or large parts of our planet will become an uninhabitable "Hothouse Earth"; either we change from our beloved fossil-fueled cars to other modes of transportation (excluding electric cars, which became affordable only in the late 2010s), or we will eventually drive through landscapes devastated by frequent floods, droughts and wildfires; either we fly much less or we will eventually gaze upon changed coastlines and megacities sunk into the rising seas from 11,000 meters above ground.

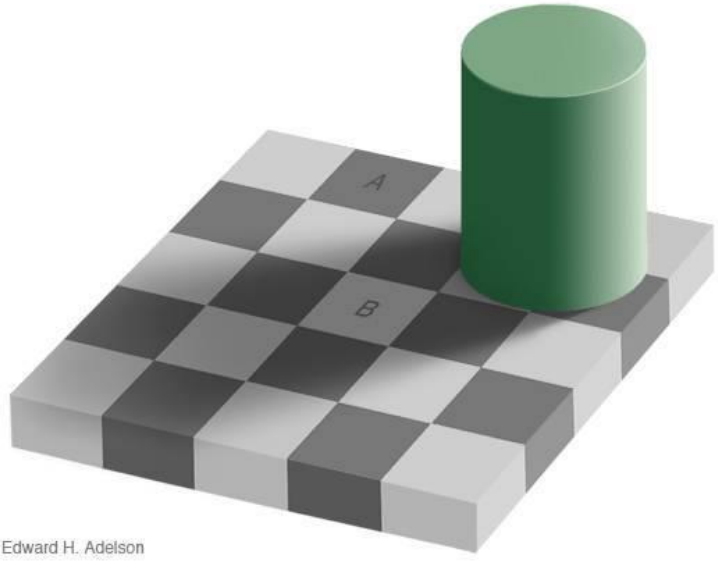
These pointed choices illustrate the inconvenient dissonances the climate crisis confronted us with already decades ago. Maintaining the fossil-fueled comfort zone and knowing that this threatens the safety of our children and grand-children are two cognitions as dissonant, as important, and as difficult to reconcile as two cognitions can possibly be. The underlying climate dissonances have turned global heating from a remote scientific problem predicted to materialize there and then into an immediate psychological problem here and now. It turned one of the most serious environmental problems into the biggest psychological burden we have ever faced as individuals and as societies since the threat of a nuclear war. Why? Because it goes to the core of our energy-rich civilization.[21] It is hard to think of a psychological burden more disturbing on a global scale than this – with one exception: the climate dissonance between intentions and actions that follows suit when we fail to reduce climate pollution adequately.

Since cognitive dissonances of this magnitude are simply unbearable, we do everything to reduce or resolve them. To strive for consistency among our cognitions is a basic human condition. "People do not just prefer eating over starving; we are driven to eat. Similarly, people who are in the throes of inconsistency […] are driven to resolve that inconsistency." While there are many ways to do this, "there is little question that it will be done", or as Festinger puts it: "as soon as dissonance occurs there will be pressures to reduce it"[22] – often in surprising ways.

## *2.3. From cognitive biases to self-deception*

Reality as it is can be quite different to what we think it is. The easiest way to illustrate this basic truth is to look at optical illusions everyone knows (although we are usually not aware of their profound philosophical implications). Steven Pinker illustrates this point in his book about "The Modern Denial of Human Nature" with an example I reproduce below: "In Edward Adelson's 'Checker Shadow Illusion' […] the light square in the middle of the shadow (B) is the same shade of gray as the dark squares outside the shadow (A)."[23] Since most people struggle seeing it correctly, Pinker concludes: "Our visual systems can play tricks on us, and that is enough to prove they are gadgets, not pipelines to the truth." In his book he presents many other examples showing that human nature is much less rational as we believe it is, a fact that has been denied even by some scientists for too long.

*Figure 2: Checkershadow Illusion*




Visual illusions show nicely that our mental representations of reality can deviate considerably from actual reality, not because of motivated self-deception. In the checkerboard example it is our experience with light and shadow that tricks us into the visual illusion. However, to properly understand how we have reduced our climate dissonances through motivated self-deception, we have to go far beyond visual illusions. We first have to familiarize ourselves with the facts that only a small fraction of our brain activity is conscious, and that considerable parts of our unconscious mental processes often deceive our conscious mind for a reason.[24] This comes in handy for reducing highly disturbing cognitive dissonances.

While the co-existence of conscious and unconscious mental processes is a well-established fact, the dynamic relation between the two is a delicate topic that has kept generations of psychoanalysts and psychologists busy. It is also delicate for us personally, for reasons best described by Rob Brotherton in his seminal book "Suspicious Minds": "Consciousness is all we know about what's going on inside our head, and it feels like it's all there is to know. Masses of psychological studies, however, lead to a surprising conclusion. Consciousness is not the whole story. We are not privy to everything – or even most – of what our brain is up to. The brain, like its fellow organs, is primarily in the business of keeping us alive, and, also like its less mysterious colleagues, the brain doesn't need much input from us to get the job done. All sorts of activity goes on behind the scenes, outside of our conscious awareness and entirely beyond our control. […] Daniel Kahneman, one of the pioneers of the psychology of our brain's hidden biases and shortcuts, described the division of labor between our conscious and unconscious mental processes in cinematic terms. 'In the unlikely event' of a movie being made in which our brain's two modes of activity were the main characters, consciousness 'would be a supporting character who believes herself to be the hero,' Kahneman wrote".[25]

To make the same point, Jonathan Haidt divides our mind into a rider and an elephant: "The rider is our conscious reasoning – the stream of words and images of which we are fully aware. The elephant is the other 99 percent of mental processes – the ones that occur outside of awareness but that actually govern most of our behavior." A few times, the rider directs the elephant, but most often the elephant takes us wherever he wants – wherever our intuitions and gut feelings take us: "The rider is an attentive servant, always trying to anticipate the elephant's next move. If the elephant leans even slightly to the left, as though preparing to take a step, the rider looks to the left and starts preparing to assist the elephant on its imminent leftward journey. The rider loses interest in everything off to the right."[26] This mental double life of ours is the basis for all kinds of cognitive biases and self-justifications we produce.

To sum it up with another metaphor used by Jonathan Haidt: while we think our mind functions more like a judge that weighs evidence consciously and carefully, it operates more like a defense lawyer that tries to explain and justify whatever another part of us did – and continues doing.

Cognitive biases are systematic and often predictable errors in thinking that are hidden from our consciousness. These cognitive biases and mental shortcuts can serve us well in doing quick assessments, or as Kahneman puts it: in "thinking fast". But sometimes the same processes fail us because they lead to wrong assessments, and consequently to bad decisions and actions. The Psychologist Peter Wason made this point already in the 1960s with a simple exercise, summarized nicely by Rob Brotherton as follows. "Imagine you're a test subject in his study. Wason tells you, 'I've made up a simple rule for constructing sequences of three numbers. I'll give you a clue: '2-4-6' fits the rule. Your job is to figure out what the rule is by coming up with other strings of three numbers. For every sequence you come up with, I'll tell you whether it fits my rule or not. When you're sure you have the solution you can stop testing and tell me what you think the rule is.' What sequence would you try first? If you're like most of Wason's subjects, your first hunch might be that the rule is something like even numbers increasing by two, so you might guess '6-8-10.' 'Yes,' Wason tells you, 'that sequence meets the rule.' 'Aha,' you think. Next you try '14-16-18.' 'Yes,' Wason says. 'AHA!' You churn out a few more for good measure: '10-12-14; 46-48-50; 184-186-188.' 'Yes, yes, and yes.' By this point you're pretty sure that you've nailed the rule. Channeling Sherlock Holmes, you announce, 'It's elementary, my dear Wason. The rule is even numbers increasing by two.' Bzzt. 'No,' Wason says, 'that's not the rule.' 'How can that be?' you mutter. 'I had so much evidence!' In fact, the rule is simply any three increasing numbers. Few people guess the rule right away, but that's not what's interesting about the game. The interesting thing is what it reveals about our intuitive hunch-testing strategy. We set about gathering evidence by trying out sequences of numbers that fit our imagined rule. Since the real rule in this case is more general (it could be any ascending numbers), our guesses are all met with positive feedback, just as we expected—that's why it's called a positive test strategy. With each 'yes,' our confidence grows; we feel like we're getting ever closer to the truth. But our confidence is misplaced. The idea of trying to disprove the rule by testing a sequence that we don't expect to fit (something like '2-3-5,' or '8-13-21') doesn't come so naturally to us. That kind of negative test strategy is potentially more informative — a 'no' would be good evidence that we're onto something, a 'yes' would send us back to the drawing board. Left to our own devices, however, most of us will collect 'yes' after 'yes' instead of looking for a single 'no.' As a result, a speculative hunch can become a confidently held belief, regardless of whether the hunch was justified." Psychologist call this bias the "positive test strategy: We seek what we expect to find".[27] It leads directly into one of the most prominent cognitive fallacies known as confirmation bias: we seek to confirm what we have already in mind instead of critically testing our assumptions.

As an incredible amount of psychological research shows, cognitive biases are not a rare anomaly but the norm. Thinking predominantly fast and intuitive instead of slow and rational is what makes our daily routines work, at least most of the time. "We are regularly fooled by our brains, and this is especially true when we believe we are beyond fooling […] When we look, we look with a purpose – we don't look at something; we look for something". Thus, "perception is not everything – it is the only thing. We have no direct access to our physical world other than through our senses", and through our oftentimes biased mental processing of the information we take in.[28] If we tried to eliminate all our cognitive biases deliberately and systematically from our daily routines by critically testing instead of seeking to confirm what we belief, we would be "everyday scientists" because that is what science is about. In contrast, cognitive biases rule our lives, whether our IQ is high or low, even when our survival is at stake: "The news sources we read, the links we click online, and the views of people we surround ourselves with […] all align, more often than not, with what we already believe. We build a fortress of positive information around our beliefs, and we rarely step outside – or even peek out the window."[29]

Sometimes, unconscious mental processes deceive us, and sometimes they help us to deceive ourselves. Both comes in handy for reducing cognitive dissonances, but what is the difference between the two? When cognitive biases deceive us, it happens without a deeper meaning or motivation, apart from some basic psychological preferences. These so-called "cold biases" deceive us because we base our assessments on readily available evidence, not on formal data analyses ("availability heuristic"), we fear losing something more than not gaining something ("loss aversion"), or we prefer being proven

right instead of wrong ("confirmation bias"). The latter is already a bit about helping to deceive ourselves for a deeper motivation, but there is more to it.

When the confirmation bias kicks in automatically in neutral settings, like figuring out the 2-4-6 sequence, can you imagine how easy and sometimes even inevitable it is for us to turn cold biases hot through deeper motivations, such as reducing disturbing dissonances. Such motivations can trigger and sustain mental processes that help us to deceive ourselves - for a reason. This is what psychologists call motivated reasoning. Of course, we are neither aware of the motivational forces behind this kind of reasoning, nor of the resulting self-deception. By definition, we can deceive ourselves only as long as the mechanisms of deception work unconsciously.[30] Good examples for this kind of motivated reasoning come from studies about positive delusions.

In 1965, researchers asked two very different groups of people to rate their driving skills. While one group consisted of drivers with a clean record, the other group "consisted of people who had been in traffic accidents sufficiently severe to put them in the hospital". Despite this difference, both groups rated their driving skills generously and almost identically good. Since other studies came to similar results, the psychologist Robert Kurzban concludes: "Apparently crashing into reality is insufficient to make people more realistic about their driving abilities". Finally, Kurzban adds a "delightfully recursive" study on positive delusions: "A sample of undergraduates were told about biases like the ones discussed here, and asked how susceptible to them they were. They uniformly judged themselves less susceptible than the average American. These students are saying: Everyone else is biased; I am dispassionately realistic."[31]

These and many other studies on motivated reasoning go already beyond simple (and usually cold) cognitive biases. At least the study on driving skills is also about rationalizing, repressing or denying an inconvenient truth about oneself. All three are not biases but powerful defense mechanisms, also referred to as psychological defenses, ego defenses, or simply defenses. Defense mechanisms are mental strategies for resolving inconvenient conflicts. They protect ourselves (that is, "our selves", including our core-beliefs, identities, and self-esteem) from dissonant cognitions we often experience as anxiety. Why we are driven to protect us against inconvenient truths (that is: anything that contradicts what we belief or do) is not hard to guess: it makes us feel better, healthier and live longer.[32]

## *2.4. Defenses we use for dissonance reduction*

So, we do not simply prefer cognitive consistency over dissonance, as we do not prefer eating over starving. We are driven to reduce cognitive dissonances, just as we are driven to eat. But how exactly does this work? We can either strive to actually resolve the disturbing inconsistency by changing our beliefs or our actions, or we can strive "to reduce the aversive feelings arising from cognitive inconsistency" with all kinds of mental strategies, in psychology referred to as means or modes of dissonance reduction, and in psychoanalysis known as defense mechanisms. Since many scientists (in particular economists) assumed for a long time that people usually act quite rationally, the surprising ways people reduce cognitive dissonances without actually resolving underlying inconsistencies made this a fascinating field of research. Let's have a look at how it started.

In 1955, Festinger read an article about a sect that expected the Earth to be annihilated by a global flood on December 21 that year. Everyone would drown, except for the sect members who believed in the prophecies coming from the planet Clarion. They were awaiting a spaceship coming for their rescue. After reading this, Festinger and his colleagues expected not only a massive cognitive dissonance among sectarians on December 22 after their beliefs have clashed with reality. More importantly, he expected to find effective ways to eliminate the dissonance triggered by the false prediction. One of the researchers infiltrated the group to find out.

Of course, the doomsday prediction was wrong and the only rational way to resolve the dissonance this caused was to admit the mistake and to abandon the cult. As predicted by Festinger, only those who have not uprooted their lives prior to the expected doomsday were able to change their cognitions. Those who quit their jobs and sold their houses would have felt very stupid if they honestly faced the

more serious mistakes they made. Instead, they resolved the cognitive dissonance of the failed prophecy by adding cognitions. To be precise, they added more irrational, self-justifying cognitions to an already irrational mindset: "There followed a terrible few hours following the midnight disconfirmation of the prophecy. People sobbed and wept. Had they been abandoned by the Clarions? Had they been wrong all along, just like their more cynical spouses and former friends had told them? Shortly past 4:00 am, Mrs Keech [the cult-leader] received her final message from Clarion. The message provided the answer to their questions, and also provided the opportunity to restore consistency between their doomsday beliefs and their observation that the spaceship had not come and there had been no Earth-destroying cataclysm. […] Through Mrs Keech's trembling hand, it said: 'This little group, sitting all night long, has spread so much goodness and light that the God of the Universe spared the Earth from destruction.' So that was it. The beliefs had not been wrong after all". As social psychologists Carol Tavris and Elliot Aronson summarize the essence of the story pointedly: "Mrs. Keech's prediction had failed, but not Leon Festinger's".[33] That's one of the differences between cult and science.

This seemingly irrational way out of the "doomsday dissonance" may resemble a bit the confirmation bias. Yet, since there was no evidence to bias, applying this explanation would be too far of a stretch. What happened is that Cult members fabricated self-justifications and explanations for obviously problematic beliefs out of the blue. As Festinger and his colleagues noted themselves, this is not a bias of perception or cognition but a much more profound mental process they referred to "as self-justifying rationalizations".[34] This "mode of dissonance reduction" identified by Festinger and colleagues obviously resembles the defense mechanism known as rationalization.[35]

Rationalization sounds like rational reasoning. What it really means is that humans often use their cognitive abilities to rationalize their deeply irrational beliefs and actions with self-serving arguments others often recognize as flawed. In other words: rationalization is a defense mechanism that reduces cognitive dissonances through self-deception, not through actually resolving the underlying conflict.[36] Thus, the origin of cognitive dissonance theory is a perfect case in point for how we can reduce dissonances psychologically: through defense mechanisms, "the processes by which people adjust what they know to avoid bad feelings such as anxiety and guilt".[37] When the Clarian cult rationalized an otherwise disturbing cognitive dissonance, they fabricated a far-fetched argument with one purpose only: not to improve but to justify and sustain what they believe and do. As psychotherapist Joseph Burgo puts it, we "make excuses for our actions – that is, we rationalize them – when we don't want to accept full responsibility for what we've done."[38] We justify irrational attitudes and detrimental behaviors so frequently one could say we are not rational but rationalizing animals.[39] Quite similarly, Dan Ariely summarizes several psychological experiments as follows: "We may not always know exactly why we do what we do, choose what we choose, or feel what we feel. But the obscurity of our real motivations doesn't stop us from creating perfectly logical-sounding reasons for our actions, decisions, and feelings". On the contrary, the obscurity of our real motivations make self-deception easy: "We want explanations for why we behave as we do and for the ways the world around us functions. Even when our feeble explanations have little to do with reality. We're storytelling creatures by nature, and we tell ourselves story after story until we come up with an explanation that we like and that sounds reasonable enough to believe. And when the story portrays us in a more glowing and positive light, so much the better".[40]

So far so good – but there is a remarkable detail that deserves attention. Although rationalization is one of the classic defense mechanisms taken up by Siegmund Freud more than half a century earlier, Festinger and his colleagues mention this important detail not even once – for a reason. Since both, cognitive dissonances and defense mechanisms, are at the core of my work, this requires a brief excursion into the history of psychology.

The key role defense mechanisms play in reducing anxiety has been in the center of psychoanalysis research since its founding days in the late 19th century. Since cognitive dissonances are mental conflicts we experience as disturbing, and since we cannot always reduce or resolve the underlying inconsistencies, it is only logical that all kinds of defense mechanisms play a key role in reducing them.[41] Unfortunately, research on cognitive dissonances and defense mechanisms has not been as intertwined

as one would expect, for a simple reason. The two concepts come from two different disciplines that have cultivated a deep void between them, despite (or rather because of) their common roots. Cognitive dissonances are researched in psychology, a discipline that has evolved into an empirical (natural) science. Defense mechanisms, on the other hand, are researched in psychoanalysis, a discipline that always was and still is a hermeneutic human science.

Consequently, the obvious fact that research findings on cognitive dissonances and defense mechanisms share important overlaps has been ignored by both sides for too long.[42] Two prominent examples illustrate this remarkable ignorance about important insights from "the other side". Although the famous "Theory of Cognitive Dissonance" by Leon Festinger emphasizes not only rationalization but also "Denial of Reality" as important mechanisms (means or modes) of dissonance reduction, he acknowledges neither of them as defense mechanism (or as concepts inspired by defenses). Like in his previous book on the failed prophecy of the Clarion cult, he never mentions defense mechanisms or Anna Freud, who wrote a seminal book on this topic about 20 years earlier. It seems that Festinger tried to relabel defense mechanisms as mechanisms of dissonance reduction without acknowledging this intention.[43] About 15 years after Festinger has published his famous work, the psychoanalyst Charles Brenner wrote a much-noticed book with the telling title "The Mind in Conflict". Although the title reads like a retaliation to Festinger's dissonance theory, he mentions it not even once.[44] This tradition of reciprocal ignorance continues until today among most scholars working on one of the two related subjects.[45]

Not surprisingly, this tradition lives on in contemporary psychology books on climate as well. Most of them mention cognitive dissonances at least briefly but they ignore defense mechanisms, usually with one familiar exception. Like Festinger, they cannot ignore denial, yet they don't appreciate it as one of the strongest defense mechanisms we know since more than 100 years. Consequently, they usually overlook the eminent role other defenses play in reducing climate dissonances, among them rationalization, repression and tokenism. A typical example is the big edited volume "Psychology and Climate Change". When I searched for the keyword "defense", I found three references to the Department of Defense, one to the Environmental Defense Fund, and two brief casual mentions of defense mechanisms. While repression is not mentioned once, at least tokenism features prominently as one of the "dragons of inaction" by Robert Gifford (albeit not as defense mechanism). In contrast, the terms bias and denial are mentioned more than 25 times each. However, denial is not recognized as a defense mechanism that goes far beyond biases. This pattern can be found in many other psychology books on climate until today.[46]

To cut a long story short, mainstream psychology still struggles with the fact that "the concept of defense is germane to the entire gamut of complex human behavior, in its adaptive and maladaptive aspects", and research on motivated reasoning or modes of dissonance reduction was not helpful in resolve this struggle because both kept the divide alive.[47] The present book provides ample evidence for the fact that both, cognitive dissonances and defense mechanisms are indispensable for understand our predicament in times of climate crisis – and for finally solving it physically instead of psychologically. Instead of reinventing defense mechanisms under different labels it is now high time to build a strong bridge across the disciplinary void between psychology and psychoanalysis. In this sense, psychiatrist George Vaillant wrote in 1993: "in order to understand human behavior psychology must learn to identify and interpret defenses".[48]

As the cognitive dissonance researchers Bertram Gawronski and Skylar Brannon note, linking research on cognitive dissonance and defense mechanisms does "not question Festinger's original ideas about the fundamental nature of cognitive (in)consistency",[49] on the contrary. Since Festinger himself relied on denial, rationalization and "selective forgetting" (or repression) as "means of dissonance reduction", defense mechanisms have been at the very core of his work all along. With hindsight, it is time to recognize that cognitive dissonance theory tried to reinvent the much older psychoanalytic concept of defense mechanisms in mainstream psychology without acknowledging this.[50] Let me now introduce various "means of dissonance reduction" in more detail – by drawing on the rich literature concerned with defense mechanisms.

As the origin of cognitive dissonance research shows nicely, some people can reduce certain cognitive dissonances quite rationally, in this case by leaving the cult that made false predictions. They heard the dissonance alarm and they were able to change their behavior and/or their attitudes to keep touch with reality. Why? Because their beliefs were not that strong and the mistake they had to admit was not that big. But what if this rational way out of a dissonance is not that easy, for example because it hurts too much to admit a big mistake, such as quitting a job or selling a house in vain? What if the dissonance touches on core aspects of our lives (such as fossil fuel dependence) that determine not only what we do but also how our civilization works? What if inconvenient attitudes are not about taste and opinions but about facts (such as the physics of global heating) - facts we cannot simply change without running into another conflict with reality? In these cases, the easiest way to reduce a cognitive dissonance is to negate or distort reality in ways it serves our short-term wellbeing best. As the cult members who rationalized their actions have demonstrated, it is sometimes easier to deceive oneself than to change course. That's exactly what defense mechanisms are about, and rationalization is just one of them.

According to George Vaillant, defense mechanisms are "patterns of feelings, thoughts, or behaviors that are relatively involuntary. They arise in response to perceptions of psychic danger or conflict […], or in response to cognitive dissonance […]. They obscure or diminish stressful mental representations that if unmitigated would give rise to depression or anxiety."[51] In other words, "[d]efense mechanisms are for the mind what the immune system is for the body." They are more or less automatic, unconscious and usually healthy mental responses to aversive feelings such as anxiety. As such, they have "more in common with an opossum involuntarily but skillfully playing dead than with […] the consciously controlled evasive maneuvers of a soccer halfback".[52]

Not coincidental, this fits nicely to our compulsion of reducing cognitive dissonances, also at the cost of losing touch with reality through self-deception. As Joseph Burgo puts it, "defense mechanisms are invisible methods by which we exclude unacceptable thoughts and feelings from awareness. In the process, they subtly distort our perceptions of reality". By referencing the British psychoanalyst Donald Meltzer, he concludes "that all defense mechanisms are essentially lies we tell ourselves to evade pain".[53] This is why psychiatrist Neel Burton's book "Hide & Seek: The Psychology of Self-Deception" is nothing but a collection of psychological defenses that help us to be happy – by losing touch with reality. Put the other way round with Siegmund Freud, reality is the inconvenience that disrupts our omnipresent self-deception, "our wishful phantasies" from time to time.[54]

Although the motivations of defense mechanisms are unconscious and invisible, their manifestations are not, be they a lack of fear in real danger, rationalizing thoughts we tell others or weird actions everyone around us can observe. This is why defenses have been discovered by Freud in the first place, and this is why we can still observe and analyze them today: "as with invisible planets, the presence of a defense can be demonstrated by its predictable and consistent distortion of the events surrounding it. As with distant mountains, the salience of a given defense can be assessed by the triangulation of repeated observations from multiple vantage points."[55]

Because of their intangible nature, the number of defense mechanisms varies considerably from author to author. While early psychoanalysts identified less than a dozen defenses (among them repression, denial and rationalization), Vaillant expanded the list to 18, and based on his work a hierarchical taxonomy of 31 defense mechanisms has been included in the Manual DSM-IV of the American Psychiatric Association as a subject for further study (dropped in the DSM-V published in 2013).[56] Others, among them the psychiatrists Neel Burton and Jerome Blackman expanded the list further, the latter to 101 defenses (including "compensation for deficiencies").[57] Overall, Vaillant notes that our "capacity for ingenious, creative, often healing self-deception seems infinite" and that lists can be as long as researchers are willing to tease out nuances between defense reactions.[58] This is why scientists keep finding new defenses (of course labelled as "modes of dissonance reduction"), among them denial of responsibility.[59]

Some may think that Leon Festinger's study about crazy cult members says little about average people because they would all have reduced their cognitive dissonance rationally by abandoning the cult (or by not joining it in the first place). Unfortunately, this is not what decades of psychological

research tells us. What Festinger has found for the Clarion cult is one of our standard ways to resolve cognitive dissonances,[60] but see for yourself two of the thousands of experiments that have been conducted since then, all confirming his findings. The first experiment has been conducted by Festinger himself. He asked students to perform boring tasks, such as sorting something irrelevant for an hour. Afterwards, half of them got paid a few Dollars, the other half far more, and they were all asked to tell waiting participants that the experiment was fun. Finally, they were asked to rate how boring the task really was for them. As expected, "those who received a lot of money confirmed that it was actually boring. They lied to the next guy for the money. That is consistent - it's a 'good reason.' But those who lied to the next participant for very little money seemed to experience dissonance. […] They wouldn't admit they had agreed to lie just for a few dollars. Their creative solution to reduce the dissonance was to start thinking that the task was, um, kind of fun after all."[61] What kind of defense mechanism did the participants employ who lied for a few dollars? They denied what they really thought about the task to undo their lying. Yet, what is the difference between denial and lying? While liars know they don't tell the truth (usually creating another dissonance), deniers believe their own lies by deceiving themselves.

In another experiment about denial, a psychologist asked about 160 women and men to read an article saying that caffeine in any form is very bad for women because it can cause breast cancer. It is not hard to guess that female and male participants who consumed a lot of coffee read the article very differently: "In the female group, 'heavy consumers' of caffeine were significantly less convinced of the connections than were 'low consumers'. The males were considerably more convinced than the female 'heavy consumers'; and there was a much smaller difference in conviction between 'heavy' and 'low' male caffeine consumers (the heavy consumers were slightly more convinced of the connections)."[62]

While the coffee experiment is only about denying evidence the participants of the study have been confronted with, self-deception in real life represents much more complex battles against inconvenient realities that go through several consecutive steps. It starts with avoiding inconvenient and gathering convenient evidence (often in echo chambers), and it continues with further cherry-picking evidence we actually process, interpreting the already biased information in line with one's world view, and finally seeking social confirmation for what we (want to) belief.[63] To see dissonance reduction through self-deception in full swing, we have to look beyond psychological experiments and study real life. One of the real-life challenges providing lots of insights about how people reduce cognitive dissonances is any kind of addiction.

We all know that alcoholism or smoking kills, and those drinking only modest amounts of alcohol or non-smokers have no problem with accepting this as a fact because it is consistent with their behavior. For alcoholics or smokers, however, this reality is highly disturbing because it is dissonant with what they do on a daily basis. After what we have heard, they cannot live with this constant alarm but they have to silence it. As decades of research have shown, the path of least resistance is not to stop drinking or smoking but to deceive oneself about one's addiction with the help of defense mechanisms. The epilogue of this book has caricatured some of them by blending in arguments put forward in the climate crisis. Let's have a more serious look at how alcoholics or smokers solve their problem psychologically while worsening it physically.

Some of them rationalize their unhealthy behavior ("I know heavy smokers who never got lung cancer, but my aunt who never smoked did"), some deny scientific evidence partially ("the few cigarettes I smoke do no harm") or entirely ("the anti-smoking propaganda has one purpose only: to restrict personal freedom"), and still others resort to tokenism ("I live quite healthy because I exercise regularly").[64] Consequently, smokers "have less exposure than nonsmokers to negative information about tobacco, they are disinclined to accept the inevitability of the negative consequences of smoking or to recognize the probability of specific illnesses, and they regard the relation between the arguments for and against tobacco consumption as more evenly balanced than do nonsmokers".[65] In short, all kinds of addicts protect their addiction by deceiving themselves and the people around them (who often adopt self-deception themselves).

Of the four defense mechanisms mentioned so far, tokenism is the best hidden one with the least research available. In the climate context, it became the perfect defense mechanism of the masses that remained largely unnoticed. When it has been noted by researchers, they involuntarily helped to obscure its omnipresence by labelling it in at least five different ways: tokenism, compensation, replacement action, low-cost hypothesis, and single-action bias. What these different labels have in common is the unconscious yet "[i]ntense attempt to correct or find a suitable substitute for a real or imagined physical or psychological inadequacy".[66] In the cases of smoking and the climate crisis, tokenism is about addressing a real physical and a consequential psychological inadequacy. The key purpose of tokenism is to "find a suitable substitute" that eases the psychological pain caused by cognitive dissonances. Tokenism works through defensive behavior that is largely symbolic, that helps us to pretend that we are acting adequately while we are not. What we do when we compensate usually does not alter the physics of the problem but only the way we see it. As other defense mechanisms, tokenism is a way of deceiving ourselves: Although bothersome inconsistencies remain unchanged, we no longer perceive them as such. Tokenism is one more way to resolve inconsistencies not physically but psychologically, and this is all that matters – at least in the short term.[67]

Whether we deny evidence, rationalize irrational assumptions and actions or take tokenism for real, these defenses work best when supported by another very basic defense mechanism known as repression. To put it colloquial, when we repress cognitions we willfully ignore them because they would worry us. A bit like cold cognitive biases turned hot, repression is like willful forgetting, also featuring as "selective forgetting" in Festinger's modes of dissonance reduction. While repression is a mostly unconscious mental process, parts of it can be consciously. In one of the first cases of repression described in the literature, Siegmund Freud notes that Miss Lucy fell in love with her employer and was initially aware of her desires. When she realized that they were unfulfillable "'she decided to banish the whole business from her mind'. Miss Lucy subsequently agrees with Freud's interpretation of the repressed desire, leading Freud to ask: 'But if you knew you loved your employer why didn't you tell me?', and she responds: 'I didn't know—or rather, I didn't want to know. I wanted to drive it out of my head and not think of it again; and I believe latterly I have succeeded'". Obviously, "repression prevents knowing (or acknowledging) that the repressed is known", it is about turning a blind eye to something, or, as Freud has put it, about "the blindness of the seeing eye".[68] Since repression can appear very similar to denial, the two defense mechanisms are regularly confused. When it comes to global heating, the difference is usually noteworthy: those repressing the problem don't deny but evade it in their daily lives.

Although repression is a powerful defense on its own, it often provides essential support to other defense mechanisms. With the help of repression, it is much easier to ignore the elephant in the room, that is, the fact that we deceive ourselves for the sake of mental peace. In case of denial and rationalization we repress potential unease about overwhelming contrary evidence, and in the case of tokenism we repress the omnipresent notion that what we do is merely symbolic and certainly not adequate.[69] Of course, all this is facilitated by the default procedure that our brains always have to focus attention on certain issues while ignoring many others because otherwise we would be overwhelmed by millions of impressions.[70] Since other common defense mechanisms (among them regression, dissociation, projection, or sublimation) are not as important for understanding the climate crisis, I skip them here and go straight to a few key points about self-deception through defense mechanisms.

In case you ever wondered whether people making use of defense mechanisms really believe what they say or do, consider these two examples: Why would drug addicts risk their health and family lives – except for they really made themselves believe they don't? As Joseph Burgo puts it, addicts "often lie to themselves, and to other people around them […]. Alcoholics are notoriously dishonest, with themselves and with their loved ones; they rely primarily on denial but also use rationalization in order to evade awareness of the damage that results from their drinking".[71]

In this vein, George Vaillant writes the following about denial: "consider a physician acquaintance of mine who fell victim to barbiturate dependence. Heavy use of barbiturates leads to slurred speech, unsteady gait, a characteristic tremor of the eyes […] and unexplained seizures. Since the doctor could

not bring himself to acknowledge to another person or to himself that he had an addiction, he sought help from a neurologist for his symptoms. His neurologist, who could not believe […] that a fellow physician could be addicted to barbiturates, tentatively diagnosed another but equally plausible cause for such symptoms, a brain tumor. […] This meant drilling burr holes through his skull and inserting needles into his brain. Even at this point he did not acknowledge his addiction, but meekly allowed the holes to be drilled – a totally unnecessary and unrevealing diagnostic procedure. Such behavior by a physician can only be described as a frank distortion or denial of external reality.[72]

So yes, whenever ordinary people employ defense mechanisms such as denial or tokenism, they really believe in whatever they say or do, no matter how stupid this may seem. Otherwise, they would not be able to deceive themselves out of disturbing dissonances. Obviously, effectively reducing inner conflicts is more important for our psychic well-being than avoiding loss of reality. This is why neurological studies found that people using "what psychologists call 'motivated reasoning' and what Freud called defense mechanisms […] feel that same kind of euphoria and reassurance that an addict feels when reunited with his drug of choice: all is right with the world. At least for a while. The brain doesn't like conflict and works hard to resolve it."[73] This is also why longitudinal studies found that "a major depressive disorder occurred only among men who had experienced a large number of severe life stressors" not making use of defenses.[74]

One of the key challenges of our everyday lives is to get the balance right between dissonance reduction that really solves problems on the one hand and using protective defenses on the other. When we silence important cognitive dissonances for too long, adaptive defenses turn maladaptive and initially healthy self-deception becomes a dangerous trap. While some problems may go away in the meantime, many others get worse, among them most addictions such as alcoholism or smoking – and global heating. As Per Espen Stoknes notes, "[t]his is a form of human self-destructiveness that is well known to psychotherapy: Sometimes the inner resistance will come up with no end of explanations and excuses as to why we keep doing what is not good for us. […] Some use their intellectual capacity to bolster their defenses until they are unassailable"[75] – and pathological in the sense that they do more harm than good. As Joseph Burgo summarizes, "here is the problem inherent in psychological defenses: while they're necessary and useful, for each and every one of us, in coping with the inevitable pain that goes with being human, when they become too deeply entrenched, they may prevent us from accessing important emotions" – or problems we ought to face. "They operate in the here-and-now, with no thought for tomorrow. They're unthinking and reflexive; they aim only to ward off pain this very moment and don't take into account the long-term costs of doing so."[76]

To conclude, cognitive dissonances on the one hand and self-deception through defense mechanisms on the other play complementary roles in improving our lives. While dissonances sound the alarm about inconvenient parts of reality that need our attention, defenses protect us against an overload of alarms and inconveniences. When we use defenses, we often appear to be irrational. Yet, we are rational in the sense that they can help keeping us happy and healthy, or as Vaillant puts it, "the deployment of such defenses reflects our adult efforts to accommodate to life" that is not always pleasant.[77] However, let's not forget that defenses protect us here and now, with little regard for what happens tomorrow, let alone next year or in a decade. Evolution decided for us: sometimes it's better to be a happy fool than an anxious realist. However, evolution also gave us the possibility to overcome defenses if we wanted to, simply because some inconvenient realities are deadly, among them the climate reality we are creating.

## *2.5. The collective dimension of self-deception*

Before Festinger's research group infiltrated the Clarion cult, they made another prediction that came true: the so far shy cult "which had shunned publicity throughout its existence, would suddenly seek social support" for their wondrous achievement of averting doomsday, and this is exactly what happened. First, the core members have supported and reinforced the rationalization of their irrational beliefs among themselves, and their strong group identity was certainly helpful in this regard.[78] Second,

after the core of the in-group has rationalized their cognitive dissonance away, "they looked for social support for their story [outside of the group]. […] They printed flyers, called newspapers and magazines, offered to talk on radio programs, all in an effort to bolster their new found consistency. […] [T]hey were driven to find a way to restore their consistency – driven to find a new belief that would make sense of what they had done and driven to convince a skeptical world of the truth of their new position."[79] In short, rationalization alone was not enough, but in combination with social support it became invincible: "For rationalization to be fully effective, support from others is needed, to make the explanation or the revision seem correct. […] If more and more people can be persuaded that the system of belief is correct, then clearly it must, after all, be correct."[80]

In his "Theory of Cognitive Dissonance", Festinger explains how social support helps to reduce cognitive dissonances as follows:[81]

- "By obtaining social support for some opinion, the person thus adds cognitive elements which are consonant with that opinion and thus reduces the total magnitude of dissonance."
- "[A] person frequently will attempt to obtain social support for the opinions he wishes to maintain. If social support is obtained, the dissonance will be materially reduced and perhaps even eliminated."
- "Social support is particularly easy to obtain when a rather large number of persons who associate together are all in the same situation – that is, they all have the same dissonance between cognitions which can be reduced in the same manner."
- "When a situation occurs where the identical dissonance exists in a large number of persons, one may observe very startling and curious mass phenomena."

Can you see the striking relevance of these quotes for our predicament in times of climate crisis? We know already that we preferred to resolve our unbearable climate dissonances psychologically because this was much easier than resolving them physically. Since the largest possible number of people was in the same situation – that is, we all sensed at least one of the climate dissonances – it was very easy to obtain social support for reducing our discomfort with defense mechanisms. Thus, it should not come as a surprise that we are now in the disturbing position to "observe very startling and curious mass phenomena", in particular denial, rationalization, repression and tokenism at a societal, even global scale. To highlight the eminent relevance of Festinger's research for understanding the climate crisis, I have one more remarkable quote: "Sometimes an event may occur which is so compelling in its nature as to produce almost identical reaction or behavior in everyone for whom the event has relevance. […] Natural disasters or the threat of such, for example, can produce such uniform reactions".[82] In short, what Festinger wrote in the 1950s explains the societal dimension of the climate crisis as if it already existed back then. In case you cannot see this yet, wait and see how startling and uniform the reaction of the majority of people not living in denial really was.

Since then, research has confirmed time and again the eminent role social support plays in both, experiencing and reducing cognitive dissonances. As social psychologist Albert Bandura puts it metaphorically, the "whole is greater than the sum of its parts", in physics and in societies. "In emergence, constituent elements are transformed into new physical and functional properties that are not reducible to those elements. For example, the novel emergent properties of water, such as fluidity and viscosity, are not simply the combined properties of its hydrogen and oxygen […]. Through their interactive effects, the constituents are transformed into new phenomena".[83] The same applies to individuals and groups, in particular when they face cognitive dissonances collectively. When dozens, thousands or even millions of people see the climate crisis as a minor problem we can deal with later, it must be that way, right? Unfortunately, social psychology and sociological history studies tell us otherwise. Let's have a brief look at both.

Since social psychology focuses mainly on how individuals or groups are influenced by social interactions, respective experiments found overwhelming evidence confirming that self-deception works much better when backed by others; when we deceive ourselves collectively. Apart from the fact that social support provides much appreciated consonant cognitions, social psychology found a few other reasons for why self-deception works best collectively. First, when particular defense mechanisms

(such as repression) become a social norm (or even part of several social norms forming an identity), self-deception is enshrined into the rules of a society. It becomes part of widely shared definitions of how to see or do things. Institutionalized rules are even harder to change than individual beliefs or routines.[84]

Second, when a group experiences a cognitive dissonance, it is often easy to shift blame away from the conflicting issues to the out-groups raising it. If it were not for climate scientists and environmentalists, there would be no climate dissonance, so the conviction goes. The in-group/out-group polarization can trigger another defense known as acting out. When not the message but the messenger is blamed for triggering a dissonance, stress can be reduced quite simply by blaming and attacking the "outgroup perpetrators". After all, "they disturb our cognitive tranquility […], they try to force us to acknowledge things we specifically choose to ignore to avoid getting hurt or upset", as Zerubavel puts it.[85] This is why Greta Thunberg and other climate activists are attacked ferociously by those not willing to accept that the fossil fuel age has to end soon if we want to avoid a climate catastrophe.

Third, a group helps to disperse responsibility for inadequate or immoral behavior, which also reduces respective cognitive dissonances. If everyone (in my group) does the same (bad) thing (be it drinking too much or burning fossil fuels), it cannot be that bad, right?[86] As Albert Bandura points out, people usually "act more cruelly under group responsibility than when they hold themselves personally accountable for their actions. […] Group decision making is a common practice that can result in otherwise considerate people behaving inhumanely. The faceless group becomes the agent that does the deciding and the authorizing. Members can discount their contribution to the policies and practices arrived at collectively so they are not really responsible. When everyone is responsible, no one really feels responsible. Napoleon put it well when he noted that 'collective crimes incriminate no one'."[87]

Overall, social support seems to function as an additional (rationalizing) line of defense that reinforces (or even institutionalizes) other defenses. While psychoanalysis has ignored this social dimension for too long,[88] at least a few scholars have noted it at least briefly. Vaillant, for example, emphasizes that defense mechanisms can be absorbed from others, or that groups and organizations can shape defense styles.[89] Others claim that particularly primitive defenses such as denial "require the active participation of other individuals for their successful operation" over a longer period of time, and they speak of "shared or group defenses", or of "social defenses".[90] Since Festinger came to the exact same conclusions, this is another remarkable overlap between research on cognitive dissonance on the one hand and defense mechanisms on the other.

A brief look into the sociological history of atrocities confirms social psychology. As the sociologist Stanley Cohen describes in his seminal book "States of Denial", people somehow involved in crimes against humanity such as genocides tend to use denial and repression as their preferred defense mechanisms: the foreseeable was unforeseen, the unthinkable never happened, the unspeakable is never voiced, and anyone who dares to violate these unwritten societal norms is punished with contempt. This applies not only to perpetrators but also to bystanders, and sometimes even to victims. Thus, "knowing and not knowing" about atrocities usually has an individual and a social dimension. Individually, "[t]he mind somehow grasps what is going on – but rushes a protective filter into place" that slips inconvenient information "into a kind of 'black hole of the mind' – a blind zone of blocked attention and self-deception". Groups of people, ranging from families to societies, develop mutually reinforcing groupthink, "a collective mind-set that protects illusions from uncomfortable truths and disconfirming information".[91]

What begins with defense mechanisms such as denial or repression first turns into groupthink, then into a culture, and ultimately history is rewritten collectively. A good illustration for this social up-scaling of individual defenses touching on both, family legacies and national history, is how children from major Nazi perpetrators have been protected by three walls of silence. The first wall was that the parents protected their children "from knowing the truth". The second wall was that "the children didn't ask any questions". Finally, "the wider culture set up a third wall. These patterns of family collusion were not private and insulated: the fifties, when these children were growing up, was the period when German

society as a whole did not talk about, let alone 'acknowledge' the past." Instead, a few denied and most repressed the atrocities their loved ones have committed about a decade earlier. Based on this and many other examples, Stanley Cohen concludes that individual defense mechanisms such as denial and repression can easily be scaled up into "cultural versions", making individual dissonance reduction much easier for everyone.[92]

Similarly, the sociologist Eviatar Zerubavel notes that the most popular cultural defense against inconvenient truths is socially cultivated silence. For him, "the most public form of denial is silence", "a product of individual as well as collective efforts".[93] Therefore, we need to understand not only the psychology but also the sociology of denial (and other defense mechanisms). An entertaining way to do this is by retelling the captivating fourteenth-century story "The Emperor's new cloth" Zerubavel uses to introduce his book with the proverbial title "The Elephant in the Room". According to the story also retold by Hans Christian Anderson, a king has been duped "by three swindlers into believing that a dazzling new suit they are supposedly weaving for him is somehow invisible" to any person of illegitimate birth (original) or stupid (Anderson's version). Since everyone not seeing the extraordinary fabric (including the king himself) is embarrassed to say so because this would question their legitimacy or intelligence, they pretend that everything is fine and "praise the invisible cloth lavishly. This then leads a constable, obviously concerned about his own reputation, also to extol it, which understandably makes the king even more embarrassed that he cannot see it. When the delusion is further corroborated by yet another sycophant who dares not admit that he cannot really see anything, the king then proudly rides into town to display his imaginary suit, and although it is invisible to all, 'everyone thought that his neighbors saw it, and that if they did not, and said so, they would be ruined and disgraced.'" Finally, it was up to a naive child (in Andersons's version) to tell the king that 'either I am blind or you are naked' and soon 'everyone was saying it, until the monarch and everyone else ceased to be afraid of knowing the truth'."[94] Not surprisingly, Greta Thunberg said more than once that the emperors of climate policy-making are naked, but more on this later.

What the story of the naked emperor adds to what we already know about defense mechanisms is that, even if we recognize individually that something is wrong, we often pretend collectively that everything is fine, or as Zerubavel puts it: there can be a considerable gap "between the private act of noticing and the public act of acknowledging", and "[t]he more people I see ignoring the elephant in the room, the harder it is for me to remain convinced that it is indeed standing there, as my own senses tell me".[95] In other words, we sometimes deny and repress aspects of reality because everyone else does it, although we would know better individually. "Essentially revolving around common knowledge that is practically never discussed in public, undiscussables and unmentionables that are 'generally known but cannot be spoken,' such 'open secrets' constitute 'uncomfortable truths hidden in plain sight'".[96]

Those who hesitate to draw such far-reaching conclusions from a fictional story should read Cohen's book about "Stages of Denial", Zerubavel's "Elephant in the Room", or Margaret Heffernan's book on "Willful Blindness". Each of them provides plenty of evidence about the social construction of denial and repression our societies practice over and over again, in particular in times of serious crises.

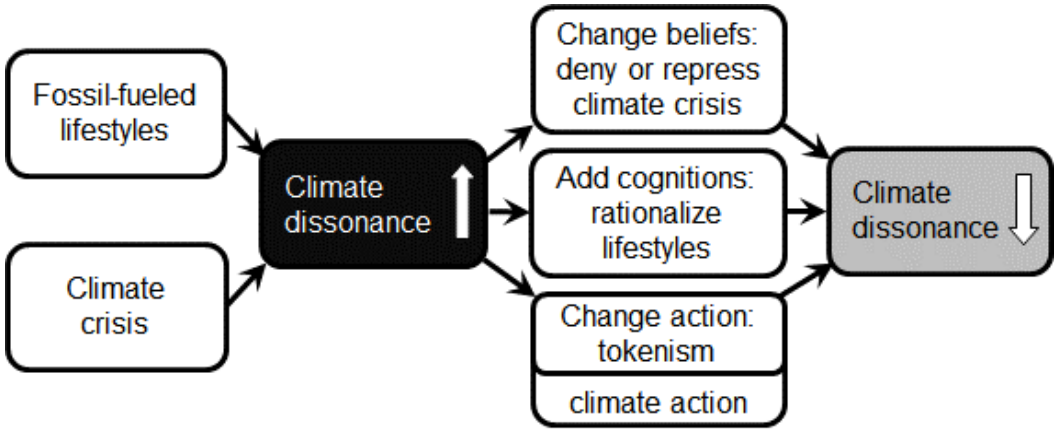
To conclude, humans are rationalizing social animals rather than rational individual thinkers, we are happy fools regularly detaching ourselves from inconvenient realities rather than fact-based problem-solvers. Of course, defenses that protect us against climate dissonances have worked differently than those applied against atrocities. The climate crisis was never completely silenced as some atrocities were, nor was it literally denied by entire societies. However, the main two points here are that our defenses against disturbing climate dissonances are as effective as literal denial, also because they are powerful social constructs. As sociologist Kari Norgaard notes, "[i]t is precisely because society organizes patterns of perception, memory, and organizational aspects of thinking that we must use psychology and sociology together to understand climate denial"[97] – and other defense mechanisms we used to not solve the climate crisis physically.

## *2.6. Reducing climate dissonances with defense mechanisms*

For more than two centuries now, fossil fuels have powered our economies into an unprecedented comfort zone that improved our living conditions enormously. Of course, the warnings of climate scientists that we will run into a climate catastrophe if we don't stop relevant pollution have triggered a massive cognitive dissonance, in particular in industrialized societies. As the psychologist Per Espen Stoknes puts it: "In most of us, the global warming message initially evokes troublesome feelings, such as uneasiness, fear, or guilt. The more we believe the message, the worse we feel".[98]

In the early 1990s, this dissonance turned distant global warming into a mental threat that had to be addressed immediately. If it would have been easy to refurbish our comfort zone with low-pollution alternatives such as electric cars, we would have done so. This would have resolved our climate dissonances and respective anxieties effectively once and for all. But politicians, businesses and ordinary people, altogether pleasantly embedded in energy-rich lifestyles, were first unprepared and then undetermined to make these alternatives work. The main point of this book is that conventional explanations are not enough to understand this course of action. It is not only due to the characteristics of the problem, a lack of cheap alternatives for decades, economic concerns, and so on. In addition, we did not have to resolve our climate dissonances physically because our mental evolution provided a much easier way out: self-deception through a variety of defense mechanisms. Per Espen Stoknes again: "Failing to act on what we know just increases the dissonance. We struggle with this internal conflict, and start negotiating with ourselves."[99] Not resolving this conflict already in the 1990s would have questioned what we have achieved and who we have become since the late 18th century. If this negotiation with ourselves would not have resulted in self-deception, our fossil-fueled comfort zone would have been a heavy burden on our wellbeing, in particular at a time when climate-friendly alternatives have not been as good and as cheap as they are today. Let's have a detailed look at this negotiation with ourselves.

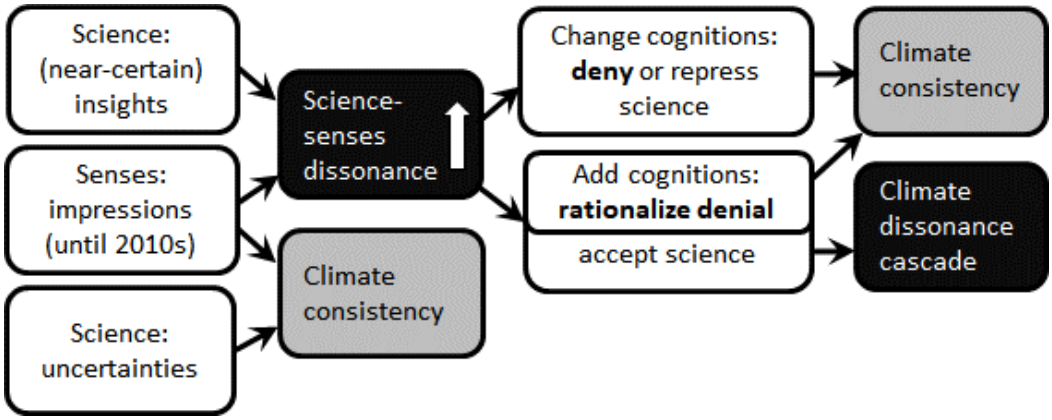
*Figure 3: Three main pathways of reducing climate dissonances*




At the heart of my climate derangement theory is our success in resolving a series of cognitive dissonances related to global heating psychologically instead of physically. How did we do this? By changing cognitions or their importance to us through denial and repression, by adding consonant cognitions through rationalization, and by changing actions only symbolically without noteworthy physical effects through tokenism.[100] Those using denial really think there is no problem: "it's a hoax". Those repressing the climate issue push it close to the margins of their conscious mind: "I don't think much about this and when I hear something I don't listen". Those using rationalization justify what they do with cherry-picked evidence in self-serving ways: "it's mainly caused by China". Finally, those engaged in tokenism change actions that are easy to change. These climate tokens make them feel better but they have no noteworthy impact on the pollution they cause, sometimes on the contrary: "I flew to Mauritius, felt guilty, ate only local food and hardly ever used a car" (as I will show later, this is not a made-up example for tokenism).

Obviously, we were able to establish at least one defense mechanism within each of the three pathways leading out of cognitive dissonances, even in the pathway that is about "changing action". Altogether, our defenses protected us not only from disturbing states of mind, but more importantly also from collectively changing our polluting lifestyles, no matter how irrational or self-destructive that may be in the long term.[101] However, since we struggle not with one but several climate dissonances, I have to make the simple figure 3 more complicated. Nevertheless, what follows is still much simpler than our messy psyche.

*Figure 4: Historical climate dissonance between science and senses*



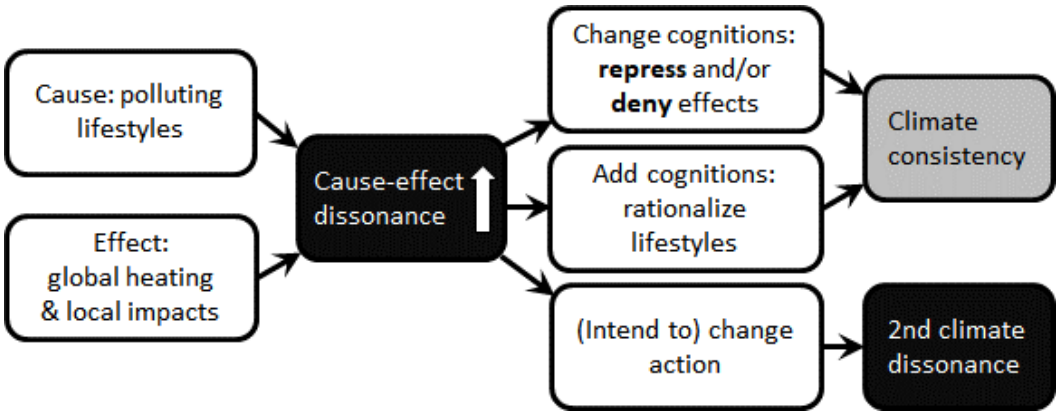

Historically, a very basic climate dissonance opened up between scientific insights about the climate crisis and our sensual impressions and beliefs in a time when severe impacts were still absent. This period lasted from the 1990s well into the 2010s. As environmental ethics scholar Dale Jamieson wrote as late as 2017, global heating "must be thought rather than sensed, and we are not very good at thinking. Even if we succeed in thinking that something is a threat, we are less reactive than if we sense that it is a threat. Consider the difference between touching a hot stove and being told that the stove is hot. Scientists are telling us that the world is warming, but we do not sense it and so we do not act. This is the hardest problem to overcome."[102] Per Espen Stoknes illustrates this with the following personal anecdote: "While in a taxi in Cape Town, Janet Swim, a psychology professor who headed the climate task force of American Psychology Association, asked the driver about climate change. Always a good thing to do if you want to understand how people think. 'I don't think there's climate change,' the driver said. 'If there was climate change and sea levels were rising, I would have seen it.' Yep, that's how our everyday mind thinks: 'People experience weather on a day-to-day basis, and that's how they think about climate change,' says Swim. This little story is confirmed by systematic research: It's not just taxi drivers. The polls on 'belief in' or 'worry about' climate change are highly influenced by temperature variations over the previous three to twelve months. […] When the weather is unusually hot, people get concerned about global warming. In cold spells, concern wanes".[103]

Fortunate for those who listened to what climate scientists had to say, there were quick fixes for this basic dissonance. The easiest way out was to focus on scientific uncertainties that were in line with one's own impressions: "They say it is not certain, yes I can see that, so no need to worry" – consistency accomplished, end of the mental journey. Those who dared to listen to near-certain climate science insights still had the chance to change their cognitions in line with their senses, simply by denying or repressing what they heard. Climate deniers always had and still have plenty of sources to choose from that attacked consensual science on false grounds, but of course they conveniently ignored the latter. Those repressing the science-senses dissonance simply began to avoid climate science: "I don't want to hear this, it sounds wrong". Those who add cognitions have two possibilities at this stage. First, they can rationalize doubt and denial by cherry-picking fake science over consensual science and focus their attention on normal weather patterns: "it all seems normal to me, just as they say on that website". Second, they can add cognitions on consensual science and focus their observations on extreme weather patterns that confirm the science: "that article in 'Nature' is spot-on, look at the extreme weather from

last week". While both approaches can resolve the basic dissonance between science and senses, accepting the science was much harder for a long time, in particular because it led straight into a highly disturbing cascade of three more dissonances.

Since the late 2010s, however, the dissonance between scientific near-certainties and senses all but disappeared. Most scientific predictions now play out in real-time, plain to see for everyone not already living in denial. "Earlier than expected" is one of two constants in the climate crisis. The second one, referring to intensity, is: "We have underestimated this". Nevertheless, it is important to note that between 1990 and the late 2010s, the fact that we were not able to sense global heating was certainly not helpful in mobilizing climate action.

*Figure 5: First climate dissonance between causes, effects and impacts*



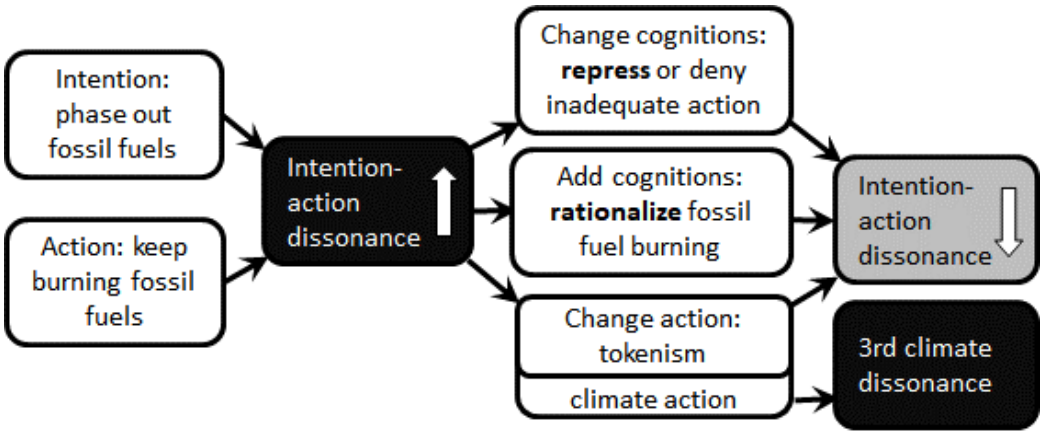

The first contemporary climate dissonance opens up between our comfortable yet polluting lifestyles based on fossil fuels and the effects they have. As Per Espen Stoknes points out, "[t]hese two notions don't go well together. They conflict with a positive self-image, and create a vexing discomfort."[104] It is one of the two main psychological stressors the climate crisis has confronted us with already decades ago, long before impacts materialized locally. The extreme impacts we can observe now (be it floods, heatwaves or forest fires) make this dissonance much worse because they turn once abstract global heating into a tangible threat. Based on what we already know the question is not if but how we reduce this disturbing state of mind.

Again, we can change our cognitions either by repressing or by denying the effects of our polluting lifestyles, or we can add cognitions to rationalize what we do. Those who use repression turn the page or switch to another program when the climate crisis makes headlines. Those who rely on denial have multiple options. They can deny the fact that the climate changes, that a changing climate is a problem, that it is caused by humans, that we can solve it, and so on and so forth. As we will see later, denial and rationalization are not always easy to keep apart. While denial cherry-picks cognitions that help to reject the cause-effects ratio altogether, rationalization cherry-picks evidence to justify our lifestyles despite the effects they have. These strategies resolve not only the first climate dissonance but also avoid all the others because they establish a comforting climate consistency. The quintessence of this state of mind is exactly what many want to hear: "don't worry, we do just fine, enjoy your energy-rich lifestyle".

A strong empirical indication for the cause-effect dissonance and our psychological exit strategies is the fact that people, regions or countries with higher carbon pollution are less willing to reduce them than others.[105] As soon as we understand the importance of cognitive dissonances and defense mechanisms in times of climate crisis, a correlation that seems paradoxical on first sight suddenly makes sense.

Finally, another pathway out of the cause-effect dissonance emerges: changing actions. However, since the climate crisis is one of the most difficult problems to solve, both technically and politically, the intention to phase out fossil fuels runs into a second climate dissonance between intentions and actions, triggering an additional defense mechanism.

*Figure 6: Second climate dissonance between intention and action*




Those accepting that we have to eliminate climate pollution have jumped already two hurdles, but unfortunately they have two significantly higher ones ahead. For decades, most governments and a majority of people in most industrialized countries intended to phase out fossil fuels – at least sooner or later. Yet, while they committed themselves to this transition, they kept burning them on a grand scale, be it in their heating systems at home, in cars or in airplanes. When you continue doing something you got to know as bad and harmful, another severe dissonance is inevitable. Unfortunately, it is as problematic and as difficult to reduce physically as the second one. Yet, it had to be reduced for the sake of our mental health. Since dissonances between our explicit intentions and our actions are very common throughout our lives (and even more so in politics), they have their own name, and that is hypocrisy.

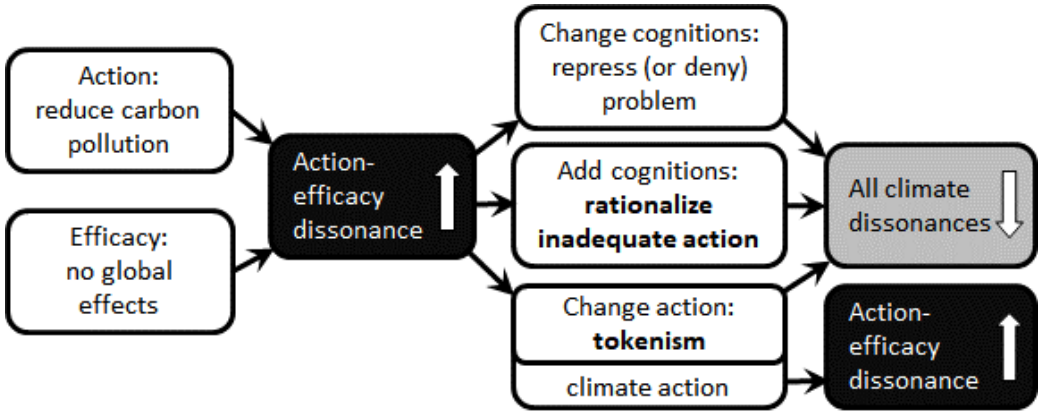
The gap between our intention to reduce fossil fuel burning and our lifestyles widened over the years in most countries and we learned to live with a massive climate hypocrisy, usually without noticing it. Of course, we did and still do everything to hide or to escape the second climate dissonance, individually and collectively. Either people started using denial, repression or rationalization at this point of their mental journey, or they have cultivated another defense on a grand scale I refer to as tokenism or compensation. A typical example is to take recycling very seriously or to buy organic food while driving a gas-guzzling SUV. The main (if not sole) purpose of these and other climate tokens is to make one feel better by reducing the intention-action dissonance at least psychologically, to unconsciously deceive oneself. While a few authors recognize the importance of "making symbolic or inconsequential mitigative efforts over more effective actions", in particular in an environmental context, they usually overlook that respective practices resemble key features of a classical defense mechanism.[106]

Compensation can include credible ways to make up for carbon pollution (such as reforestation, if done properly), whereas tokenism emphasizes how inadequate replacement actions really are. Instead of actually reducing pollution significantly, the main goal of climate tokens is to make ourselves and others believe that we do something meaningful against the climate crisis while we do it mainly for ourselves. Even when we notice that flying is a problem, we simply claim to "protect the environment in other ways".[107] Of course, the real purpose of tokenism is conveniently overlooked. That is exactly what defense mechanisms are about: climate tokens make us believe that inadequate climate actions are adequate. They make us feel better through self-deception, not through cutting our CO2 pollution substantially. This inconvenient truth would be easy to find out if we wanted to, but why should we? To save the world from a climate catastrophe in the far future? OK fine, but most people care more about their (mental) wellbeing today. That's why they are quite happy with a little climate tokenism.

As I will show later in detail, climate hypocrisy hidden by tokenism is by no means limited to individuals, on the contrary. It has strong political and corporate dimensions, both gladly supported by a vast majority of voters and consumers since decades, altogether being happily trapped in a vicious circle of climate hypocrisy. With hindsight, and with the help of figures 6 and 7, it is not hard to see why tokenism became a convenient defense of the masses against an ever worsening climate crisis: While

replacement actions reduce the second climate dissonance and evade the third one altogether, serious climate action has the ultimate hurdle still ahead.

*Figure 7: Third climate dissonance between action and efficacy*




Those who align their actions with their intention by actually reducing climate pollution finally struggle with the disturbing fact that their efforts have little to no global impact, no matter how hard they try. This holds true as long as most others (be they individuals, businesses or governments) don't do the same, and this is exactly what has happened for decades. The notion of "[n]o matter what I do, I can't do anything about that anyway" is another powerful reason for why we have "solved" the climate crisis psychologically with defense mechanisms, at least until recently.[108]

The most promising physical way out of this final climate dissonance requires collective climate action, mainly dependent on international or multi-state agreements and decisive national climate policies around the world. If industrialized countries would have been serious about solving the problem, they could have influenced the climate policies of emerging economies like China and India in numerous ways. They could have linked free trade agreements to adequate national climate policies, or they could have imposed carbon tariffs on imported goods. The fact that not even the European Union thought about any of this until 2019 is remarkable, the seriousness of the problem given.

The failure to reduce global carbon pollution is neither due to the fact that it was politically impossible, nor because the "laissez-faire approach" was the most adequate solution to the physical problem. The conventional psychological, economic and political explanations, including the tragedy of the commons metaphor, tell us in various ways that we had good reasons not to solve the third climate dissonance through effective climate action. Yet, these conventional explanations overlook a crucial point: we did not reduce the third dissonance with serious climate action because doing this via tokenism was much easier – and it served most of us well until today. In this regard, decades of cognitive dissonance research give us one more relevant rule of thumb. The more tedious an action is and the smaller its effects, the more unlikely we use it as a mode of dissonance reduction. Vice versa, the less effort we put into what we do, the less we care about efficacy. Tokenism is a sophisticated defense exploiting exactly this. Since its main purpose is not to actually solve problems but to make us feel better, the fact that symbolic actions have at best small physical effects does not matter. This is why climate tokenism has been a full success, at least in the short term, and that's all that mattered so far.

If you disagree that industrialised countries could have done more to reduce the action-efficacy dissonance physically, defense mechanisms would have been the only way to resolve it. The core aspects of my theory would apply as explained, with one difference only: we would have had no other choice but to deceive ourselves. I say we had a choice and we opted for the easier way out. While adequate climate action would have been tedious, in particular because it would have required interfering with free markets and free trade, two of the main political priorities of our time, tokenism ways none of that. Howsoever, the fact of the matter is that we have reduced also the third climate dissonance with readily available psychological "solutions", almost effortlessly and very successful.

Isn't it ironic that a theory that started with a cult struggling with its false doomsday prediction is now vital to understand how we struggle with a doomsday-like threat, but now coming from mainstream science around the world? Isn't it ironic that the Clarion cult was unable to face the continuous reality after their false doomsday prediction, while our societies have been unable to face the increasingly disruptive climate reality, correctly predicted by mainstream science? Either way, reality is often a major inconvenience that threatens our wellbeing, but luckily we have our ways and means to escape the dissonances it throws at us. As Vaillant notes, "[d]efenses creatively rearrange the sources of conflict so that they become manageable".[109]

Since all three climate dissonances are difficult to reduce physically, it should not come as a surprise that we have made extensive use of creatively rearranging the sources of conflict for decades. The easier it is to reduce dissonances psychologically instead of physically, the less likely real solutions are. As the social psychologists Gawronski and Brannon put it in their disciplinary jargon, "[t]o the extent that aversive feelings of dissonance can be reduced without resolving the underlying inconsistency, any downstream reactions aimed at restoring consistency may become unnecessary from an emotion-regulation point of view."[110] This is exactly what Greta Thunberg senses when she says in simpler yet much more powerful words: "The politics needed does not exist today despite what you might hear from world leaders. And I still believe that the biggest danger is not inaction. The real danger is when politicians and CEOs are making it look like real action is happening when in fact almost nothing is being done apart from clever accounting and creative PR."[111] Based on the evidence collected here, I agree that pretending to solve the climate crisis is worse than doing nothing because this is how we have thwarted effective solutions for decades while most people made themselves believe we are doing a good job.

Although denial, repression, rationalization and tokenism are four very different defenses, they have more in common than what meets the eye. Unlike effective climate action, they are all solely in our hands, come to us almost naturally in disturbing situations, and they effectively reduce anxiety triggered not only by the fourth but by all climate dissonances. "If defense mechanisms are lies we tell ourselves to avoid pain, it's because we're afraid of feeling that pain. Of course we are!", as psychotherapist Joseph Burgo puts it.[112] Thanks to powerful defenses we were able to protect our mental well-being while enjoying our fossil-fueled comfort zone, or as Per Espen Stoknes put it: "The self works hard to undermine whatever it perceives as a threat, and identity easily eats reality for breakfast."[113]

As noted already, defense mechanisms may look like controlled and physically demanding evasive maneuvers of a soccer player, yet they have more in common with an opossum skillfully and effortlessly playing dead. Whether we have played dead by repressing or denying the climate crisis or we have avoided adequate climate action by collectively cultivating climate tokenism, both was skillful and comparatively effortless. In this light, resolving our climate dissonances psychologically instead of physically was not an accidental choice but the most convenient way to deal with the problem, the path of least resistance. In the honest words of a Norwegian teacher, quoted by Kari Norgaard in her seminal study on everyday repression and denial in times of climate crisis, the troubling climate dissonances and our psychological ways out can be summarized as follows: "We live in one way, and we think in another. We learn to think in parallel. It's a skill, an art of living".[114]

As inadequate pollution reductions around the world suggest, this art of living worked well for most people – at least until 2019. Since then, a strengthened climate movement succeeds to disturb our collective complacency about the climate crisis, also by calling out instances of climate tokenism. With the help of young activists, the cruel reality climate scientists have communicated for decades finally made its way through our collective firewall, at least partially. For the first time in the history of climate politics, the only way out of both, anxiety triggered by climate dissonances and the underlying physical problem, came within reach. This, however, is another story to be explored later.

So far, I have introduced defense mechanisms as powerful responses to climate dissonances as if they followed a particular matching order, for example the one summarize in table 2. This is what scientists often do to make sense of messy realities. Yet, in our highly dynamic psychosocial realities,

neither the four climate dissonances on the one hand, nor our responses on the other can be separated easily from their kin. Instead, we can imagine them as threads of stressors and protectors weaving into each other. The complex texture they create shape not only our states of mind, but also our actions in all societal domains. When it comes to climate dissonances, we don't have to go through them one by one to understand that repression and tokenism are the easier ways out than effective climate action. We knew that as soon as we understood the global nature of the problem.

*Table 2: Matching climate dissonances with defense mechanisms*

| Climate dissonances | What the dissonance is about | Defense mechanisms |
|---|---|---|
| Historic:<br>Science-senses | What science told us was not what we sensed for a long time | Denial of climate science, repression of weather extremes |
| 1st:<br>Cause-effects | Our fossil-fueled lifestyles cause global heating and local extreme weather impacts | Rationalization of fossil-fueled lifestyles, repression or denial of global and/or local effects |
| 2nd:<br>Intention-action | We intend to reduce pollution but we keep burning fossil fuels | Tokenism, rationalization and/or repression of inadequate action, denial |
| 3rd:<br>Action-efficacy | Climate actions have no effect on the global climate, unless … | |

For defense mechanisms, psychoanalysts assume a similar connectedness that makes it hard to separate them from each other. Anna Freud formulated this as follows: "If you look at them microscopically, they all merge into each other. You will find repression anywhere you look. […] The point is, one should not look at them microscopically, but macroscopically, as big and separate mechanisms, structures, events […]. [Then] the problem of separating them theoretically becomes negligible. You have to take off your glasses to look at them, not put them on."[115] This may be due to the fact that single defense mechanisms are often not enough to protect us against inconvenient truths. For her father Siegmund Freud, repression was one of the first responses to stressors. When we know without knowing what stresses us, we call it successful repression. "However, repression is often not totally successful. Repressed contents reveal themselves through […] derivatives. Repression may be only partial. The impulse itself may be ignored, or the stimulating object may become unseeable […], or what is seen or felt is plainly declared as not being meaningful. All these can be comprised under the terms denial, disavowal, or negation."[116] In other words, when the leakages of repression bother us too much, we reinforce our defense with whatever works, for example by rationalizing what we do or by adding denial. As soon as we deny a threat there is no need to repress it anymore. We made it go away completely, not by ignoring but by negating it. In this sense, all kinds of defenses can support each other in our attempt to reduce dissonances.[117] Similar interactions can be found between denial and tokenism. As the psychotherapist Charles Brenner points out, "every defense denies something": "Denial, in the colloquial sense of the word, is intrinsic to all defense".[118] This is why tokenism can overcome even the third climate dissonance between action and a lack of efficacy: it comes with a good portion of denial that helps to hide how inadequate it really is.

What about those who think we can overcome the third climate dissonance with serious climate action? Isn't that another form of denial as long as others don't do the same and even serious climate action lacks efficacy? If an individual has stopped polluting the climate and is convinced that this makes a significant global difference it could be regarded as efficacy denial. Yet, most individuals are fully aware of their very small contribution but they do it anyway. In contrast to those who pursue tokenism they simply want to do the right thing, irrespective of what others do: cutting pollution. Doing this is as honorable and as far away from denial as people who stop being racists in a racist society.

But what about climate politics? Would it be efficacy denial when Europe or the US pursued serious climate action while China does not? No, for a simple reason. We never tried serious climate policies that include limitations for free trade and climate tariffs on imports. If the second and/or the third largest polluters in the world had adopted such policies, it would have decreased global emissions,

irrespective of what others were doing. Yet, European climate policies have been dominated by tokenism and American policies by denial and rationalization for too long, letting global emissions soar.

To sum up, our lives in unprecedented fossil-fueled comfort zones that led to an existential climate crisis have not been biased towards fossil fuels. We are still systemically addicted to fossil fuels and we found strongly motivated mechanisms to protect both, our mental well-being and our polluting lifestyles. How did we do this? By reducing unbearable climate dissonances psychologically instead of physically; by distorting a highly disturbing reality the way it suited us best in the short term. Not seeing the eminent role defense mechanisms have played in accelerating the climate crisis is not understanding it properly. Isn't it strange that even sociologists like Kari Norgaard saw this in her empirical work while mainstream psychology is still preoccupied with cognitive biases? In this light, the cognitive bias research suddenly appears in a recursive way: could it be that the failure to appreciate the importance of defense mechanisms in mainstream psychology is itself a biased view of human nature?

Obviously, human evolution has created skillful mental mechanisms that help to keep us happy and healthy, even in the face of catastrophic threats. Except for situations characterized by acute danger, there is nothing bad, ignorant or apathetic about this as a first response, on the contrary. We have encountered severe climate dissonances and we have reduced them successfully with defense mechanisms because we cared about the underlying problem from the very beginning. As psychotherapist Renee Lertzman puts it, "people can care a whole lot and still do very little because a deep sense of fear and anxiety underlie our concern for the future. […] The question is not about a 'lack of care' but rather […], where does the care or concern go? How it is channeled and expressed?".[119] For denial, one of the defense mechanisms we employed to reduce our cognitive dissonances, the sociologist Kari Norgaard writes: it "can – and I believe should – be understood as testament to our human capacity for empathy, compassion, and an underlying sense of moral imperative to respond, even as we fail to do so."[120]

Yet, what can be healthy and adaptive for a while eventually turns into maladaptive routines when a serious problem remains unresolved. "When we disregard science in order to construct a reality that fits more into the way we want the world to be rather than the way it is, we risk outcomes that do not adhere to the laws of science."[121] In the climate crisis, this turning point creped upon us slowly over several years around the Millennium, when limiting global heating below 1.5 degrees would still have been quite easy if we began to decrease instead of increase carbon pollution. Denying, rationalizing or repressing that our economies and lifestyles violate basic laws of physics works for a while – until these laws strikes back. If we finally want to solve the problem, we have to understand how we have turned once vital defenses collectively into self-destructive traps – and how we can escape them.

## *2.7. Collective self-deception seen by others (including the Thunberg family)*

Although I thought otherwise when I started my research for this book in the summer of 2018, I am not the first to explain the persistent climate crisis with self-deception. Many scholars and activists who have worked on the topic for a while come to similar conclusions, yet most of them in less systematic ways. This section briefly summarizes how others view our collective self-deception as a root cause of the climate crisis. Although many of the quotes do not represent core aspects of the works reviewed here, they nevertheless show how widespread key aspects of my climate derangement theory are.[122]

The first work on self-deception in times of environmental crisis is an article by Harold Searles from 1972. In the same year the bestselling report "The Limits to Growth" has been published, Searles wrote "The current state of ecological deterioration is such as to evoke in us largely unconscious anxieties of different varieties that are of a piece with those characteristic of various levels of an individual's ego-development history. Thus the general apathy […] is based upon largely unconscious ego defenses against these anxieties". As Rene Lertzman adds after quoting Searles, "there is arguably more than meets the eye when it comes to 'apathy' and lack of response in the form of specific actions".[123]

In 1985, Daniel Goleman published a book with the telling title “Vital Lies, Simple Truths: The Psychology of Self-Deception”. Goleman works with three general premises that are also at the core of my analysis: “• The mind can protect itself against anxiety by dimming awareness. • This mechanism creates a blind spot: a zone of blocked attention and self-deception. • Such blind spots occur at each major level of behavior from the psychological to the social”. The book starts out with an environmental focus, but Goleman loses this focus when he goes through lots of material on mental stress on the one hand and ways to deal with it on the other. As a result, it is not more useful for explaining the climate crisis than many other books on self-deception in general. This quote from the introduction gives an idea what the book could have been for the climate crisis if it kept its environmental focus: “Our habits of consumption, on a worldwide scale, are destroying the planet's resources at a rate unparalleled in history. In effect, […] we live our lives oblivious to the consequences for the planet for our own descendents, of just how we live. […] And, for most of us, being oblivious to that relationship allows us to slip into the grand self-deception, that the small and large decisions in our material lives are of no great consequence”.[124]

Because the climate crisis is such a difficult problem, the climate communication expert George Marshall warns ironically: “Don’t even think about it”. Throughout his book with this title, he shows that the climate crisis is such a unique threat because “we all contribute directly through our own emissions and are therefore personally responsible for the ever-increasing costs for ourselves, our in-group, and our children and descendants. This moral challenge, combined with a sense of the relative powerlessness of individual action, helps mobilize a well-ingrained set of defense mechanisms that enables us to ignore the problem - both through personal disavowal and through socially constructed silence.” As a consequence, “we do not accept climate change because we wish to avoid the anxiety it generates and the deep changes it requires. In this regard, it is not unlike any other major threat. However, because it carries none of the clear markers that would normally lead our brains to overrule our short-term interests, we actively conspire with each other, and mobilize our own biases to keep it perpetually in the background”.[125] Spot-on.

In a similar book, the psychologist and economist Per Espen Stoknes explores “What we think about when we try not to think about global warming”. During this endeavor, he also comes across cognitive dissonances and defense mechanisms as one among many psychological explanations for the climate crisis. Since I discovered his work after I have established large parts of my climate derangement theory, I was surprised to find such an overlap with what I present here: „We all work and live based on the fossil energy that fuels our society. Along come some climate scientists. […] Those faced with such a challenge feel a need to defend their identity and lifestyle against the message that climate disruption is real, urgent, and caused by human fossil fuel use; they feel an inner need to explain it away. This defense can be achieved by targeting the messengers: ‘They’re obviously wrong.’ […] It would be easy to understand if this view were held just by oil workers and petroleum executives who wanted to defend their own jobs. But the need to remain innocent is much broader, extending to the many who feel that their way of life and core beliefs […] are threatened by ambitious climate policies.” Obviously, what Stoknes describes here resembles my second climate dissonance introduced above. By comparing cognitive dissonances about smoking and global heating, he also highlights several defenses (without naming them) that help to protect us against “vexing discomfort” and restore “a positive self-image”.[126] Although Stoknes is one of the few scholars who saw the role dissonances and defenses play in times of climate crisis, he did not elaborate this significant insight any further. This leaves plenty of space for me to dig deeper.

Stoknes explores “What we think about when we try not to think about global warming” based on psychological literature that focuses on individuals. Kari Norgaard analyses the exact same question empirically, but as a sociologist she takes defense mechanisms to the societal level. While living in the Norwegian village Bygdaby for a year, she found mainly repression, rationalization of inaction and tokenism, but also a bit of climate denial in the narrow sense. Since she subsumes all these defenses under the title “Living in Denial”, she uses the concept in the widest sense, more or less synonymous

with defense mechanisms in general.[127] The truly groundbreaking contribution of Norgaard's book is her analysis of what the sociologist Eviatar Zerubavel calls "the social organization of denial". She shows in detail how the collective use of individual defenses created a distorted climate reality that made adequate climate action impossible. What she describes "as 'climate denial' felt to people in Bygdaby (and, indeed, to people around the world) like 'everyday life.' Nonresponse to global heating was produced through cultural practices of everyday life", among them minimizing disturbing information and knowing without knowing, the classical definition of repression.[128]

As Norgaard notes early in her book, societies react similarly whenever they find themselves confronted with a reality too brutal to cope with consciously. The sociologist Stanley Cohen has documented respective "States of Denial" to deal with atrocities during and after wartimes, and the psychiatrist Robert Lifton coined the phrase "psychic numbing" for the collective repression of the Hiroshima bombings and the imminent nuclear threat during the cold war era.[129] In other words: What Norgaard describes for a small community in Norway has happened throughout the industrialized world for reasons explained above: It is one of our natural responses to overwhelming threats and anxiety, as individuals and as societies.

So far, I have reviewed contributions coming from climate psychologists, sociologists and communicators. With the moral philosopher Stephen Gardiner, I add another discipline that comes to very similar conclusions. He analyses the climate crisis as "A perfect Moral Storm" that intrigues us collectively into "buck-passing" inconvenient actions to future generations without acknowledging our immoral behavior: "We have, in elementary terms, 'fouled the nest.' We could clean it up—that would be the most direct approach, the one most likely to work – but so intent are we on continuing our messy habits, that we will pursue any means to avoid that, even those that impose huge risks on others". But how does he explain this? According to Gardiner, we "engage in willful self-deception and moral corruption", both endangering "the lives of future generations, the world's poor, and even the basic fabric of life on the planet".[130] Obviously, this and the way he explains self-deception comes very close to my work, with a crucial difference. Although I can recognize all key components of my climate derangement theory in Gardiner's writing, he presents them rather implicitly in philosophical terms. In the following quote, Gardiner implicitly notes the importance of cognitive dissonance: "Acknowledging that one is engaging in intergenerational buck-passing is morally uncomfortable, especially when the consequences of such buck-passing may be severe, or even catastrophic, for the victims. Presumably, this is discomfort that we would like to avoid. Given this, if the current generation engages in buck-passing, it will welcome ways to obscure what it is doing. […] This might be achieved in a wide variety of ways."

When Gardiner explains how exactly we obscure our moral corruption, the notion of defense mechanisms is omnipresent, yet again only implicitly. He notes the importance of repression when he writes about distraction, "complacency, evasiveness, and opacity" as "serious vices".[131] More importantly, he recognizes the key role rationalization plays as a defense: "if the current generation favors buck-passing, but does not want to face up to what it is doing, it is likely to welcome any rationale that appears to justify its behavior. […] In other words, the perfect moral storm may work to subvert our understanding of what is at stake."[132] In this light, the enormous complexity of global heating is no longer a burden that makes our lives more difficult, but it "may turn out to be perfectly convenient for us, the current generation"[133] because it has served our selection and confirmation biases well for decades. Apart from repression and rationalization, Gardiner also notes that we mask our moral corruption with climate tokenism: "In a perfect moral storm, we should expect 'shadow solutions' to the problem at hand that reflect only the limited concerns of those with the power to act. Such 'solutions' are morally problematic. Not only are they typically inadequate as a matter of substance, but they also create the dangerous illusion of real action, and this serves as a distraction through which continued buck-passing can be perpetrated."[134] This is clearly about tokenism – and it could have been written by Greta Thunberg years later.

Taken together, these strategies of self-deception help with both, hiding and sustaining what Gardiner calls out as moral corruption in times of climate crisis: "If it can avoid the appearance of overtly

selfish (or self-absorbed) behavior, an earlier generation can take advantage of the future without the unpleasantness of admitting it – either to others, or, perhaps more importantly, to itself."[135] Overall, his analysis is closer than any other to what I call the climate hypocrisy trap. Yet, although Gardiner refers to the perfect moral storm also as hypocrisy, he does not get to the psychological bottom of it. What I add here is that the perfect moral storm is first and foremost a perfect psychosocial storm, rampaging between the lows of stressful climate dissonances and the highs of virtuous defense mechanisms cultivated collectively.

Apart from social science scholars and philosophers, many climate scientists and climate activists also have a clear understanding of our collective self-deception in times of climate crisis. While climate scientist Michael E. Mann fails to see that deception of the fossil fuel industry succeeded because it has exploited collective self-deception, he criticizes others who see the big picture much clearer, among them his climate scientist colleague Kevin Anderson. Since many years, Anderson criticizes time and again that we are collectively "in denial of the mitigation repercussions of the science". We have "all been party of a greening of business as usual. On mitigation and particularly cutting emissions in line with Paris, we're all players in a grand unifying delusion – we've become mitigation deniers". For Anderson, this kind of "mitigation denial" is more damaging to our prospects than the conventional denial of climate science because the latter is practiced only by a few while "mitigation denial" is omnipresent.[136] About the alleged climate policy leaders Sweden and UK, he notes together with Isak Stoddard, "peel away the layers of obfuscation and even these 'climate leaders' are actively choosing to fail – and by a huge margin. […] For thirty years we've swallowed the delusion offered by the blue pill, nonsense models of utopian tech and cheery tales of green growth. But in 2020, even the blue pill dealers are having their doubts. Perhaps now is the time to embrace the unpalatable reality revealed by the red pill?". For those not familiar with the pill metaphor. It has been made famous by the late-1990s movie "The Matrix", and it refers "to a choice between the willingness to learn a potentially unsettling or life-changing truth, by taking the red pill, or remaining in contented ignorance with the blue pill".[137] In the climate crisis, it is about going "[b]eyond a climate of comfortable ignorance" by finally delivering "a deep and profound transformation towards a progressive, sustainable and zero-carbon future".[138] A few years earlier, Kevin Anderson explicitly pointed to "an almost global-scale cognitive dissonance with regard to acknowledging the quantitative implications" of climate science findings. Since not even scientists had the courage to say it as it is, he concluded, "[w]e simply are not prepared to accept the revolutionary implications of our own findings, and even when we do we are reluctant to voice such thoughts openly".[139]

With the evidence presented in this book I can confirm Kevin Anderson's assessment, in particular "the global-scale cognitive dissonance" we have been unable to face, in particular as societies as a whole. Yet, does this really qualify as a "grand unifying delusion"? Colloquially speaking (and this is what Anderson does), yes. The way how Webster's Dictionary defines delusion matches perfectly with what Anderson criticizes: "a false conception and persistent belief unconquerable by reason in something that has no existence in fact."[140] Technically speaking, not quite. According to the Glossary of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) of the American Psychiatric Association, a delusion is a "false belief based on incorrect inference about external reality that is firmly held despite what almost everyone else believes and despite what constitutes incontrovertible and obvious proof or evidence to the contrary. The belief is not ordinarily accepted by other members of the person's culture or subculture (i.e., it is not an article of religious faith)."[141] Since what I analyze here became part of our culture, almost as an article of religious faith of neoliberal capitalism, it does not qualify as a delusion in the strict sense of a mental disorder. Thus, I refer to our predicament in times of climate crisis as collective self-deception, or, deliberately ambiguous, as great derangement.

The speeches of Greta Thunberg demonstrate that she also sees the omnipresent self-deception in times of climate crisis quite clearly. In the book "Our house is on fire", her mother writes, "Greta has a diagnosis, but it doesn't rule out the fact that she's right and the rest of us have got it all wrong. Because however much she tried she could not work out that equation that all the rest of us had already solved,

the equation that was the ticket to a functioning everyday life. She saw what the rest of us did not want to see. She belonged to the tiny minority who could see our CO2 emissions with their naked eye. […] She was the child, we were the emperor. And we were all naked."[142] For a teenager, this is an extraordinary ability facilitated by her character. Thanks to her Asperger's syndrome, Greta Thunberg struggled with our collective self-deception already at the age of eight around 2011, a time very few even sensed it. Since then, she learned to see what was hidden in plain sight, like an ethnographer visiting a foreign tribe that performs self-destructive routines without noticing it.

Scene 44 in the Thunberg family's book "Our House is on Fire" has the telling title "Lip Service". It conveys this extraordinary ability quite well when Greta compares easy to see climate denial with almost invisible but omnipresent climate tokenism most of us are complicit in: "'At least Donald Trump is honest. He prioritizes new jobs and more money and blows off the Paris Agreement so everyone calls him an extremist. And rightly so, but we're all doing the exact same thing,' Greta says. We're watching the party leaders' debate on Swedish television. […] 'Our emissions are among the highest in the world,' Greta continues, upset. 'And now almost all the party leaders are standing there saying that we mustn't focus on our own emissions but instead help neighbouring countries who are evidently worse than we are. Even though our ecological footprint is so much higher than theirs! […]'. And the programme hosts aren't saying anything, because they probably don't know that we've exported our emissions to other countries. No one knows, because no one talks about it. Everyone complains about Trump's alternative facts but we're probably even worse than he is, because we fool ourselves into believing that we're doing good things for the environment.' The next day the newspapers do a fact check of what was said during the debate. But what is checked is quite different from what we talked about – namely the rate at which the ice is actually melting. Is it really 200,000 m2 of ice that is melting every month or is it possibly a little less? No one is disturbed by the fact that most of the party leaders understate Sweden's emissions by more than half. Greta reads the article at the breakfast table and comments: 'One day we miss our emissions targets by miles. The next we're going to expand all our airports, triple the number of passengers and build climate-smart highways. They say that climate-change deniers are idiots. But everyone is a climate-change denier. Every single one of us'".

Scene 45 in the same book adds an explanation for why we do this, and it comes very close to my view on climate dissonances summarized above: "our climate and environmental struggle has got nothing to do with rescuing the climate – we're fighting for the possibility to keep on living the way we do." Apart from the fact that most people are climate hypocrites rather than climate deniers, these quotes capture key findings of my book quite well. Since it took me more than 20 years of research to come to these conclusions, I find this remarkable, even admirable.

Interestingly, also the Thunberg parents learned to see their own and the collective self-deception around them, but of course not without strong interventions from their daughters. The parents' view on their recent family history tells us a lot about how most of us deal with disturbing climate dissonances: "We weren't that concerned when it came to the environment. We thought it was being looked after. We were wrong. We thought we would solve everything with technological development. We were wrong. […] For us, that parallel picture [of a high-emission lifestyle on the one hand and the climate crisis on the other] developed so slowly that it almost went completely unnoticed. The fact that something in our everyday life was seriously wrong. It actually wasn't even that hard to see. Just very uncomfortable. […] It took us four full years to grasp that image; the image of a skewed whole that would go on to change our lives completely. […] We were challenged by our children and in the end we ran out of arguments and now we're rapidly running out of time."[143]

In other words, first Greta first disturbed the Thunberg families' psychological solution to stressful climate dissonances, then something similar happened around the world. Greta's remarkable ability to not only see but also articulate our collective climate self-deception eloquently, facilitated a global movement that now calls out instances of climate hypocrisy on a daily basis. The sentence Greta Thunberg repeats most often is "listen to the science". As a scientist I could not agree more – but I want to add: scientists, listen to Greta Thunberg because she understands the climate crisis better than most people do, including researchers.

## 3. Self-deception, metaphorically speaking: summary and outlook

The deranged climate reality we have created is both, a physical threat to our fossil-fueled comfort zones and a psychological threat to our mental well-being because it questions what we do on a daily basis: burning fossil fuels to keep our comfort zone as it used to be. The resulting cascade of disturbing cognitive dissonances is our alarm system, signaling that something is seriously wrong. Yet, instead of listening to the alarms and correcting our wrongdoing by refurbishing our comfort zones, we have learned to tone them down, normalize the abnormal and continue with business as usual, almost. We did this by putting on armors, ranging from iron armors of denial to fabric armors of repression, complemented by helmets of rationalization and protective shields of tokenism, all of them tempered and chrome-plated with dozens of cognitive biases. These shiny armors have protected many of us not only from the unnervingly frequent alarms and from most inconveniences climate reality began throwing at us, but also from changing our ways of live.

The armors we have put on individually have been reinforced collectively, now resembling societal fortresses of self-deception with firmly locked gates. We have built these fortresses around our fossil fueled comfort zones to protect them from substantial change. Most lords were even able to build additional fortifications around the already strong fortresses of self-deception. While the old structures protected existing fossil-fueled comfort zones, additional city and boundary walls made even new airports, runways, motorways and pipelines possible.

Since we cannot sense the disturbing climate reality on our own, our alarm system is fed with information coming mostly from couriers. They transmit the alarms sounded by scouts who either use watchtowers or who leave the fortress for occasional field trips. Since all couriers and most scouts live their lives within the fortress walls, they have often moderated increasingly loud alarms coming from some of the scouts on field trips. Many couriers didn't care to distinguish between solid evidence coming from reliable scouts and false all-clear signals coming from a fake alarm system, financed by merchants who got rich by supplying fossil fuels to the now fortressed comfort zone. Since the merchants feared that their sales would dwindle if their customers listened closely to the real alarms, they did everything to distract them.

The fake alarm system is no surprise because merchants have done this before. The actual surprise is how successful their deception was for decades. Although their fake alarm system was staffed with heavily armored charlatans coming from the darkest places of the fortress of self-deception, many couriers, residents, merchants and lords preferred their false all clear signals over credible alarms. How was this possible? Certainly not because their fake alarm system mimicked the real one so well that the difference was invisible. It was plain to see for everyone who wanted to that the armored charlatans were part of a sedative system mimicking an alarm system. The main reason for their success was that their messages met exactly the needs and wants of virtually anyone behind the fortress walls: "everything is fine, there is no need to change anything now, enjoy your energy-rich lifestyle". Who would not like this comforting message, apart from environmentalists refusing to wear armors and scientists keeping touch with climate reality? Outside the fortress of self-deception, the fake alarm system would have been rejected swiftly. A vast majority would have dismissed its charlatans and their messages as dangerous, as it has dismissed deception by tobacco merchants and others before.

Whenever climate reality breached the fortresses of self-deception with unprecedented heat, droughts, forest fires or floods, those wearing iron armors of denial regularly claimed that there is nothing to worry about because they have seen all of this before. While a few couriers and residents believed them, most others couldn't help but notice that something is seriously wrong. Yet, they found it most convenient to further strengthen their fabric armors of repression, their helmets of rationalization, their shields of tokenism, or their collectively built fortress walls, whatever worked to sustain their fossil-fueled comfort zones.

Since most real alarms have been confirmed by climate reality, an increasing number of people, in particular youths, have realized that alarms are vital for their survival, that their armors have become death traps, and that some of the gates firmly shut a long time ago can be used as emergency exits.

When they took off the armor they inherited from their parents and walked out of the fortresses of self-deception, they made two crucial discoveries. First, they recognized that the climate reality outside of the fortress walls is much worse than they expected. Second, and more importantly, they learned that the protective equipment they left behind works only in one direction: it blocks the distressing climate reality out but it does not lock people in, on the contrary: everyone is free to take off their death-trap-armor. While they found themselves still locked into fossil-fueled comfort zones, they learned that they are free to find this deeply problematic – and that this is a prerequisite for finally demanding substantial political changes.

If we really want to solve the climate crisis, a majority of people has to understand that the worsening climate reality turned their armors and fortresses from a once protective equipment into a death trap a long time ago. Either a majority is willing to overcome denial, rationalization, repression and tokenism or we will keep fooling ourselves with climate illusions and ineffective tokenism. Either we finally face climate reality and learn to be honest to ourselves about what needs to be done or we will turn the climate crisis into a global catastrophe. In short, not dismantling the fake alarm system but recognizing and leaving our fortress of collective self-deception is the often-overlooked way out of the climate crisis. Once a majority is willing and able to do this, the fake alarm system will crumble alongside with token climate actions.

Of course, this is easier said than done. How can we leave a fortress of self-deception behind that most of us have built over decades for good reasons? I regard this question as one of the biggest yet hardly explored conundrums of our time. For now, I want to give just a few metaphorical answers, to be revisited at the end of the book.

First and foremost, taking off armors and leaving the fortress of self-deception requires insight. As the term suggests, it has to come "from the inside", but of course societal influences play a key role in making this happen. Until the late 2010s, however, most societal influences did the exact opposite: they have strengthened our fortifications, protecting us from inconvenient truths. Since then, however, many have taken off their armor and left the fortress, signaling how a solution may look like.

To end self-deception, we must not attack the fortress walls with a countervailing force in the sense of a "climate war", as some suggest, on the contrary. The more we bombard the fortresses with heavy artillery, the more those still inside will strengthen their defenses. Instead, a growing social movement can redefine social and political norms with decisive force, as the climate movement began doing around the world in the late 2010s. Apart from highlighting the repressed climate reality, it ought to call out instances of self-deception as what they are: inadequate responses that make the problem worse. Those who left the fortress of self-deception make it very clear: as long as people can justify frequent flying or enjoy the use of gas-guzzling SUVs, they have not grasped the threat of the climate crisis. Once a majority recognizes these and other excessive instances of fossil fuel burning as deeply immoral, we will have come to terms with climate reality and subsequent climate dissonances.

So, how can the climate movement outside the fortress of self-deception achieve its goals best? Instead of firing big guns to the fortress walls, knocking on some of the closed gates of self-deception and convincing some of the couriers seems most promising. Instead of attack or assault we need empathy and persuasion with solid science. The science is as much about the magnitude of the problem as it is about the need for a moral revolution, redefining what is regarded as good and bad. As the philosopher Kwame Appiah has put it with one of his book titles, it is about redefining "The Honor Code" of our societies. Thus, our societal struggle in times of climate crisis resembles a citizens' movement driven by insight and moral, very similar to the movements that have abolished slavery in the British empire during the 1830s, state-sanctioned racism in the US in the 1960s, and Apartheid in South Africa in 1990. Only when we succeed in decarbonizing "The Honor Code" of our societies, fossil fuel interests, their attempts to deceive us and the politicians as well as policies still supporting them will lose ground. On this ground, governments will be able to switch from mainly symbolic to ambitious climate policies that put the decarbonized honor code into practice for all.

This revolution has been in the making for decades, yet it gained decisive force only in the late 2010s. Once it will be completed, we will look back upon our current climate pollution with a similar disbelieve

as we now look back on the days of slavery and state-sponsored racism. As the sociologist Zerubavel emphasizes by using a less dramatic example of societal change, "[n]oticing and ignoring are not just personal acts, since they are always performed by members of particular social communities with particular social conventions of attention and communication. In fact, the way we focus our attention is often grounded in highly impersonal social traditions of paying attention. […] The social underpinnings of what we notice and ignore are also evident from the way it shifts historically. Only a few decades ago smoking, for example, was still considered a 'background' activity that, like doodling or drinking coffee, others might not even notice".[1] The time will come when we will look back on our current energy consumption in awe and disbelief.

The more we know about our fortresses of self-deception, the easier it is to first recognize and then dismantle them, from the inside and from the outside. When self-deception is exposed to scientific and, even better, public scrutiny, defense mechanisms have an increasingly hard time operating in the dark of our unconsciousness. Once in the spotlight, self-deception can be recognized by everyone committed to solve the climate crisis. This is the practical relevance of this book.

Nevertheless, some will still struggle to see what they have been hiding from themselves and from others for so long. As Goleman puts it, "self-deception, by its very nature, is the most elusive of mental facts. We do not see what it is that we do not see."[2] Luckily, our armors and fortresses of self-deception are not uniform but diverse. While it is difficult to see one's own protective equipment, we can see the arrangements of others – if we want to, and as long as they are a bit different to ours. As Vaillant puts it, "[d]efenses often appear odd or startling to everyone but the user."[3] This is why many people can easily recognize primitive types of climate denial and rationalization, used most excessively in the US and in Australia, as odd.

In contrast, repression and tokenism, the defenses dominating the European response to the climate crisis, are more difficult to see. While the collective repression of the climate crisis has always been quite obvious for experts working on the problem,[4] seeing and conveying inadequate climate actions as tokenism is the hardest part because this is one of the most sophisticated and subtlest defense mechanisms we got used to over time.

Who else should be able to see climate tokenism easily, apart from climate activists such as Greta Thunberg and a few researchers on field trips outside of our fortresses of self-deception, such as Stephen Gardiner or Kevin Anderson? The answer is simple, yet surprising: climate crisis deniers who deny the very existence, the human causes or the severity of global heating criticize all kinds of climate tokenism frequently, simply because they are sitting behind a very different fortress of self-deception (while they are often right about corporate and political climate hypocrisy, they are usually wrong about individuals because their attacks ignore systemic constraints and have one purpose only: damaging credibility). Since I realized this, I follow some of them on Twitter. Ironically this helped me finding some of the examples of corporate and political climate hypocrisy included in this book.

For everyone else, climate tokenism is easiest to see when others use slightly different strategies. To increase their visibility, I will present many different examples of tokenism from all societal domains around the world. When we can recognize at least some parts of the protective equipment we use collectively, this can help to understand one's own self-deception.

How can you tell how close your view of the climate crisis is to climate reality? Here is my rule of thumb for your self-assessment: When you think that the majority of deeply concerned scientists is exaggerating and the problem is not that bad, or when you accept the problem is bad but you are convinced we are doing (or will do) a decent job in solving it, you have clearly deceived yourself. This is not my opinion but a fact-based assessment because neither of the two interpretations is in touch with the climate reality as depicted by mainstream science (and as summarized in section 2). Most scientists agree that the climate crisis is one of the biggest problems humankind has ever created, gets alarmingly worse every year, and is handled in totally irresponsible ways by most governments around the world. Obviously, this reality is hard to take in, but unless we face it unfiltered we will not be prepared to prevent the worst.

So far, my analysis focused on cognitive dissonances and defense mechanisms remained abstract. The still missing parts of my climate dissonance theory will turn the focus around. They will analyze the mechanisms that helped us to reduce climate dissonances without actually solving the underlying problem. The many types and examples of climate denial, rationalization, repression and tokenism I will present can help to see and finally overcome the deadly traps they have become a long time ago. This applies at least to all those determined to solve the problem. Those not yet ready to face climate reality will cling to their protective fortifications – perhaps until the reality they are unable to face bombards them with undeniable impacts. Meanwhile, they will find plenty of opportunities to agitate themselves, and to attack the messengers for spreading inconvenient truths, involuntarily confirming what I write about them here: if they really didn't care about "the climate hoax" they would ignore it, but of course they care deeply. It's all about cognitive dissonances, stupid.

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**Footnotes chapter 1:**

[1] Robert Walker, quoted in Rich, N. (2019): Losing Earth, section 8.
[2] Klein, N. (2014): This changes everything, 64.
[3] Gardiner, S.M. (2011): A Perfect Moral Storm, 8 (Mobi).
[4] Burners-Lee, M. & Clark, D. (2013): The Burning Question, 23 (Mobi).
[5] Rich, N. (2019): Losing Earth, afterword (Mobi).
[6] https://twitter.com/R_Steurer/status/1426189766685560832; https://www.linkedin.com/posts/laszlo-varro-57123b3_global-co2-emissions-in-2019-analysis-activity-6632918079586258944-sSDB/, 13 August 2021.
[7] https://ourworldindata.org/emissions-by-fuel, 12 April 2021.
[8] McKibben, B. (2019): Falter, 17 (Mobi).
[9] McKibben, B. (2019): Falter, section 6. For statistics, see https://www.eia.gov/todayinenergy/detail.php?id=40973, 5 December 2020.
[10] https://www.theguardian.com/environment/2016/nov/22/nasa-earth-donald-trump-eliminate-climate-change-research; see also https://skepticalscience.com/Trump-NASA-whos-really-politicising-climate-science.html, 5 December 2020.
[11] https://climateemergencydeclaration.org/climate-emergency-declarations-cover-15-million-citizens/, 14 February 2020.
[12] Thunberg, G. (2019): No one is too small to make a difference; Unpopular.
[13] Thunberg, G. (2019): No one is too small to make a difference; Unpopular.
[14] Dodds, J. (2011): Psychoanalysis and Ecology at the Edge of Chaos, 44.
[15] Stoknes, P.E. (2015): What we think about, 129 (Mobi). See also Norgaard, K. (2011): Living in Denial, 2ff, 64-70.
[16] When I write about "we" I mean a majority of people in industrialized countries. I speak of "we" to emphasise that the climate crisis is not caused solely by a few bad perpetrators (such as Big Oil), but also by a majority of people who were at least complicit in making adequate mitigation impossible.
[17] Translation of a well-known German phrase ("weil nicht sein kann, was nicht sein darf") from the poem "The impossible fact" by author Christian Morgenstern, https://www.babelmatrix.org/works/de/Morgenstern%2C_Christian-1871/Die_unmögliche_Tatsache/en/32691-The_Impossible_Fact, 27 Feb 2020.
[18] Hallinan, J. (2014): Kidding Ourselves, 5 (Mobi).
[19] Ariely, D. (2012): The (Honest) Truth about Dishonesty, 110 (Mobi).
[20] Cramer, P. (2006): Protecting the Self, 4. See also Trivers, R. (2011/2013): Deceit and Self-Deception; Cramer, P. (2000): Defense Mechanisms, 637f.
[21] Burton, N. (2019): Hide and Seek, 28 (AZW3). See also Kahn-Harris, K. (2018): Denial, 19 (AZW3).
[22] UNFCCC (2015): Adoption of the Paris Agreement, 2.
[23] Geden, O. (2016): The Paris Agreement, 793.
[24] Gardiner, S.M. (2011): A Perfect Moral Storm, 7 (Mobi). See also Marshall, G. (2014): Don't even think about it, 14 (Mobi), who states: "Understanding human responses to climate change is clearly becoming just as important as understanding climate change itself."
[25] Mann, M.E. (2021): The New Climate War, 287 (Mobi).
[26] Oreskes, N. & Conway E.M. (2014): The Collapse of Western Civilization, 51.
[27] Machiavelli, N. (1532/2010): The Prince, 64 (AZW3).
[28] Klein Salamon, M. & Gage, M. (2020): Facing the Climate Emergency, 28 (AZW3).
The denial campaign has been successful because it aligns with our desires and defenses. The oil industry is telling a story we all wish was true.
[29] https://theintercept.com/2018/08/03/climate-change-new-york-times-magazine/, 22 September 2021 (I thank Manuel Grebenjak for recommending this piece).
[30] This is why deception, self-deception, "live within a lie" and "living in truth" were key themes of the Czech writer and politician Vaclav Havel, see e.g. Havel, V. (1978/2018): The Power of the Powerless, 23 (quote, Mobi); Havel, V. (1986): Living in Truth.
[31] Poulson, B. (2018): On Mourning Climate Change; see also Dodds, J. (2011): Psychoanalysis and Ecology at the Edge of Chaos, 22f.

**Footnotes chapter 2:**

[1] Thunberg, G. (2019): No One Is Too Small to Make a Difference, 11 (Mobi).
[2] Burners-Lee, M. & Clark, D. (2013): The Burning Question, 17f (Mobi).
[3] Wrigley, E.A. (2010): Energy and the English Industrial Revolution, 25. For work-related issues of the Industrial Revolution, see Klein, N. (2014): This changes everything, 149-154.
[4] Burners-Lee, M. & Clark, D. (2013): The Burning Question, 18 (Mobi). For this and the following parts on economic growth, see Steurer (2001): Der Wachstumsdiskurs in Wissenschaft und Politik, Section 7.1.
[5] Wrigley, E.A. (2010): Energy and the English Industrial Revolution, 44.
[6] Wrigley, E.A. (2010): Energy and the English Industrial Revolution.
[7] Both quotes are from Klein, N. (2014): This Changes Everything, 26 (Jevons), 154.
[8] Shellenberger, M. (2020): Apocalypse Never, 148f (Mobi). See also Lomborg, B. (2020): False Alarm, 176 (Mobi).
[9] Smith, M.P.F. (2021): The Good Hand, Pos. 1942-1946 (Mobi).
[10] McKibben, B. (2019): Falter, 58 (Mobi).
[11] Dukes, J.S. (2003): Burning Buried Sunshine, 31.
[12] Burners-Lee, M. & Clark, D. (2013): The Burning Question, 20 (Mobi).
[13] Wrigley, E.A. (2016): The Path to Sustained Growth; Wrigley, E.A. (2010): Energy and the English Industrial Revolution. Note that "sustained growth", even if sustained over centuries, is not necessarily "sustainable growth" that is within the carrying capacities of the Earth's ecosystems.
[14] McKibben, B. (2019): Falter, 58 (Mobi).
[15] Robert Walker, quoted in Rich, N. (2019): Losing Earth, section 8.
[16] Rush Limbaugh, quoted in Kahn-Harris, K. (2018): Denial, 104 (AZW3).
[17] Festinger, L. (1957): A Theory of Cognitive Dissonance, 19.
[18] Gawronski, B. & Brannon, S.M. (2019): What Is Cognitive Consistency, 174f (first two parts of the quote) & 197 (last part of the quote; AZW3). See also Harmon-Jones E. & Harmon-Jones C. (2019): Understanding the Motivation, 141f (AZW3); Devine, P.G. et al. (2019): Moving Beyond Attitude Change, 445f.
[19] For an overview, see Norgaard, K. (2011): Living in Denial, 67f.
[20] Festinger, L. (1957): A Theory of Cognitive Dissonance, 16 (first quote), 183 (second quote). See also Gawronski, B. & Brannon, S.M. (2019): What Is Cognitive Consistency, 176 (AZW3); Cooper, J. (2007): Cognitive Dissonance, 6-10; Mills, J. (2019): Improving the 1957 Version of Dissonance Theory, 67f (Mobi); Tavris, C. & Aronson, E. (2020): Mistakes were made, 39 (Mobi).
[21] Lifton, R.J. (2017): The Climate Swerve.
[22] Cooper, J. (2007): Cognitive Dissonance, 3 (first quotes); Festinger, L. (1957): A Theory of Cognitive Dissonance, 5 (last quote). See also Aronson, E. (2019): Dissonance, Hypocrisy, 262 (AZW3).
[23] http://www-bcs.mit.edu/gallery/checkershadow, 26 May 2021.
[24] Trivers, R. (2011/2013): Deceit and Self-Deception, 25 (Mobi); Beattie, G. & McGuire, L. (2019). The Psychology of Climate Change, 23ff (AZW3).
[25] Brotherton, R. (2015): Suspicious Minds, 10f (Mobi).
[26] Haidt, J. (2012): The Righteous Mind, 8 (first quote), 71 (second quote, both Mobi).
[27] Brotherton, R. (2015): Suspicious Minds, 245ff (Mobi, emphases and paragraphs removed). See also Beattie, G. & McGuire, L. (2019). The Psychology of Climate Change, 26f (AZW3).
[28] Hallinan, J.T. (2014): Kidding Ourselves, 156f (Mobi).
[29] Brotherton, R. (2015): Suspicious Minds, 247 (Mobi). See also Haidt, J. (2012): The Righteous Mind, 97 (Mobi).
[30] Mele, A.R. (2007): Self-Deception unmasked, 32f; Ariely, D. (2012): The (Honest) Truth about Dishonesty, throughout the book, in particular 123-130 (Mobi); Heffernan, M. (2011): Willfull Blindness, 55 (Mobi).
[31] Kurzban, R. (2010): Why Everyone (Else) Is a Hypocrite, 127 (first example), 130 (Mobi).
[32] Hentschel, U. et al. (2004): Defense Mechanisms: Current Approaches, 6; Cramer, P. (2006): Protecting the Self; Gorman, S.E. & Gorman, J. (2016): Denying to the Grave, 160f.
[33] Cooper, J. (2007): Cognitive Dissonance, 4f (first quote); Tavris, C. & Aronson, E. (2020): Mistakes were made, 19 (summarizing quote).
[34] Festinger, L. et al. (1956/1988): When Prophecy Fails, 5.
[35] Hishinuma, E.S. (1987): Psychoanalytic and Cognitive Dissonance Theories, 163.
[36] In the words of cognitive dissonance researchers, this sounds a bit more complicated: "To the extent that aversive feelings of dissonance can be reduced without resolving the underlying inconsistency, any downstream reactions aimed at restoring consistency may become unnecessary from an emotion-regulation point of view." Gawronski, B. & Brannon, S.M. (2019): What Is Cognitive Consistency, 180 (AZW3). See also Burton, N. (2019): Hide and Seek, 24 (AZW3).

[37] Heffernan, M. (2011): Willfull Blindness, 55 (Mobi). See also Gawronski, B. & Brannon, S.M. (2019): What Is Cognitive Consistency, 181 (AZW3); Harmon-Jones E. & Harmon-Jones C. (2019): Understanding the Motivation; McGregor, I. et al. (2019): Dissonance Now, 233-239 (AZW3). Bardon, A. (2019): The Truth about Denial, chapter 1.

[38] Burgo, J. (2012): Why do I do that, Pos. 2094 (Mobi).

[39] Burton, N. (2021): Hide & Seek, 52 (AZW3). See also Gifford, R. et al. (2018): Understanding responses to climate change, 425 (Mobi); Tavris, C. & Aronson, E. (2020): Mistakes were made.

[40] Ariely, D. (2012): The (Honest) Truth about Dishonesty, 126f (Mobi).

[41] Vaillant, G. (1993): The Wisdom of the Ego, 135; Cooper, J. (2007): Cognitive Dissonance, 50ff; Devine, P.G. et al. (2019): Moving Beyond Attitude Change.

[42] Hishinuma, E.S. (1987): Psychoanalytic and Cognitive Dissonance Theories.

[43] Festinger, L. (1957): A Theory of Cognitive Dissonance. See also Hishinuma, E.S. (1987): Psychoanalytic and Cognitive Dissonance Theories, 173, who notes correctly: "although Festinger gave ample acknowledgement and citation to the originators of consistency theory […], this acknowledgement was not extended to the psychoanalytic literature despite the similarities noted herein. The practices of the disunified science did not call for noting these kinds of interrelationships across fields, problems, or subjects".

[44] Brenner, C. (1982): The mind in conflict.

[45] See for example Hentschel, U. et al. (2004): Defense Mechanisms (mentions cognitive dissonance once); Cramer, P. (2006): Protecting the Self; Burgo, J. (2012): Why Do I Do That? (both do not mention cognitive dissonance). While some books on cognitive dissonances recognize the importance of "emotion-focused coping", "defensive motivations" and "defensiveness", they usually ignore defense mechanisms. See e.g. Harreveld, F. van et al. (2012): The Dynamics of Ambivalence, 408f; Gawronski, B. & Strack, F. (eds.) (2012): Cognitive Consistency; Harmon-Jones, E. (ed.) (2019): Cognitive Dissonance (the latter mentions defense mechanisms twice en passant).

[46] Clayton, S. & Manning, C. (eds.) (2018): Psychology and Climate Change. For another example, see Beattie, G. & McGuire, L. (2019): The Psychology of Climate Change, 61 (AZW3). It briefly mentions "defensive avoidance ('too scary, don't think about it'), denial ('this won't happen to me') and reactance ('they're just trying to manipulate me')" without framing them as defense mechanisms - and without recognizing their significance for our predicament in times of climate crisis.

[47] Hentschel, U. et al. (2004): Defense Mechanisms, v (quote). See also Hishinuma, E.S. (1987): Psychoanalytic and Cognitive Dissonance Theories, 157-165.

[48] Vaillant, G. (1993): The Wisdom of the Ego, 106 (quote), 19f. See also Hoggett, P (2019) Climate Psychology, 9; Stoknes, P.E. (2015): What we think about; Hentschel, U. et al. (2004): Defense Mechanisms, v-vii.

[49] Gawronski, B. & Brannon, S.M. (2019): What Is Cognitive Consistency, 180.

[50] Hishinuma, E.S. (1987): Psychoanalytic and Cognitive Dissonance Theories, 157-165, 173.

[51] Vaillant, G. (2001): Defense Mechanisms, 3355.

[52] Vaillant, G. (1993): The Wisdom of the Ego, 18 (first quote); Vaillant, G. (2001): Defense Mechanisms, 3355 (second quote).

[53] Burgo, J. (2012): Why do I do that, Pos. 146, 206 (Mobi). See also Blackman, J.S. (2004/2005): 101 Defenses.

[54] Weintrobe, S. (2021): The Psychological Roots of the Climate Crisis, 25 (Mobi). On defense mechanisms and self-deception, see also Vaillant, G. (1995): The Wisdom of the Ego, 6-28.

[55] Vaillant, G. (1995): The Wisdom of the Ego, 138.

[56] Hentschel, U. et al. (2004): Defense Mechanisms: Current Approaches, 3-42. American Psychiatric Association (1994): Diagnostic and Statistical Manual of Mental Disorders, 751-757.

[57] Blackman, J.S. (2004/2005): 101 Defenses, X. See also Cramer, P. (1991): The Development of Defense Mechanisms, I-V. Cramer, P. (2006): Protecting the Self, 7f.

[58] Vaillant, G. (1995): The Wisdom of the Ego, 16 (quote), 28. Vaillant, G. (1977/1995): Adaptation to Life, 98.

[59] Gosling, P. et al. (2006): Denial of Responsibility, 731f.

[60] Tavris, C. & Aronson, E. (2020): Mistakes were made.

[61] Stoknes, P.E. (2015): What we think about, 103f (Mobi).

[62] Mele, A.R. (2007): Self-Deception unmasked, 16.

[63] Heffernan, M. (2011): Willfull Blindness; Trivers, R. (2011/2013): Deceit and Self-Deception; Hallinan, J.T. (2014): Kidding Ourselves; Gorman, S.E. & Gorman, J. (2016): Denying to the Grave.

[64] Stoknes, P.E. (2014): What we think about, 105f (Mobi).

[65] Cooper, J. & Stone, J. (1999): Cognitive Dissonance and the Social Group, 246 (references removed from the quote). See also Festinger, L. (1957): A Theory of Cognitive Dissonance, 2, 22.

[66] Conte, H.R. & Plutchik, R. (2004): The Measurement of Ego Defenses, 278. Although the authors find high scores for compensation as defense mechanism, they do so because they blend it together with identification

and use it rather in that sense ("There has always been a person whom I wished I were like"). For tokenism (and the low-cost hypothesis) in the sense used here, see American Psychological Association (2010): Psychology & Global Climate Change, 67.

[67] Gifford, R. et al. (2018): Understanding responses to climate change.

[68] Boag, S. (2015): Repression, defence, and the psychology of science, 247-250 (quotes within the quote are from Freud as referenced by Boag).

[69] Burton, N. (2021): Hide & Seek, 35ff (AZW3). Cooper, J. & Stone, J. (1999): Cognitive Dissonance and the Social Group, 239f.

[70] Zerubavel, E. (2015): Hidden in Plain Sight, 1f.

[71] Burgo, J. (2012): Why Do I Do That?, Pos. 2183 (Mobi).

[72] Vaillant, G. (1993): The Wisdom of the Ego, 29f. For further evidence on how defense mechanisms such as denial are often self-destructive, see Gorman, S.E. & Gorman, J. (2016): Denying to the Grave.

[73] Heffernan, M. (2011): Willful Blindness, 55 (Mobi).

[74] Cramer, P. (2006): Protecting the Self, 5. See also Vaillant, G. (1995): The Wisdom of the Ego; Vaillant, G. (1977/1995): Adaptation to Life.

[75] Stoknes, P.E. (2015): What we think about, 122 (Mobi). See also Burgo, J. (2012): Why Do I Do That?, Pos. 51, 163 (Mobi); Blackman, J.S. (2004/2005): 101 Defenses, 4f.

[76] Burgo, J. (2012): Why Do I Do That?, Pos. 163 (Mobi), Pos. 215ff (Mobi).

[77] Vaillant, G. (1993): The Wisdom of the Ego, 7.

[78] Cooper, J. & Stone, J. (1999): Cognitive Dissonance and the Social Group, 230 (first quote), 231 (second quote).

[79] Cooper, J. (2007): Cognitive Dissonance, 5.

[80] Festinger, L. et al. (1956/1988): When Prophecy Fails, 38f (emphasis deleted).

[81] Festinger, L. (1957): A Theory of Cognitive Dissonance, 188 (bullet point 1), 191ff (bullet points 2-4).

[82] Festinger, L. (1957): A Theory of Cognitive Dissonance, 193.

[83] Bandura, A. (2015): Moral Disengagement, 13.

[84] Appiah, K.A. (2010): The Honor Code; Norgaard, K. (2011): Living in Denial, 132ff.

[85] Zerubavel, E. (2015): Hidden in Plain Sight, 89. See also Bandura, A. (2015): Moral Disengagement, 89-94.

[86] For all three points, see Cooper, J. & Stone, J. (1999): Cognitive Dissonance and the Social Group, 232-237.

[87] Bandura, A. (2015): Moral Disengagement, 62f.

[88] Dorpat, T.L. (1989): Interactional Perspectives on Denial and Defense, 21.

[89] Vaillant, G. (1993): The Wisdom of the Ego, 478; Vaillant, G. (1977/1995): Adaptation to life, 358.

[90] Dorpat, T.L. (1989): Interactional Perspectives on Denial and Defense, 21, 32f; Armstrong, & Rustin, M. (2015): Social Defences Against Anxiety; Bardon, A. (2019): The Truth about Denial, 39-45 (AZW3).

[91] Cohen, S. (2001): States of Denial, 6-11 (first quote: 6), 64-68 (second quote: 66).

[92] Cohen, S. (2001): States of Denial, 124-139 (quotes: 124f). See also Norgaard, K. (2011): Living in Denial, 132ff.

[93] Zerubavel, E. (2006): The Elephant in the Room, 4.

[94] Zerubavel, E. (2006): The Elephant in the Room, 1-4.

[95] Zerubavel, E. (2006): The Elephant in the Room, 2f (first part), 71 (second part).

[96] Zerubavel, E. (2006): The Elephant in the Room, 2f (the quotes within the last quote are from Paul Krugman).

[97] Norgaard, K. (2011): Living in Denial, 134.

[98] Stoknes, P.E. (2015): What we think about, 105 (Mobi).

[99] Stoknes, P.E. (2015): What we think about, 102 (Mobi).

[100] Technically speaking, changing actions (or our cognitive representation thereof) is a sub-group of changing cognitions. However, since our (cognitive representations of) actions play a key role in solving the climate crisis, I distinguish them as a third category. See Gawronski, B. & Brannon, S.M. (2019): What Is Cognitive Consistency, 181 (AZW3).

[101] Stoknes, P.E. (2015): What we think about ..., section 5.

[102] Jamieson, D. (2017): Reason in a Dark Time, Pos. 2240-2243 (Mobi). See also Frantz, C.M. & Mayer, F.S. (2009): The Emergency of Climate Change.

[103] Stoknes, P.E. (2015): What we think about, 71 (Mobi).

[104] Stoknes, P.E. (2015): What we think about, 105ff (Mobi). See also Norgaard, K.M. (2011): Living in Denial, 86f.

[105] Norgaard, K.M. (2011): Living in Denial, 77f.

[106] Gifford, R.D. & Chen, A.K.S. (2017): Why aren't we taking action?, 167 (quote); American Psychological Association (2010): Psychology & Global Climate Change, 67; Bandura, A. (2015): Moral Disengagement, 380, 433-440.

[107] Stoll-Kleemann et al. (2001): The psychology of denial concerning climate mitigation measures, 112ff. See also Stoknes, P.E. (2015): What we think about, 136 (Mobi).

[108] Norgaard, K. (2011): Living in Denial, 67f, 83 (quote), 198; see also Kellstedt, P. et al. (2008): Personal Efficacy.
[109] Vaillant, G. (1993): The Wisdom of the Ego, 27.
[110] Gawronski, B. & Brannon, S.M. (2019): What Is Cognitive Consistency, 175 (AZW3).
[111] Quote from her COP25 speech in Madrid on 11 Dec 2020, https://www.rev.com/blog/transcripts/greta-thunberg-un-climate-change-conference-speech-transcript, 23 Feb 2020.
[112] Burgo, J. (2012): Why do I do that, Pos. 2690 (Mobi).
[113] Stoknes, P.E. (2015): What we think about, 125 (Mobi).
[114] Norgaard, K.M. (2011): Living in Denial, 5.
[115] Anna Freud in a letter to psychoanalyst Joseph Sandler, quoted in Vaillant, G. (1995): The Wisdom of the Ego, 137.
[116] Siegmund Freud, quoted in Wangh, M. (1989): The Evolution of Psychoanalytic Thought, 8.
[117] Blackman, J.S. (2004/2005): 101 Defenses, 7.
[118] Brenner, C. (1982): The Mind in Conflict, 77f. This is why he pleads to use denial in a narrow, psychoanalytical sense as the "defensive distortion" of "external reality". See also Vaillant, G. (1993): The Wisdom of the Ego, 65, who writes: "all defenses deny something".
[119] Lertzman, R.A. (2015): Environmental Melancholia, 5. See also Lertzman, R.A. (2012): The myth of apathy.
[120] Norgaard, K. (2011): Living in Denial, 61 (see also 8).
[121] Wolters, E.A. & Steel, B.S. (2017): When Ideology Trumps Science, Pos. 107 (Mobi).
[122] Additional references to self-deception in times of climate crisis can be found here: Hoggan J. & Littlemore, R. (2010): Climate Cover-Up, 206 ("We are all living a lie, all ambling along as if everything is going to turn out fine with the climate and the future, even if we currently find it 'impractical' to make any realistic gesture to ensure that that is so."; Mobi); ###
[123] Lertzman, R.A. (2013): The myth of apathy, 210 (AZW3).
[124] Goleman, D. (1985/1998): Vital Lies, Simple Truths, 22 (first quote), 11f (second quote).
[125] Marshall, G. (2014): Don't even think about it, 240 (first quote), 243 (second, Mobi).
[126] Stoknes, P.E. (2015): What we think about, 116 (first quote), 105 (second, Mobi).
[127] This is my interpretation based on Brenner, (1982): The Mind in Conflict, 77f.
[128] Norgaard, K.M. (2011): Living in Denial, 13 (first quote), 121 (second quote); Zerubavel, E. (2006): The Elephant in the Room.
[129] Cohen, S. (2001): States of Denial; Lifton, R.J. (1982): Indefensible Weapons; Lifton, R.J. (2017): The Climate Swerve.
[130] Gardiner, S.M. (2011): A perfect moral storm, 393 (first), 11 (second, both Mobi).
[131] Gardiner, S.M. (2011): A perfect moral storm, 242 (Mobi).
[132] Gardiner, S.M. (2011): A perfect moral storm, 45 (Mobi).
[133] Gardiner, S.M. (2011): A perfect moral storm, 59 (Mobi).
[134] Gardiner, S.M. (2011): A perfect moral storm, 76 (Mobi).
[135] Gardiner, S.M. (2011): A perfect moral storm, 48 (Mobi).
[136] https://www.sgr.org.uk/resources/turning-delusion-climate-action-prof-kevin-anderson-interview, 15 April 2021.
[137] https://en.wikipedia.org/wiki/Red_pill_and_blue_pill, 16 April 2021.
[138] https://theecologist.org/2020/jun/08/beyond-climate-comfortable-ignorance; see also https://twitter.com/KevinClimate/status/1202876894070394880;; https://www.theguardian.com/environment/2020/jun/26/leading-scientist-criticises-uk-over-its-climate-record; 12 April 2021.
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[140] Haidt, J. (2012): The Righteous Mind, 107.
[141] American Psychiatric Association (2013): DSM-V, 819
[142] Ernman, M. et al. (2020): Our house is on fire, Scene 13.
[143] Ernman, M. et al. (2020): Our house is on fire, Scenes 15, 14 and 15.

**Footnotes chapter 3:**

[1] Zerubavel, E. (2006): The Elephant in the Room, 35 (first part), 19 (second part).
[2] Goleman, D. (1985/1998): Vital Lies, Simple Truths, 12.
[3] Vaillant, G. (1993): The Wisdom of the Ego, 25.
[4] Norgaard, K.M. (2011): Living in Denial; Marshall, G. (2014): Don't even think about it.